CUCAMONGA VALLEY WATER DISTRICT

2020 URBAN WATER MANAGEMENT PLAN

APPENDICES

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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			
3610018	Cucamonga Valley Water District	48,293	47,059
	TOTAL	48,293	47,059
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: The "Volume of Water Supplied 2020" includes recycled water supplies of 1,038 AF for direct deliveries. 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)	
07/01	
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
Inland Empire Utilities Agency (IEUA)
NOTES:

Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	198,979	207,151	225,483	231,531	236,573	236,573
NOTES: The 2020 population was estimated based on SCAG population data (See Section 5.4.1). Populations from 2025 through 2045 were estimated based on the District's Land Use Development analysis (See Section 3.4.1). It is assumed that the service area will be build-out in 2040.						

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	24,267
Multi-Family		Drinking Water	4,064
Commercial		Drinking Water	1,978
Industrial		Drinking Water	2,097
Institutional/Governmental		Drinking Water	616
Landscape		Drinking Water	9,099
Sales/Transfers/Exchanges to other Suppliers		Drinking Water	0
Agricultural irrigation		Drinking Water	11
Losses		Drinking Water	3,806
Other		Drinking Water	83
		TOTAL	46,021

[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: Recycled water demands are provided separately in Table 4-3 and Table 6-4.

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		29,462	32,046	32,935	33,679	33,679
Multi-Family		4,713	5,126	5,269	5,387	5,387
Commercial		2,294	2,495	2,565	2,622	2,622
Industrial		2,432	2,645	2,719	2,780	2,780
Institutional/Governmental		714	777	798	816	816
Landscape		8,751	9,519	9,783	10,003	10,003
Agricultural irrigation		13	14	15	15	15
Losses		3,094	3,366	3,459	3,537	3,537
Other		96	104	107	110	110
	TOTAL	51,569	56,092	57,650	58,949	58,949

[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 4-3 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*	46,021	51,569	56,092	57,650	58,949	58,949
Recycled Water Demand[1] *From Table 6-4*	5,496	5,800	6,000	6,000	6,000	6,000
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]	4,458	4,000	4,000	4,000	4,000	4,000
TOTAL WATER USE	47,059	53,369	58,092	59,650	60,949	60,949

[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: "Optional Deduction of Recycled Water Put Into Long-Term Storage" includes recycled water which IEUA recharges in the Chino Basin for the benefit of its member agencies (including the District). The amount of recycled water recharged is credited to the agency's Local Supplemental storage account, less the storage loss.

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]
07/2015	2,598
07/2016	2,331
07/2017	2,534
07/2018	2,208
07/2019	3,806

[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 FY 2016-17 through FY 2018-19 were obtained from the annual AWWA Water Loss Audits (and based on the combination of apparent losses and real losses). Because the AWWA water loss audits were reported on a calendar year basis, half of the water loss during each calendar year was applied to the water losses for the corresponding fiscal year (to estimate the water losses for the entire fiscal year), pursuant to direction from DWR staff. The AWWA Water Loss Audit for calendar year 2020 will be prepared by October 2021. The "Volume of Water Loss" quantities for FY 2015-16 and for FY 2019-20 were estimated based on metered water production less metered water deliveries to customers.

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*	*290*	*232*
5 Year	*2004*	*2008*	*283*	

**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)*		
206	*0*	*206*	*232*	*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	Chino Basin	20,524	16,549	6,829	9,624	23,315
Alluvial Basin	Cucamonga Basin	7,627	8,379	6,707	3,259	3,618
	TOTAL	28,151	24,928	13,536	12,883	26,933
**** 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*
CVWD	Estimated	8,800	IEUA	RP-4	Yes	No
CVWD	Estimated	4,500	IEUA	RP-1	No	No
Total Wastewater Collected from Service Area in 2020:		13,300				

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

NOTES: CVWD's collected sewerage is sent to Inland Empire Utilities Agency for treatment. The total wastewater from CVWD is estimated based on the 2020 population and a wastewater generation rate of approximately 60 gallons of wastewater per person per day. The breakdown of the volumes of wastewater collected by RP-4 and RP-1 is estimated based on their geographical locations to CVWD.

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
RP-4	Santa Ana River	Santa Ana River		River or creek outfall	Yes	Tertiary	11,700	5,400	1,038	5,262	
						Total	11,700	5,400	1,038	5,262	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: RP-4 is located within the District's service area; however; the water reclamation plant is wholly owned and operated by IEUA. Information regarding "2020 volumes" is estimated based IEUA's Recycled Water Annual Report FY 2019-20. Recycled water volume (within the serviced area) is for fiscal year 2019-20. Because the District does not own the water reclamation plant, information regarding "Instream Flow Permit Requirement" is not available and is not applicable.

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:	Inland Empire Utilities Agency
Name of Supplier Operating the Recycled Water Distribution System:	Cucamonga Valley Water District
Supplemental Water Added in 2020 (volume) *Include units*	0
Source of 2020 Supplemental Water	N/A

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)	Schools, Parks, City Landscape	2,000	Schools, Parks, City Landscape	Tertiary	1,038	1,800	2,000	2,000	2,000	2,000
Golf course irrigation										
Commercial use										
Industrial use										
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)				Tertiary	4,458	4,000	4,000	4,000	4,000	4,000
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)										
				Total:	5,496	5,800	6,000	6,000	6,000	6,000
				2020 Internal Reuse						

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

NOTES: Golf course irrigation has reduced compared to the 2015 usage due to the conversion of the Empire Lakes Golf Course to mixed use development in 2016. The use of recycled water as groundwater recharge is permitted by the State Water Resources Control Board. Groundwater recharge includes recycled water which IEUA recharges in the Chino Basin for the benefit of its member agencies (including the District). The amount of recycled water recharged is credited to the agency's Local Supplemental storage account, less the storage loss.

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)	1,600	1,038
Golf course irrigation		
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)	4,200	4,458
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)		
Total	5,800	5,496

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

NOTE: Groundwater recharge includes recycled water which IEUA recharges in the Chino Basin for the benefit of its member agencies (including the District). The amount of recycled water recharged is credited to the agency's Local Supplemental storage account, less the storage loss.

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			
Retrofits	Retrofit landscape irrigation systems	Ongoing	300
New Connections	New connections at various sites	2030	300
		Total	600
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES:			

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						
Construct Well 48	No		Construct new Well 48 in the Chino Basin	2021	All Year Types	3,500
Construct Well 49	No		Construct replacement Well 49 in the Chino Basin	2023	All Year Types	2,000
Construct Well 50	No		Construct new Well 50 in the Chino Basin	2025	All Year Types	2,000
***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)	Chino Basin	23,315	Drinking Water	
Groundwater (not desalinated)	Cucamonga Basin	3,618	Drinking Water	
Surface water (not desalinated)	Cucamonga Canyon Tunnel Water	931	Drinking Water	
Surface water (not desalinated)	Deer Canyon	0	Drinking Water	
Surface water (not desalinated)	Day/East Etiwanda Canyon Tunnel Water	3,813	Recycled Water	
Purchased or Imported Water	Inland Empire Utilities Agency	14,343	Drinking Water	
Recycled Water	Inland Empire Utilities Agency	1,038	Recycled Water	
Recycled Water	Inland Empire Utilities Agency (Groundwater Recharge)	4,458	Recycled Water	
	Total	51,516		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)	Chino Basin	10,250		14,773		16,331		17,630		17,630	
Groundwater (not desalinated)	Cucamonga Basin	10,000		10,000		10,000		10,000		10,000	
Surface water (not desalinated)	Cucamonga Canyon Tunnel Water	800		800		800		800		800	
Surface water (not desalinated)	Deer Canyon	50		50		50		50		50	
Surface water (not desalinated)	Day/East Etiwanda Canyon Tunnel Water	2,100		2,100		2,100		2,100		2,100	
Purchased or Imported Water	Inland Empire Utilities Agency	28,369		28,369		28,369		28,369		28,369	
Recycled Water	Inland Empire Utilities Agency (Direct Use)	1,800		2,000		2,000		2,000		2,000	
Recycled Water	Inland Empire Utilities Agency (Groundwater Recharge)	4,000		4,000		4,000		4,000		4,000	
	Total	57,369	0	62,092	0	63,650	0	64,949	0	64,949	0

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

NOTES: Groundwater recharge includes recycled water which IEUA recharges in the Chino Basin for the benefit of its member agencies (including the District). The amount of recycled water recharged is credited to the agency's Local Supplemental storage account, less the storage loss.

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	2011	49,219	100%
Single-Dry Year	2018	48,048	97.6%
Consecutive Dry Years 1st Year	2012	52,114	105.9%
Consecutive Dry Years 2nd Year	2013	56,306	114.4%
Consecutive Dry Years 3rd Year	2014	55,726	113.2%
Consecutive Dry Years 4th Year	2015	48,950	99.5%
Consecutive Dry Years 5th Year	2016	40,166	81.6%

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)*	57,369	62,092	63,650	64,949	64,949
Demand totals *(autofill from Table 4-3)*	53,369	58,092	59,650	60,949	60,949
Difference	4,000	4,000	4,000	4,000	4,000
NOTES:					

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	55,999	60,610	62,131	63,399	63,399
Demand totals*	52,099	56,710	58,231	59,499	59,499
Difference	3,900	3,900	3,900	3,900	3,900
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	60,708	65,708	67,358	68,733	68,733
	Demand totals	56,508	61,508	63,158	64,533	64,533
	Difference	4,200	4,200	4,200	4,200	4,200
Second year	Supply totals	63,297	68,509	70,229	71,662	71,662
	Demand totals	58,897	64,109	65,829	67,262	67,262
	Difference	4,400	4,400	4,400	4,400	4,400
Third year	Supply totals	64,924	70,271	72,035	73,506	73,506
	Demand totals	60,424	65,771	67,535	69,006	69,006
	Difference	4,500	4,500	4,500	4,500	4,500
Fourth year	Supply totals	57,077	61,774	63,323	64,615	64,615
	Demand totals	53,077	57,774	59,323	60,615	60,615
	Difference	4,000	4,000	4,000	4,000	4,000
Fifth year	Supply totals	46,852	50,707	51,978	53,038	53,038
	Demand totals	43,552	47,407	48,678	49,738	49,738
	Difference	3,300	3,300	3,300	3,300	3,300
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	51,163
Total Supplies	52,114
Surplus/Shortfall w/o WSCP Action	951
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	951
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	54,719
Total Supplies	54,318
Surplus/Shortfall w/o WSCP Action	(401)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	401
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	1%

2023	Total
Total Water Use	57,566
Total Supplies	55,726
Surplus/Shortfall w/o WSCP Action	(1,840)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	1,840
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	3%

2024	Total
Total Water Use	51,822
Total Supplies	48,950
Surplus/Shortfall w/o WSCP Action	(2,872)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	2,872
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	6%

2025	Total
Total Water Use	43,552
Total Supplies	40,166
Surplus/Shortfall w/o WSCP Action	(3,386)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	3,386
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	8%

Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description*)
1	Up to 10%	The following prohibitions are in effect: 1. Hosing paved areas for health and safety purposes only using a water broom or water-efficient pressure washer using not more than five gallons per minute. 2. Wash vehicles using a hose equipped with a shutoff nozzle so that water does not flow to waste. 3. All decorative fountains shall be equipped with re-circulating systems. 4. Upon notification by the District, repair all leaks. 5. Adjust sprinklers so there is no runoff, overspray, or excessive irrigation from the property. 6. Restaurants will only serve water on request. 7. Hotels will offer guests the option to not launder linen daily. 8. Industrial customers will review their water-using processes to evaluate ways to increase water conservation. 9. Prohibition of watering outdoor landscapes during and within 48 hours after a measurable rainfall.
2	Up to 20%	In addition to Stage 1 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution.
3	Up to 30%	In addition to Stage 2 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution.
4	Up to 40%	In addition to Stage 3 measures, the following end-user prohibitions are also in effect: 1. The irrigation with potable water on ornamental turf areas on public street medians. 2. The irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission.
5	Up to 50%	In addition to Stage 4 measures, the following end-user prohibitions are also in effect: 1. All non-essial outdoor water may be prohibited as determined bythe District and enacted by resolution. 2. The use of water for construction purposes shall be curtailed during a water emergency crisis with the exception that recycled water may be used for such purposes.
6	> 50%	In addition to Stage 5 measures, additional restrictions may be implemented as determined by the District.

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	Other - Prohibit use of potable water for washing hard surfaces	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Hosing paved areas for health and safety purposes only using a water broom or water-efficient pressure washer using not more than five gallons per minute.	Yes
1	Other	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Wash vehicles using a hose equipped with a shutoff nozzle so that water does not flow to waste.	Yes
1	Water Features - Restrict water use for decorative water features, such as fountains	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	All decorative fountains shall be equipped with re-circulating systems	Yes
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Upon notification by the District, repair all leaks.	Yes
1	Landscape - Restrict or prohibit runoff from landscape irrigation	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Adjust sprinklers so there is no runoff, overspray, or excessive irrigation from the property.	Yes
1	CII - Restaurants may only serve water upon request	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Restaurants will only serve water on request.	Yes
1	CII - Lodging establishment must offer opt out of linen service	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Hotels will offer guests the option to not launder linen daily.	Yes
1	Other	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Industrial customers will review their water-using processes to evaluate ways to increase water conservation.	Yes
1	Landscape - Other landscape restriction or prohibition	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Prohibition of watering outdoor landscapes during and within 48 hours after a measurable rainfall.	Yes
1	Landscape - Limit landscape irrigation to specific times	Collective reduction from all Shortage Level 1 actions is up to 6,162 AF	Hours of watering are limited to 4:00 p.m. through 9:00 a.m.,	Yes
2	Other	Collective reduction from all Shortage Level 2 actions is up to 12,324 AF	All actions under Shortage Level 1	Yes
2	Landscape - Limit landscape irrigation to specific days	Collective reduction from all Shortage Level 2 actions is up to 12,324 AF	Limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution.	Yes
3	Other	Collective reduction from all Shortage Level 3 actions is up to 18,485 AF	All actions under Shortage Level 2	Yes
4	Other	Collective reduction from all Shortage Level 4 actions is up to 24,647 AF	All actions under Shortage Level 3	Yes
4	Landscape - Prohibit certain types of landscape irrigation	Collective reduction from all Shortage Level 4 actions is up to 24,647 AF	Irrigation with potable water on ornamental turf areas on public street medians.	Yes
4	Landscape - Prohibit certain types of landscape irrigation	Collective reduction from all Shortage Level 4 actions is up to 24,647 AF	Irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission.	Yes
5	Other	Collective reduction from all Shortage Level 5 actions is up to 30,809 AF	All actions under Shortage Level 4	Yes
5	Landscape - Prohibit all landscape irrigation	Collective reduction from all Shortage Level 5 actions is up to 30,809 AF	All non-essential outdoor water may be prohibited as determined by the District and enacted by resolution.	Yes
5	Other - Prohibit use of potable water for construction and dust control	Collective reduction from all Shortage Level 5 actions is up to 30,809 AF	The use of water for construction purposes shall be curtailed during this stage with the exception that recycled water may be used for such purposes.	Yes
6	Other	Collective reduction from all Shortage Level 6 actions is greater than 30,809 AF	All actions under Shortage Level 5	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: The District will consider increased production from the Chino and Cucamonga Basins using existing facilities to address increased demands. As noted on Table 8-2, the District 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		
Fontana	Yes	Yes
Ontario	Yes	Yes
Rancho Cucamonga	Yes	Yes
Upland	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

DEMONSTRATION OF CONSISTENCY WITH THE DELTA PLAN FOR PARTICIPANTS IN COVERED ACTIONS (FY 2014-2015 THROUGH FY 2044-45) CUCAMONGA VALLEY WATER DISTRICT

Introduction

Pursuant to the California Department of Water Resources (DWR), an urban water supplier that anticipates participating in or receiving water from a proposed project (or "covered action") such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta) should provide information in their 2015 and 2020 Urban Water Management Plans (UWMPs) for use in demonstrating consistency with Delta Plan Policy WR P1, "*Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance"*. In addition, pursuant to California Code of Regulations, Title 23, § 5003:

> *(c)(1) Water suppliers that have done all of the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:*
>
> > *(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;*
> >
> > *(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and*
> >
> > *(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water*

efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).

The District is member agency of the Inland Empire Utilities Agency, which in turn is a member agency of the Metropolitan Water District of Southern California (MWD).

IEUA is an urban water supplier and a member agency of MWD. MWD provides IEUA with imported water supplies, which IEUA in turn distributes on a wholesale basis to its retail water purveyors. MWD is a contractor on the State Water Project (SWP) and, due to water quality considerations, all imported water supplies IEUA receives from MWD originate from the SWP system. The SWP system runs from Lake Oroville in Northern California to Southern California, crossing the Sacramento-San Joaquin Delta (Delta) along the way. MWD and its member agencies have made investments into water supply and demand management to regionally reduce impacts on the Delta. These investments bring regional reliability and reduced Delta reliance that make it infeasible for individual MWD member agencies to determine their individual Delta reliance. As a recipient of imported water from the SWP delivered via MWD, IEUA may indirectly receive water through a proposed covered action, such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Delta. Through this appendix, IEUA is providing information in its 2015 and 2020 UWMPs that may be used in the covered action process, to demonstrate consistency with Delta Plan Policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (WR P1) [California Code of Regulations (CCR), Title 23, § 5003].

As noted in MWD's document entitled "*Infeasibility of Accounting Supplies from the Delta Watershed for Metropolitan's Member Agencies and their Customers*" (which is included in MWD's 2020 Regional UWMP and is provided as Attachment 1 below), "... Metropolitan's service area, as a whole, reduces reliance on the Delta through investments in non-Delta water supplies, local water supplies, and regional and local demand management measures. Metropolitan's member agencies coordinate reliance on the Delta through their membership in Metropolitan, a regional cooperative providing

wholesale water service to its 26 member agencies. Accordingly, regional reliance on the Delta can only be measured regionally—not by individual Metropolitan member agencies and not by the customers of those member agencies....”

In addition, MWD’s 2020 Regional UWMP indicates “...in accordance with UMWP requirements, Metropolitan’s member agencies and their customers (many of them, retail agencies) also report demands and supplies for their service areas in their respective UWMPs. The data reported by those agencies are not additive to the regional totals shown in Metropolitan’s UWMP; rather, their reporting represents subtotals of the regional total and should be considered as such for the purposes of determining reduced reliance on the Delta…While the demands that Metropolitan’s member agencies and their customers report in their UWMPs are a good reflection of the demands in their respective service areas, they do not adequately represent each water supplier’s contributions to reduced reliance on the Delta. In order to calculate and report their reliance on water supplies from the Delta watershed, water suppliers that receive water from the Delta through other regional or wholesale water suppliers would need to determine the amount of Delta water that they receive from the regional or wholesale supplier. Two specific pieces of information are needed to accomplish this: first is the quantity of demands on the regional or wholesale water supplier that accurately reflect a supplier’s contributions to reduced reliance on the Delta, and second is the quantity of a supplier’s demands on the regional or wholesale water supplier that are met by supplies from the Delta watershed…For water suppliers that make investments in regional projects or programs it may be infeasible to quantify their demands on the regional or wholesale water supplier in a way that accurately reflects their individual contributions to reduced reliance on the Delta.” Nonetheless, the District has taken proactive measures to help reduce regional reliance on imported water supplies and is discussed in the following sections.

Reduced Reliance Calculation Tables

Pursuant to DWR guidance, Tables C-1 through C-4 were prepared to show the potential reduction of reliance on imported water supplies for the District. The District has used

these tables to demonstrate its reduced regional reliance on imported water supplies, but not specifically Delta Watershed supplies. For each of the tables, a “Baseline year” was selected. Water demands during subsequent years (from 2015 through 2045 in five-year increments) were compared to water demands during the Baseline year. Table C-1 considers the population and service area water demands, and a demand per capita per day (GPCD) water use rate was calculated for each of the years following the Baseline year. The calculated reduction in GPCD from the Baseline year was then translated to an estimated amount of water saved as a result of water conservation measures. Table C-2 references the estimated amount of water saved from Table C-1 and shows the District’s water demand without water use efficiency in effect.

A method of showing reduced regional reliance on imported water supplies is to show increased regional self-reliance. Table C-3 lists water supply sources that contribute to regional self-reliance, including water use efficiency (from Table C-1 and C-2), recycled water use, and groundwater recharge activities. Regional self-reliance is expressed both in terms of acre feet (AF) and as a percentage.

The calculation of reduced regional reliance on imported water supplies is shown on Table C-4. Table C-4 also shows the percent change in imported water supplies relative to the District’s total supply. A negative percent change of imported water supplies indicates the District has reduced regional reliance on imported water supplies.

Since the Baseline year, the District has decreased its reduced regional reliance on imported water supplies in 2015, 2020, and anticipates doing so through 2045.

The District has reduced regional reliance on imported water supplies in three separate categories, as follows:

- The demand in GPCD for the "Baseline” year was compared to the GPCDs in subsequent years (from 2015 through 2045, in five-year increments). The reduced GPCD multiplied by the population in these subsequent years is indicative of the

potential reduced regional reliance on imported water supplies and is included in Table C-1.

- The recycled water use from 2015 through 2045, in five-year increments, also demonstrates reduced regional reliance on imported water supplies and is included in Table C-1.
- To the extent the Chino Basin Watermaster has, or plans to, use recycled water to replenish the Chino Basin, the District's proportional share (up to the total replenishment water obligation) will be included on Table C-1.

These categories of reduced regional reliance on imported water supplies are discussed below. The sum of the increased regional self-reliance and the sum of the reduced regional reliance on imported water demand resulting from these categories is reflected on Table C-3 and Table C-4, respectively, and is reflective of the District's overall reduced reliance.

Reduced GPCD

Section 6.2.2 of the District's 2020 UWMP describes the management of the Chino Basin. The District relies on groundwater produced from the Chino Basin, which is adjudicated and managed by the Chino Basin Watermaster. To the extent the District historically (baseline during FY 2010-11) has produced groundwater in excess of its water rights, it has paid assessments to the Chino Basin Watermaster which are then used to purchase untreated imported water from the Inland Empire Utilities Agency, which is in turn purchased water from MWD. The untreated imported water subsequently is delivered to replenish the Chino Basin and to supplement local storm water replenishment. In addition, the District can purchase untreated imported water from Inland Empire Utilities Agency, which CVWD subsequently treats, which is ultimately provided by MWD.

Chapter 9 of the 2020 UWMP describes the Demand Management Measures which the District has implemented to reduce the amount water used by its customers. In addition, Chapter 6 of the 2020 UWMP describes the groundwater basin management measures

implemented by the Chino Basin Watermaster. Collectively these actions translate to a reduction in the GPCD usage rate which is described further in Chapter 5 of the 2020 UWMP. These actions directly impact total water demands, and consequently, the quantity of water which may be required from imported water supplies. Absent the proactive measures taken by the District, it is anticipated there may have been a greater demand on imported water.

Pursuant to DWR guidance, reduced regional reliance on imported water supplies can be demonstrated by first selecting a “Baseline” water demand, represented by total potable water demands during FY 2010-11. Table C-1 summarizes the “Baseline” water usage by the District in FY 2010-11 (assuming demand reduction efforts had not been implemented); actual water usage in 2015 and 2020; and projected water usage through 2045 in five-year increments. Furthermore, it is assumed that as of FY 2010-11 the District was already exceeding its water rights and was required to fund the purchase of untreated imported water supplies. Table C-2 demonstrates that if water conservation measures had not been implemented by the District, there may have been a greater reliance on untreated imported water supplies during subsequent years as compared to the Baseline year. However, as discussed below and shown in Table C-1, the reduced water demands have resulted in reduced regional reliance on imported water supplies as compared to the Baseline year.

The District’s potable water demand of 48,486 AF during FY 2010-11, along with the corresponding service area population of approximately 183,414, were used to determine the Baseline GPCD. Subsequently, the actual demands for FY 2014-15 and FY 2019-20 were compared to the calculated population to obtain the recent GPCD which includes the water conservations measures which have been implemented (those demand management measures are described in Chapter 9 of the 2020 UWMP). The “Water Supplies Contributing to Regional Self-Reliance" are also provided in Table C-3. The differences between the Baseline GPCD and the 2015 and 2020 GPCDs are effectively considered a demonstration of the reduced regional reliance on imported water supplies with the understanding that any potential increased demand by the District resulting from

increased population could have been required from imported water supplies, absent the District's new water supplies which contribute to self-reliance. A similar methodology is used for the projected potable water demands (2020 UWMP Table 4-3) and populations (2020 UWMP Table 3-1).

Recycled Water Use

The District has also constructed infrastructure to deliver recycled water to its customers instead of continuing to use its potable water supplies. The historical recycled water demands for FY 2014-15 and 2019-20, along with the projected recycled water demands (from 2020 UWMP Table 4-3) are incorporated in Table C-1 and Table C-3. These quantities are in addition to the reduced demand resulting from decreased GPCD.

In 2000, the Chino Basin Watermaster developed the Chino Basin Optimum Basin Management Program (OBMP). As an integral part of the OBMP, Inland Empire Utilities Agency (IEUA), Chino Basin Watermaster, Chino Basin Water Conservation District, and San Bernardino County Flood Control District implemented the Chino Basin Recycled Water Groundwater Recharge Program. This program was implemented to serve as a comprehensive water supply program to enhance local groundwater quality and to provide a source of reliable water for the Chino Basin through increased recharge of stormwater, imported water, and recycled water. IEUA anticipates recharging as much as 16,000 AFY of recycled water. The recharged water hypothetically assigned to the District is based on the District's share (5.202%) of the Chino Basin's current Operating Safe Yield (131,000 AFY) multiplied by the amount of recycled water replenished and is shown on Table C-3. Therefore, the benefit to each producer in the Chino Basin is based on the proportional share of its anticipated production to the total Chino Basin production.

The decrease in GPCD and increase in recycled water use compared to the Baseline year has resulted in an overall decrease in regional reliance on imported water supplies. As shown in Table C-4, the percentage of imported water supplies relative to the District's

total supply has decreased, and is projected to decrease, from the percentage in the Baseline year.

Metropolitan Water District of Southern California

In addition, as the wholesale provider, MWD has included a detailed discussion regarding measurable reduction in Delta reliance in Appendix 11 for 2015 and 2020 as part of its 2015 Regional Urban Water Management Plan and 2020 Regional Urban Water Management Plan, respectively, and are also included in Attachment 1 below.

Inland Empire Utilities Agency

As the wholesale provider, IEUA has included a detailed discussion regarding measurable reduction in Delta reliance in Appendix G for 2015 and 2020 as part of its 2020 Regional Urban Water Management Plan, respectively, and is also included in Attachment 2 below.

Reduced Reliance Calculation - Cucamonga Valley Water District

Table C-1: Optional Calculation of Water Use Efficiency -To be completed if Water Supplier does not specifically estimate Water Use Efficiency as a supply

Service Area Water Use Efficiency Demands (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands with Water Use Efficiency Accounted For	49,219	48,950	47,059	53,369	58,092	59,650	60,949	60,949
Non-Potable Water Demands	734	1,401	1,038	1,800	2,000	2,000	2,000	2,000
Potable Service Area Demands with Water Use Efficiency Accounted For	48,486	47,549	46,021	51,569	56,092	57,650	58,949	58,949

Total Service Area Population	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Population	183,414	200,466	198,979	207,151	225,483	231,531	236,573	236,573

Water Use Efficiency Since Baseline (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Per Capita Water Use (GPCD)	236	212	206	222	222	222	222	222
Change in Per Capita Water Use from Baseline (GPCD)		(24)	(30)	(14)	(14)	(14)	(14)	(14)
Estimated Water Use Efficiency Since Baseline		5,444	6,579	3,192	3,515	3,556	3,589	3,589

Table C-2: Calculation of Service Area Water Demands Without Water Use Efficiency

Total Service Area Water Demands (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands with Water Use Efficiency Accounted For	49,219	48,950	47,059	53,369	58,092	59,650	60,949	60,949
Reported Water Use Efficiency or Estimated Water Use Efficiency Since Baseline	-	5,444	6,579	3,192	3,515	3,556	3,589	3,589
Service Area Water Demands without Water Use Efficiency Accounted For	49,219	54,394	53,638	56,561	61,607	63,206	64,538	64,538

Table C-3: Calculation of Supplies Contributing to Regional Self-Reliance

Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Use Efficiency	-	5,444	6,579	3,192	3,515	3,556	3,589	3,589
Water Recycling (Direct Use and Groundwater Recharge)	2,605	4,577	5,496	5,800	6,000	6,000	6,000	6,000
Stormwater Capture and Use								
Advanced Water Technologies								
Conjunctive Use Projects								
Local and Regional Water Supply and Storage Projects								
Other Programs and Projects the Contribute to Regional Self-Reliance[1]	327	564	696	678	713	774	846	846
Water Supplies Contributing to Regional Self-Reliance	2,932	10,585	12,771	9,669	10,228	10,329	10,435	10,435

Service Area Water Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands without Water Use Efficiency Accounted For	49,219	54,394	53,638	56,561	61,607	63,206	64,538	64,538

Change in Regional Self Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Supplies Contributing to Regional Self-Reliance	2,932	10,585	12,771	9,669	10,228	10,329	10,435	10,435
Change in Water Supplies Contributing to Regional Self-Reliance		7,653	9,839	6,737	7,296	7,397	7,503	7,503

Percent Change in Regional Self Reliance (As Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Percent of Water Supplies Contributing to Regional Self-Reliance	6.0%	19.5%	23.8%	17.1%	16.6%	16.3%	16.2%	16.2%
Change in Percent of Water Supplies Contributing to Regional Self-Reliance		13.5%	17.9%	11.1%	10.6%	10.4%	10.2%	10.2%

Table C-4: Calculation of Reliance on Water Supplies from the Delta Watershed

Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
CVP/SWP Contract Supplies								
Delta/Delta Tributary Diversions								
Transfers and Exchanges								
Other Water Supplies from the Delta Watershed (for replenishment)[2]	13,176	7,261	15,805	-	7,245	8,743	9,970	9,970
Other Water Supplies from the Delta Watershed (for treatment)[3]	19,994	21,306	14,343	28,369	28,369	28,369	28,369	28,369
Total Water Supplies from the Delta Watershed	33,169	28,567	30,148	28,369	35,614	37,112	38,339	38,339

Service Area Water Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands without Water Use Efficiency Accounted For	49,219	54,394	53,638	56,561	61,607	63,206	64,538	64,538

Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Supplies from the Delta Watershed	33,169	28,567	30,148	28,369	35,614	37,112	38,339	38,339
Change in Water Supplies from the Delta Watershed		(4,602)	(3,021)	(4,800)	2,445	3,943	5,170	5,170

Percent Change in Supplies from the Delta Watershed (As a Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Percent of Water Supplies from the Delta Watershed	67.4%	52.5%	56.2%	50.2%	57.8%	58.7%	59.4%	59.4%
Change in Percent of Water Supplies from the Delta Watershed		-14.9%	-11.2%	-17.2%	-9.6%	-8.7%	-8.0%	-8.0%

Baseline Year is FY 2010-11

[1] Represents groundwater recharge of recycled water made by IEUA within the Chino Basin. Groundwater recharge by IEUA is projected to range from 13,000 AFY to 16,000 AFY through 2045. Water supply available to the District is based on the District's share of the Safe Yield (5.202%).

[2] Represents imported untreated water to satisify replenishment obligations due to Chino Basin overproduction. Based on the District's production less water available to the District from IEUA recharge and less the District's share (5.202%) of the Operating Safe Yield (131,000 AFY).

[3] Represents imported untreated water from Inland Empire Utilities Agency

APPENDIX B
ATTACHMENT 1

- **Infeasibility of Accounting Supplies from the Delta Watershed for Metropolitan's Member Agencies and their Customers**

- **Appendix 11 Addendum to the Metropolitan Water District of Southern California's 2015 Urban Water Management Plan**

- **Appendix 11 "Quantifying Regional Self-Reliance and Reliance on Water Supplies from the Delta Watershed", Metropolitan Water District of Southern California's 2020 Urban Water Management Plan**

Infeasibility of Accounting Supplies from the Delta Watershed for Metropolitan's Member Agencies and their Customers

Metropolitan's service area, as a whole, reduces reliance on the Delta through investments in non-Delta water supplies, local water supplies, and regional and local demand management measures. Metropolitan's member agencies coordinate reliance on the Delta through their membership in Metropolitan, a regional cooperative providing wholesale water service to its 26 member agencies. Accordingly, regional reliance on the Delta can only be measured regionally—not by individual Metropolitan member agencies and not by the customers of those member agencies.

Metropolitan's member agencies, and those agencies' customers, indirectly reduce reliance on the Delta through their collective efforts as a cooperative. Metropolitan's member agencies do not control the amount of Delta water they receive from Metropolitan. Metropolitan manages a statewide integrated conveyance system consisting of its participation in the State Water Project (SWP), its Colorado River Aqueduct (CRA) including Colorado River water resources, programs and water exchanges, and its regional storage portfolio. Along with the SWP, CRA, storage programs, and Metropolitan's conveyance and distribution facilities, demand management programs increase the future reliability of water resources for the region. In addition, demand management programs provide system-wide benefits by decreasing the demand for imported water, which helps to decrease the burden on the district's infrastructure and reduce system costs, and free up conveyance capacity to the benefit of all member agencies.

Metropolitan's costs are funded almost entirely from its service area, with the exception of grants and other assistance from government programs. Most of Metropolitan's revenues are collected directly from its member agencies. Properties within Metropolitan's service area pay a property tax that currently provides approximately 8 percent of the fiscal year 2021 annual budgeted revenues. The rest of Metropolitan's costs are funded through rates and charges paid by Metropolitan's member agencies for the wholesale services it provides to them.[1] Thus, Metropolitan's member agencies fund nearly all operations Metropolitan undertakes to reduce reliance on the Delta, including Colorado River Programs, storage facilities, Local Resources Programs and Conservation Programs within Metropolitan's service area.

Because of the integrated nature of Metropolitan's systems and operations, and the collective nature of Metropolitan's regional efforts, it is infeasible to quantify each of Metropolitan member agencies' individual reliance on the Delta. It is infeasible to attempt to segregate an entity and a system that were designed to work as an integrated regional cooperative.

In addition to the member agencies funding Metropolitan's regional efforts, they also invest in their own local programs to reduce their reliance on any imported water. Moreover, the customers of those member agencies may also invest in their own local programs to reduce water demand. However, to the extent those efforts result in reduction of demands on Metropolitan, that reduction does not equate to a like reduction of reliance on the Delta. Demands on Metropolitan are not commensurate with demands on the Delta because most of Metropolitan member agencies receive blended resources from

[1] A standby charge is collected from properties within the service areas of 21 of Metropolitan's 26 member agencies, ranging from $5 to $14.20 per acre annually, or per parcel if smaller than an acre. Standby charges go towards those member agencies' obligations to Metropolitan for the Readiness-to-Serve Charge. The total amount collected annually is approximately $43.8 million, approximately 2 percent of Metropolitan's fiscal year 2021 annual budgeted revenues.

Metropolitan as determined by Metropolitan—not the individual member agency—and for most member agencies, the blend varies from month-to-month and year-to-year due to hydrology, operational constraints, use of storage and other factors.

Colorado River Programs

As a regional cooperative of member agencies, Metropolitan invests in programs to ensure the continued reliability and sustainability of Colorado River supplies. Metropolitan was established to obtain an allotment of Colorado River water, and its first mission was to construct and operate the CRA. The CRA consists of five pumping plants, 450 miles of high voltage power lines, one electric substation, four regulating reservoirs, and 242 miles of aqueducts, siphons, canals, conduits and pipelines terminating at Lake Mathews in Riverside County. Metropolitan owns, operates, and manages the CRA. Metropolitan is responsible for operating, maintaining, rehabilitating, and repairing the CRA, and is responsible for obtaining and scheduling energy resources adequate to power pumps at the CRA's five pumping stations.

Colorado River supplies include Metropolitan's basic Colorado River apportionment, along with supplies that result from existing and committed programs, including supplies from the Imperial Irrigation District (IID)-Metropolitan Conservation Program, the implementation of the Quantification Settlement Agreement (QSA) and related agreements, and the exchange agreement with San Diego County Water Authority (SDCWA). The QSA established the baseline water use for each of the agreement parties and facilitates the transfer of water from agricultural agencies to urban uses. Since the QSA, additional programs have been implemented to increase Metropolitan's CRA supplies. These include the PVID Land Management, Crop Rotation, and Water Supply Program, as well as the Lower Colorado River Water Supply Project. The 2007 Interim Guidelines provided for the coordinated operation of Lake Powell and Lake Mead, as well as the Intentionally Created Surplus (ICS) program that allows Metropolitan to store water in Lake Mead.

Storage Investments/Facilities

Surface and groundwater storage are critical elements of Southern California's water resources strategy and help Metropolitan reduce its reliance on the Delta. Because California experiences dramatic swings in weather and hydrology, storage is important to regulate those swings and mitigate possible supply shortages. Surface and groundwater storage provide a means of storing water during normal and wet years for later use during dry years, when imported supplies are limited. The Metropolitan system, for purposes of meeting demands during times of shortage, regulating system flows, and ensuring system reliability in the event of a system outage, provides over 1,000,000 acre-feet of system storage capacity. Diamond Valley Lake provides 810,000 acre-feet of that storage capacity, effectively doubling Southern California's previous surface water storage capacity. Other existing imported water storage available to the region consists of Metropolitan's raw water reservoirs, a share of the SWP's raw water reservoirs in and near the service area, and the portion of the groundwater basins used for conjunctive-use storage.

Since the early twentieth century, DWR and Metropolitan have constructed surface water reservoirs to meet emergency, drought/seasonal, and regulatory water needs for Southern California. These reservoirs include Pyramid Lake, Castaic Lake, Elderberry Forebay, Silverwood Lake, Lake Perris, Lake Skinner, Lake Mathews, Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, Orange County Reservoir, and Metropolitan's Diamond Valley Lake (DVL). Some reservoirs such as Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, and Orange County Reservoir, which have a total combined capacity of about 3,500 AF, are used solely for regulating purposes. The total gross storage capacity for

the larger remaining reservoirs is 1,757,600 AF. However, not all of the gross storage capacity is available to Metropolitan; dead storage and storage allocated to others reduce the amount of storage that is available to Metropolitan to 1,665,200 AF.

Conjunctive use of the aquifers offers another important source of dry year supplies. Unused storage in Southern California groundwater basins can be used to optimize imported water supplies, and the development of groundwater storage projects allows effective management and regulation of the region's major imported supplies from the Colorado River and SWP. Over the years, Metropolitan has implemented conjunctive use through various programs in the service area; the following table lists the groundwater conjunctive use programs that have been developed in the region.

Program	Metropolitan Agreement Partners	Program Term	Max Storage AF	Dry-Year Yield AF/Yr
Long Beach Conjunctive Use Storage Project (Central Basin)	Long Beach	June 2002-2027	13,000	4,300
Foothill Area Groundwater Storage Program (Monkhill/ Raymond Basin)	Foothill MWD	February 2003-2028	9,000	3,000
Orange County Groundwater Conjunctive Use Program	MWDOC OCWD	June 2003-2028	66,000+	22,000
Chino Basin Conjunctive Use Programs	IEUA TVMWD Watermaster	June 2003-2028	100,000	33,000
Live Oak Basin Conjunctive Use Project (Six Basins)	TVMWD City of La Verne	October 2002-2027	3,000	1,000
City of Compton Conjunctive Use Project (Central Basin)	Compton	February 2005-2030	2,289	763
Long Beach Conjunctive Use Program Expansion in Lakewood (Central Basin)	Long Beach	July 2005-2030	3,600	1,200
Upper Claremont Basin Groundwater Storage Program (Six Basins)	TVMWD	Sept. 2005- 2030	3,000	1,000
Elsinore Basin Conjunctive Use Storage Program	Western MWD Elsinore Valley MWD	May 2008- 2033	12,000	4,000
TOTAL			**211,889**	**70,263**

Metropolitan Demand Management Programs

Demand management costs are Metropolitan's expenditures for funding local water resource development programs and water conservation programs. These Demand Management Programs incentivize the development of local water supplies and the conservation of water to reduce the need to import water to deliver to Metropolitan's member agencies. These programs are implemented below the delivery points between Metropolitan's and its member agencies' distribution systems and, as such, do not add any water to Metropolitan's supplies. Rather, the effect of these downstream programs is to

produce a local supply of water for the local agencies and to reduce demands by member agencies for water imported through Metropolitan's system. The following discussions outline how Metropolitan funds local resources and conservation programs for the benefit of all of its member agencies and the entire Metropolitan service area. Notably, the history of demand management by Metropolitan's member agencies and the local agencies that purchase water from Metropolitan's members has spanned more than four decades. The significant history of the programs is another reason it would be difficult to attempt to assign a portion of such funding to any one individual member agency.

Local Resources Programs

In 1982, Metropolitan began providing financial incentives to its member agencies to develop new local supplies to assist in meeting the region's water needs. Because of Metropolitan's regional distribution system, these programs benefit all member agencies regardless of project location because they help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs and free up conveyance capacity to the benefit of all the agencies that rely on water from Metropolitan.

For example, the Groundwater Replenishment System (GWRS) operated by the Orange County Water District is the world's largest water purification system for indirect potable reuse. It was funded, in part, by Metropolitan's member agencies through the Local Resources Program. Annually, the GWRS produces approximately 103,000 acre-feet of reliable, locally controlled, drought-proof supply of high-quality water to recharge the Orange County Groundwater Basin and protect it from seawater intrusion. The GWRS is a premier example of a regional project that significantly reduced the need to utilize imported water for groundwater replenishment in Metropolitan's service area, increasing regional and local supply reliability and reducing the region's reliance on imported supplies, including supplies from the State Water Project.

Metropolitan's local resource programs have evolved through the years to better assist Metropolitan's member agencies in increasing local supply production. The following is a description and history of the local supply incentive programs.

Local Projects Program

In 1982, Metropolitan initiated the Local Projects Program (LPP), which provided funding to member agencies to facilitate the development of recycled water projects. Under this approach, Metropolitan contributed a negotiated up-front funding amount to help finance project capital costs. Participating member agencies were obligated to reimburse Metropolitan over time. In 1986, the LPP was revised, changing the up-front funding approach to an incentive-based approach. Metropolitan contributed an amount equal to the avoided State Water Project pumping costs for each acre-foot of recycled water delivered to end-use consumers. This funding incentive was based on the premise that local projects resulted in the reduction of water imported from the Delta and the associated pumping cost. The incentive amount varied from year to year depending on the actual variable power cost paid for State Water Project imports. In 1990, Metropolitan's Board increased the LPP contribution to a fixed rate of $154 per acre-foot, which was calculated based on Metropolitan's avoided capital and operational costs to convey, treat, and distribute water, and included considerations of reliability and service area demands.

Groundwater Recovery Program

The drought of the early 1990s sparked the need to develop additional local water resources, aside from recycled water, to meet regional demand and increase regional water supply reliability. In 1991, Metropolitan conducted the Brackish Groundwater Reclamation Study which determined that large

amounts of degraded groundwater in the region were not being utilized. Subsequently, the Groundwater Recovery Program (GRP) was established to assist the recovery of otherwise unusable groundwater degraded by minerals and other contaminants, provide access to the storage assets of the degraded groundwater, and maintain the quality of groundwater resources by reducing the spread of degraded plumes.

Local Resources Program

In 1995, Metropolitan's Board adopted the Local Resources Program (LRP), which combined the LPP and GRP into one program. The Board allowed for existing LPP agreements with a fixed incentive rate to convert to the sliding scale up to $250 per acre-foot, similar to GRP incentive terms. Those agreements that were converted to LRP are known as "LRP Conversions."

Competitive Local Projects Program

In 1998, the Competitive Local Resources Program (Competitive Program) was established. The Competitive Program encouraged the development of recycled water and recovered groundwater through a process that emphasized cost-efficiency to Metropolitan, timing new production according to regional need while minimizing program administration cost. Under the Competitive Program, agencies requested an incentive rate up to $250 per acre-foot of production over 25 years under a Request for Proposals (RFP) for the development of up to 53,000 acre-feet per year of new water recycling and groundwater recovery projects. In 2003, a second RFP was issued for the development of an additional 65,000 acre-feet of new recycled water and recovered groundwater projects through the LRP.

Seawater Desalination Program

Metropolitan established the Seawater Desalination Program (SDP) in 2001 to provide financial incentives to member agencies for the development of seawater desalination projects. In 2014, seawater desalination projects became eligible for funding under the LRP, and the SDP was ended.

2007 Local Resources Program

In 2006, a task force comprised of member agency representatives was formed to identify and recommend program improvements to the LRP. As a result of the task force process, the 2007 LRP was established with a goal of 174,000 acre-feet per year of additional local water resource development. The new program allowed for an open application process and eliminated the previous competitive process. This program offered sliding scale incentives of up to $250 per acre-foot, calculated annually based on a member agency's actual local resource project costs exceeding Metropolitan's prevailing water rate.

2014 Local Resources Program

A series of workgroup meetings with member agencies was held to identify the reasons why there was a lack of new LRP applications coming into the program. The main constraint identified by the member agencies was that the $250 per acre-foot was not providing enough of an incentive for developing new projects due to higher construction costs to meet water quality requirements and to develop the infrastructure to reach end-use consumers located further from treatment plants. As a result, in 2014, the Board authorized an increase in the maximum incentive amount, provided alternative payment structures, included onsite retrofit costs and reimbursable services as part of the LRP, and added eligibility for seawater desalination projects. The current LRP incentive payment options are structured as follows:

- Option 1 – Sliding scale incentive up to $340/AF for a 25-year agreement term
- Option 2 – Sliding scale incentive up to $475/AF for a 15-year agreement term
- Option 3 – Fixed incentive up to $305/AF for a 25-year agreement term

On-site Retrofit Programs

In 2014, Metropolitan's Board also approved the On-site Retrofit Pilot Program which provided financial incentives to public or private entities toward the cost of small-scale improvements to their existing irrigation and industrial systems to allow connection to existing recycled water pipelines. The On-site Retrofit Pilot Program helped reduce recycled water retrofit costs to the end-use consumer which is a key constraint that limited recycled water LRP projects from reaching full production capacity. The program incentive was equal to the actual eligible costs of the on-site retrofit, or $975 per acre-foot of up-front cost, which equates to $195 per acre-foot for an estimated five years of water savings ($195/AF x 5 years) multiplied by the average annual water use in previous three years, whichever is less. The Pilot Program lasted two years and was successful in meeting its goal of accelerating the use of recycled water.

In 2016, Metropolitan's Board authorized the On-site Retrofit Program (ORP), with an additional budget of $10 million. This program encompassed lessons learned from the Pilot Program and feedback from member agencies to make the program more streamlined and improve its efficiency. As of fiscal year 2019/20, the ORP has successfully converted 440 sites, increasing the use of recycled water by 12,691 acre-feet per year.

Stormwater Pilot Programs

In 2019, Metropolitan's Board authorized both the Stormwater for Direct Use Pilot Program and a Stormwater for Recharge Pilot Program to study the feasibility of reusing stormwater to help meet regional demands in Southern California. These pilot programs are intended to encourage the development, monitoring, and study of new and existing stormwater projects by providing financial incentives for their construction/retrofit and monitoring/reporting costs. These pilot programs will help evaluate the potential benefits delivered by stormwater capture projects and provide a basis for potential future funding approaches. Metropolitan's Board authorized a total of $12.5 million for the stormwater pilot programs ($5 million for the District Use Pilot and $7.5 million for the Recharge Pilot).

Current Status and Results of Metropolitan's Local Resource Programs

Today, nearly one-half of the total recycled water and groundwater recovery production in the region has been developed with an incentive from one or more of Metropolitan's local resource programs. During fiscal year 2020, Metropolitan provided about $13 million for production of 71,000 acre-feet of recycled water for non-potable and indirect potable uses. Metropolitan provided about $4 million to support projects that produced about 50,000 acre-feet of recovered groundwater for municipal use. Since 1982, Metropolitan has invested $680 million to fund 85 recycled water projects and 27 groundwater recovery projects that have produced a cumulative total of about 4 million acre-feet.

Conservation Programs

Metropolitan's regional conservation programs and approaches have a long history. Decades ago, Metropolitan recognized that demand management at the consumer level would be an important part of balancing regional supplies and demands. Water conservation efforts were seen as a way to reduce the need for imported supplies and offset the need to transport or store additional water into or within the Metropolitan service area. The actual conservation of water takes place at the retail consumer level. Regional conservation approaches have proven to be effective at reaching retail consumers throughout Metropolitan's service area and successfully implementing water saving devices, programs and practices. Through the pooling of funding by Metropolitan's member agencies, Metropolitan is able to engage in regional campaigns with wide-reaching impact. Regional investments in demand management programs, of which conservation is a key part along with local supply programs, benefit all member agencies regardless of project location. These programs help to increase regional water supply

reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs, and free up conveyance capacity to the benefit of all member agencies.

Incentive-Based Conservation Programs

Conservation Credits Program

In 1988, Metropolitan's Board approved the Water Conservation Credits Program (Credits Program). The Credits Program is similar in concept to the Local Projects Program (LPP). The purpose of the Credits Program is to encourage local water agencies to implement effective water conservation projects through the use of financial incentives. The Credits Program provides financial assistance for water conservation projects that reduce demands on Metropolitan's imported water supplies and require Metropolitan's assistance to be financially feasible.

Initially, the Credits Program provided 50 percent of a member agency's program cost, up to a maximum of $75 per acre-foot of estimated water savings. The $75 Base Conservation Rate was established based Metropolitan's avoided cost of pumping SWP supplies. The Base Conservation Rate has been revisited by Metropolitan's Board and revised twice since 1988, from $75 to $154 per acre-foot in 1990 and from $154 to $195 per acre-foot in 2005.

In fiscal year 2020 Metropolitan processed more than 30,400 rebate applications totaling $18.9 million.

Member Agency Administered Program

Some member agencies also have unique programs within their service areas that provide local rebates that may differ from Metropolitan's regional program. Metropolitan continues to support these local efforts through a member agency administered funding program that adheres to the same funding guidelines as the Credits Program. The Member Agency Administered Program allows member agencies to receive funding for local conservation efforts that supplement, but do not duplicate, the rebates offered through Metropolitan's regional rebate program.

Water Savings Incentive Program

There are numerous commercial entities and industries within Metropolitan's service area that pursue unique savings opportunities that do not fall within the general rebate programs that Metropolitan provides. In 2012, Metropolitan designed the Water Savings Incentive Program (WSIP) to target these unique commercial and industrial projects. In addition to rebates for devices, under this program, Metropolitan provides financial incentives to businesses and industries that created their own custom water efficiency projects. Qualifying custom projects can receive funding for permanent water efficiency changes that result in reduced potable demand.

Non-Incentive Conservation Programs

In addition to its incentive-based conservation programs, Metropolitan also undertakes additional efforts throughout its service area that help achieve water savings without the use of rebates. Metropolitan's non-incentive conservation efforts include:

- residential and professional water efficient landscape training classes
- water audits for large landscapes
- research, development and studies of new water saving technologies
- advertising and outreach campaigns
- community outreach and education programs
- advocacy for legislation, codes, and standards that lead to increased water savings

Current Status and Results of Metropolitan's Conservation Programs

Since 1990, Metropolitan has invested $824 million in conservation rebates that have resulted in a cumulative savings of 3.27 million acre-feet of water. These investments include $450 million in turf removal and other rebates during the last drought which resulted in 175 million square feet of lawn turf removed. During fiscal year 2020, 1.06 million acre-feet of water is estimated to have been conserved. This annual total includes Metropolitan's Conservation Credits Program; code-based conservation achieved through Metropolitan-sponsored legislation; building plumbing codes and ordinances; reduced consumption resulting from changes in water pricing; and pre-1990 device retrofits.

Infeasibility of Accounting Regional Investments in Reduced Reliance Below the Regional Level

The accounting of regional investments that contribute to reduced reliance on supplies from the Delta watershed is straightforward to calculate and report at the regional aggregate level. However, any similar accounting is infeasible for the individual member agencies or their customers. As described above, the region (through Metropolitan) makes significant investments in projects, programs and other resources that reduce reliance on the Delta. In fact, all of Metropolitan's investments in Colorado River supplies, groundwater and surface storage, local resources development and demand management measures that reduce reliance on the Delta are collectively funded by revenues generated from the member agencies through rates and charges.

Metropolitan's revenues cannot be matched to the demands or supply production history of an individual agency, or consistently across the agencies within the service area. Each project or program funded by the region has a different online date, useful life, incentive rate and structure, and production schedule. It is infeasible to account for all these things over the life of each project or program and provide a nexus to each member agency's contributions to Metropolitan's revenue stream over time. Accounting at the regional level allows for the incorporation of the local supplies and water use efficiency programs done by member agencies and their customers through both the regional programs and through their own specific local programs. As shown above, despite the infeasibility of accounting reduced Delta reliance below the regional level, Metropolitan's member agencies and their customers have together made substantial contributions to the region's reduced reliance.

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Link to Metropolitan's 2020 UWMP once final

Appendix 11

Addendum to
The Metropolitan Water District of Southern California's
2015 Urban Water Management Plan

Quantifying Regional Self-Reliance and Reduced Reliance on Water Supplies from the Delta Watershed

June 2021

Appendix 11
METROPOLITAN'S REDUCED DELTA RELIANCE REPORTING
Addendum to Metropolitan's 2015 Urban Water Management Plan

A.11.1 Background

Under the Sacramento-San Joaquin Delta Reform Act of 2009, state and local public agencies proposing a covered action in the Delta,[1] prior to initiating the implementation of that action, must prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with applicable Delta Plan policies and submit that certification to the Delta Stewardship Council.[2] Anyone may appeal a certification of consistency, and if the Delta Stewardship Council grants the appeal, the covered action may not be implemented until the agency proposing the covered action submits a revised certification of consistency, and either no appeal is filed, or the Delta Stewardship Council denies the subsequent appeal.[3]

An urban water supplier that anticipates participating in or receiving water from a proposed covered action such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Delta should provide information in their 2015 and 2020 Urban Water Management Plans (UWMPs) that can then be used in the covered action process to demonstrate consistency with Delta Plan Policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (WR P1).[4]

WR P1 details what is needed for a covered action to demonstrate consistency with reduced reliance on the Delta and improved regional self-reliance. WR P1 subsection (a) states that:

(a) Water shall not be exported from, transferred through, or used in the Delta if all of the following apply:

> *(1) One or more water suppliers that would receive water as a result of the export, transfer, or use have failed to adequately contribute to reduced reliance on the Delta and improved regional self-reliance consistent with all of the requirements listed in paragraph (1) of subsection (c);*
>
> *(2) That failure has significantly caused the need for the export, transfer, or use; and*
>
> *(3) The export, transfer, or use would have a significant adverse environmental impact in the Delta.*

WR P1 subsection (c)(1) further defines what adequately contributing to reduced reliance on the Delta means in terms of (a)(1) above.

(c)(1) Water suppliers that have done all the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:

> *(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;*

[1] Water Code, § 85057.5; Cal. Code Regs. tit. 23, § 5001.
[2] Water Code, § 85225; Delta Plan, App. D.
[3] Water Code, §§ 85225.10-85225.25; Delta Plan, App. D.
[4] Cal. Code Regs., tit. 23, § 5003.

(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and

(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).

The analysis and documentation provided below include all of the elements described in WR P1(c)(1) that need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action.

A.11.2 Summary of Expected Outcomes for Reduced Reliance on the Delta

As stated in WR P1(c)(1)(C), the policy requires that, commencing in 2015, UWMPs include expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance. WR P1 further states that those outcomes shall be reported in the UWMP as the reduction in the amount of water used, or in the percentage of water used, from the Delta.

The expected outcomes for Metropolitan's Delta reliance and regional self-reliance were developed using the approach and guidance described in Appendix C of DWR's Urban Water Management Plan Guidebook 2020 (Guidebook Appendix C) issued in March 2021.

The data used in this analysis represent the total regional efforts of Metropolitan and its member agencies and their customers (many of them, retail agencies) and were developed in conjunction with Metropolitan's member agencies as part of the UWMP coordination process as described in Section 5 of Metropolitan's UWMP. In accordance with UMWP requirements, Metropolitan's member agencies and their customers (many of them, retail agencies) also report demands and supplies for their service areas in their respective UWMPs. The data reported by those agencies are not additive to the regional totals shown in Metropolitan's UWMP; rather, their reporting represents subtotals of the regional total and should be considered as such for the purposes of determining reduced reliance on the Delta.

While the demands that Metropolitan's member agencies and their customers report in their UWMPs are a good reflection of the demands in their respective service areas, they do not adequately represent each water supplier's contributions to reduced reliance on the Delta. In order to calculate and report their reliance on water supplies from the Delta watershed, water suppliers that receive water from the Delta through other regional or wholesale water suppliers would need to determine the amount of Delta water that they receive from the regional or wholesale supplier. Two specific pieces of information are needed to accomplish this: first is the quantity of demands on the regional or wholesale water supplier that accurately reflect a supplier's contributions to reduced reliance on the Delta, and second is the quantity of a supplier's demands on the regional or wholesale water supplier that are met by supplies from the Delta watershed.

For water suppliers that make investments in regional projects or programs it may be infeasible to quantify their demands on the regional or wholesale water supplier in a way that accurately reflects their individual contributions to reduced reliance on the Delta. Due to the extensive, long-standing and successful implementation of regional demand management and local resource

incentive programs in Metropolitan's service area, this infeasibility holds true for Metropolitan's members as well their customers. For Metropolitan's service area, reduced reliance on supplies from the Delta watershed can only be accurately accounted at the regional level, as is demonstrated in this analysis.

The following provides a summary of the near-term (2025) and long-term (2045) expected outcomes for Metropolitan's Delta reliance and regional self-reliance. The results show that as a region, Metropolitan and its members as well as their customers are measurably reducing reliance on the Delta and improving regional self-reliance, both as an amount of water used and as a percentage of water used.

Expected Outcomes for Regional Self-Reliance

- Near-term (2025) – Normal water year regional self-reliance is expected to increase by 813 TAF from the 2010 baseline; this represents an increase of almost 25 percent of 2025 normal water year retail demands (Table A.11-2).
- Long-term (2045) – Normal water year regional self-reliance is expected to increase by more than 1.28 MAF from the 2010 baseline, this represents an increase of more than 25 percent of 2045 normal water year retail demands (Table A.11-2).

Expected Outcomes for Reduced Reliance on Supplies from the Delta Watershed

- Near-term (2025) – Normal water year reliance on supplies from the Delta watershed decreased by 301 TAF from the 2010 baseline, this represents a decrease of 3 percent of 2025 normal water year retail demands (Table A.11-3).
- Long-term (2045) – Normal water year reliance on supplies from the Delta watershed decreased by 314 TAF from the 2010 baseline, this represents a decrease of just over 5 percent of 2045 normal water year retail demands (Table A.11-3).

A11.3 Demonstration of Reduced Reliance on the Delta

The methodology used to determine Metropolitan's reduced Delta reliance and improved regional self-reliance is consistent with the approach detailed in DWR's UWMP Guidebook Appendix C, including the use of narrative justifications for the accounting of supplies and the documentation of specific data sources. Some of the key assumptions underlying Metropolitan's demonstration of reduced reliance include:

- All data were obtained from the current 2020 UWMP or previously adopted UWMPs and represent average or normal water year conditions.
- All analyses were conducted at the service area level, and all data reflect the total contributions of Metropolitan and its members as well as their customers.
- No projects or programs that are described in the UWMPs as "Projects Under Development" were included in the accounting of supplies.

Baseline and Expected Outcomes

In order to calculate the expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance, a baseline is needed to compare against. This analysis uses a normal water year representation of 2010 as the baseline, which is consistent with the approach described in the Guidebook Appendix C. Data for the 2010 baseline were taken from Metropolitan's 2005 UWMP as the UWMPs generally do not provide normal water year data for the year that they are adopted (i.e., 2005 UWMP forecasts begin in 2010, 2010 UWMP forecasts begin in 2015, and so on).

Consistent with the 2010 baseline data approach, the expected outcomes for reduced Delta reliance and improved regional self-reliance for 2015 and 2020 were taken from Metropolitan's 2010 and 2015 UWMPs respectively. Expected outcomes for 2025-2045 are from the current 2020 UWMP. Documentation of the specific data sources and assumptions are included in the discussions below.

Service Area Demands without Water Use Efficiency

In alignment with the Guidebook Appendix C, this analysis uses normal water year demands, rather than normal water year supplies to calculate expected outcomes in terms of the percentage of water used. Using normal water year demands serves as a proxy for the amount of supplies that would be used in a normal water year, which helps alleviate issues associated with how supply capability is presented to fulfill requirements of the Act versus how supplies might be accounted for to demonstrate consistency with WR P1.

Because WR P1 considers water use efficiency savings a source of water supply, water suppliers such as Metropolitan that explicitly calculate and report water use efficiency savings in their UWMP will need to make an adjustment to properly reflect normal water year demands in the calculation of reduced reliance. As explained in the Guidebook Appendix C, water use efficiency savings must be added back to the normal year demands to represent demands without water use efficiency savings accounted for; otherwise the effect of water use efficiency savings on regional self-reliance would be overestimated. Table A.11-1 shows the results of this adjustment for Metropolitan. Supporting narratives and documentation for all of the data shown in Table A.11-1 are provided below.

Table A.11-1
Demands without Water Use Efficiency Accounted For

Total Service Area Water Demands (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Demands with Water Use Efficiency Accounted For	4,628,000	4,563,000	4,163,000	3,763,000	3,821,000	3,893,000	3,936,000	3,985,000
Reported Water Use Efficiency	865,000	936,000	1,056,000	1,162,000	1,211,000	1,263,000	1,325,000	1,389,000
Service Area Demands without Water Use Efficiency Accounted For	**5,493,000**	**5,499,000**	**5,219,000**	**4,925,000**	**5,032,000**	**5,156,000**	**5,261,000**	**5,374,000**

Service Area Demands without Water Use Efficiency

The service area demands shown in Table A.11-1 represent the total retail water demands for Metropolitan's service area and include municipal and industrial demands, agricultural demands, seawater barrier demands, and storage replenishment demands. These demand types and the modeling methodologies used to calculate them are described in Section 2.2 and Appendix 1 of Metropolitan's UWMP.

Water Use Efficiency

The water use efficiency numbers shown in Table A.11-1 represent the total water use efficiency savings (conservation) for Metropolitan's region, including savings from active, code-based, price-effect and pre-1990 sources. These sources of water use efficiency and the methodologies used to calculate them are described in Section 2.2, Section 3.4, Section 3.7 and Appendix 1 of Metropolitan's UWMP.

The demand and water use efficiency data shown in Table A.11-1 were collected from the following sources:

- Baseline (2010) values – Metropolitan's 2005 UWMP, Table 2-6: Metropolitan Regional Water Demand Average Year
- 2015 values – Metropolitan's 2010 UWMP, Table 2-8: Metropolitan Regional Water Demands Average Year
- 2020 values – Metropolitan's 2015 UWMP, Table 2-3: Metropolitan Regional Water Demands Average Year
- 2025-2045 values – Metropolitan's 2020 UWMP, Table 2-3: Metropolitan Regional Water Demands Normal Water Year

Supplies Contributing to Regional Self-Reliance

For a covered action to demonstrate consistency with the Delta Plan, WR P1 subsection (c)(1)(C) states that water suppliers must report the expected outcomes for measurable improvement in regional self-reliance. Table A.11-2 shows expected outcomes for supplies contributing to regional self-reliance both in amount and as a percentage. The numbers shown in Table A.11-2 represent efforts to improve regional self-reliance for Metropolitan's entire service area and include the total contributions of Metropolitan and its members as well as their customers. Supporting narratives and documentation for the all of the data shown in Table A.11-2 are provided below.

The results shown in Table A.11-2 demonstrate that Metropolitan's service area is measurably improving its regional self-reliance. In the near-term (2025), the expected outcome for normal water year regional self-reliance increases by 747 TAF from the 2010 baseline; this represents an increase of about 23 percent of 2025 normal water year retail demands. In the long-term (2045), normal water year regional self-reliance is expected to increase by more than 1.2 MAF from the 2010 baseline; this represents an increase of 25 percent of 2045 normal water year retail demands.

Table A.11-2
Supplies Contributing to Regional Self-Reliance

Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Use Efficiency	865,000	936,000	1,056,000	1,162,000	1,211,000	1,263,000	1,325,000	1,389,000
Water Recycling	316,000	348,000	436,000	550,000	613,000	687,000	698,000	706,000
Stormwater Capture and Use	100,000	103,000	110,000	80,000	82,000	82,000	82,000	82,000
Advanced Water Technologies	111,000	101,000	194,000	194,000	208,000	209,000	209,000	210,000
Conjunctive Use Projects	1,416,000	1,429,000	1,303,000	1,255,000	1,273,000	1,296,000	1,311,000	1,326,000
Local and Regional Water Supply and Storage Projects	252,000	224,000	261,000	257,000	257,000	258,000	258,000	258,000
Other Programs and Projects that Contribute to Regional Self-Reliance	875,000	1,250,000	1,200,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Water Supplies Contributing to Regional Self-Reliance	**3,935,000**	**4,391,000**	**4,560,000**	**4,748,000**	**4,894,000**	**5,045,000**	**5,133,000**	**5,221,000**

Service Area Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Demands without Water Use Efficiency Accounted For	5,493,000	5,499,000	5,219,000	4,925,000	5,032,000	5,156,000	5,261,000	5,374,000

Change in Regional Self Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Supplies Contributing to Regional Self-Reliance	3,935,000	4,391,000	4,560,000	4,748,000	4,894,000	5,045,000	5,133,000	5,221,000
Change in Supplies Contributing to Regional Self-Reliance	**NA**	**456,000**	**625,000**	**813,000**	**959,000**	**1,110,000**	**1,198,000**	**1,286,000**

Percent Change in Regional Self Reliance (As Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Percent of Supplies Contributing to Regional Self-Reliance	71.6%	79.9%	87.4%	96.4%	97.3%	97.8%	97.6%	97.2%
Change in Percent of Supplies Contributing to Regional Self-Reliance	**NA**	**8.2%**	**15.7%**	**24.8%**	**25.6%**	**26.2%**	**25.9%**	**25.5%**

Water Use Efficiency

The water use efficiency information shown in Table A.11-2 is taken directly from Table A.11-1 above.

Water Recycling

The water recycling values shown in Table A.11-2 reflect the total recycled water production in Metropolitan's service area as described in Section 3.5 and Appendix 2 of Metropolitan's UWMP.

Stormwater Capture and Use

The stormwater capture and use data shown in Table A.11-2 include supplies from local surface water production as described in Section 1.4 and Appendix 2 of Metropolitan's UWMP.

These values do not include production from regional storage reservoirs; storage in these reservoirs is comprised of previously stored water from sources already reflected in Tables A.11-2 and A.11-3. These regional storage resources are generally used to provide additional regional self-reliance in dry years, which is not reflected in this normal water year analysis. The regional storage reservoirs and their yields are described in Section 3.6, Appendix 2 and Appendix 3 of Metropolitan's UWMP.

The stormwater capture and use values shown in Table A.11-2 also do not include stormwater capture that is used to recharge local groundwater basins. Stormwater capture for groundwater recharge supports production of groundwater in the region, and for the purposes of this analysis that production is already captured in Table A.11-2 under conjunctive use projects.

Advanced Water Technologies

The advanced water technologies data shown in Table A.11-2 include total groundwater recovery and seawater desalination production in Metropolitan's service area as described in Section 3.5 and Appendix 2 of Metropolitan's UWMP.

Conjunctive Use Projects

The values for conjunctive use projects shown in Table A.11-2 represent total groundwater production in the region as described in Section 1.4 and Appendix 2 of Metropolitan's UWMP.

The conjunctive use projects numbers shown in Table A.11-2 do not include production from regional groundwater conjunctive use programs. As described in the stormwater capture and use discussion above, these regional storage programs rely on previously stored water from sources already reflected in Tables A.11-2 and A.11-3 and are generally used to provide additional regional self-reliance in dry-years. The regional groundwater conjunctive use programs and their yields are described in Section 3.6 and Appendix 3.

Local and Regional Water Supply and Storage Programs

The data for local and regional water supply and storage programs shown in Table A.11-2 include supplies from the Los Angeles Aqueduct. This supply is described in Section 1.4 and Appendix 2 of Metropolitan's UWMP.

The local and regional supply numbers shown in Table A.11-2, except for "Other Programs and Projects that Contribute to Regional Self-Reliance" which is discussed below, were obtained from the following sources:

- Baseline (2010) values – Metropolitan's 2005 UWMP, Table 2-6: Metropolitan Regional Water Demand Average Year

- 2015 values – Metropolitan's 2010 UWMP, Table 2-8: Metropolitan Regional Water Demands Average Year
- 2020 values – Metropolitan's 2015 UWMP, Table 2-3: Metropolitan Regional Water Demands Average Year
- 2025-2045 values – Metropolitan's 2020 UWMP, Table 2-3: Metropolitan Regional Water Demands Normal Water Year

Other Programs and Projects that Contribute to Regional Self-Reliance

Other programs and projects that contribute to regional self-reliance shown in Table A.11-2 include current programs from the Colorado River Aqueduct. Colorado River supplies include Metropolitan's basic Colorado River apportionment, as well as supplies that result from existing and committed programs, including those from the IID-MWD Conservation Program, the implementation of the Quantification Settlement Agreement (QSA), related agreements, and the exchange agreement with SDCWA. Colorado River Aqueduct supplies and programs are described in Section 3.1 and Appendix 3 of Metropolitan's UWMP.

The values shown in Table A.11-2 for other programs and projects that contribute to regional self-reliance come from the following sources:

- Baseline (2010) values – Metropolitan's 2005 UWMP, Table A.3-7: Maximum Expected Colorado River Aqueduct Deliveries Year 2010 (Average Year)
- 2015 values – Metropolitan's 2010 UWMP, Table A.3-7: Maximum Expected Colorado River Aqueduct Deliveries Year 2015 (Average Year)
- 2020 values – Metropolitan's 2015 UWMP, Table A.3-7: Maximum Expected Colorado River Aqueduct Deliveries Year 2020 (Average Year)
- 2025-2045 values – Metropolitan's 2020 UWMP, Table A.3-7: Maximum Expected Colorado River Aqueduct Deliveries Years 2025, 2030, 2035, 2040, 2045 (Normal Water Year)

Reliance on Water Supplies from the Delta Watershed

In order for a covered action to demonstrate consistency with the Delta Plan, WR P1 subsection (c)(1)(C) requires that water suppliers report the expected outcomes for measurable reductions in supplies from the Delta watershed either as an amount or as a percentage. This analysis provides both calculations. Based on the methodology described in Guidebook Appendix C, and consistent with the approach of this analysis in not including projects under development, this accounting does not include any supplies from potential future covered actions. Table A.11-3 shows the expected outcomes for reliance on supplies from the Delta watershed for Metropolitan's service area. Supporting narratives and documentation for the all of the data shown in Table A.11-3 are provided below.

The results shown in Table A.11-3 demonstrate that Metropolitan's service area is measurably reducing its Delta reliance. In the near-term (2025), the expected outcome for normal water year reliance on supplies from the Delta watershed decreased by 301 TAF from the 2010 baseline; this represents a decrease of 3 percent of 2025 normal water year retail demands. In the long-term (2045), normal water year reliance on supplies from the Delta watershed decreased by 314 TAF from the 2010 baseline; this represents a decrease of just over 5 percent of 2045 normal water year retail demands.

Table A.11-3
Reliance on Water Supplies from the Delta Watershed

Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
CVP/SWP Contract Supplies	1,472,000	1,029,000	984,000	1,133,000	1,130,000	1,128,000	1,126,000	1,126,000
Delta/Delta Tributary Diversions	-	-	-	-	-	-	-	-
Transfers and Exchanges of Supplies from the Delta Watershed	20,000	44,000	91,000	58,000	52,000	52,000	52,000	52,000
Other Water Supplies from the Delta Watershed	-	-	-	-	-	-	-	-
Total Water Supplies from the Delta Watershed	**1,492,000**	**1,073,000**	**1,075,000**	**1,191,000**	**1,182,000**	**1,180,000**	**1,178,000**	**1,178,000**

Service Area Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Demands without Water Use Efficiency Accounted For	5,493,000	5,499,000	5,219,000	4,925,000	5,032,000	5,156,000	5,261,000	5,374,000

Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000
Change in Supplies from the Delta Watershed	**NA**	**(419,000)**	**(417,000)**	**(301,000)**	**(310,000)**	**(312,000)**	**(314,000)**	**(314,000)**

Percent Change in Supplies from the Delta Watershed (As a Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Percent of Supplies from the Delta Watershed	27.2%	19.5%	20.6%	24.2%	23.5%	22.9%	22.4%	21.9%
Change in Percent of Supplies from the Delta Watershed	**NA**	**-7.6%**	**-6.6%**	**-3.0%**	**-3.7%**	**-4.3%**	**-4.8%**	**-5.2%**

CVP/SWP Contract Supplies

The CVP/SWP contract supplies shown in Table A.11-3 include Metropolitan's SWP Table A and Article 21 supplies. These supplies are described in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

The values shown in Table A.11-3 do not include Desert Water Agency/Coachella Valley Water District SWP contract supplies. These supplies are exchanged with Desert Water Agency and Coachella Valley Water District for an equal amount of Colorado River water, which is reflected in the Colorado River Aqueduct supplies shown in Table A.11-2. In addition, Desert Water Agency and Coachella Valley Water District should include their SWP contract supplies in their own accountings of reduced reliance. Additional information on these exchange agreements can be found in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

These values also do not include supplies from San Luis Carryover storage or Central Valley storage programs because storage in these programs comprises previously stored water from sources already reflected in Table A.11-3. These storage programs are generally used to provide additional regional self-reliance in dry years, which is not reflected in this normal water year analysis. The Central Valley storage projects and their yields are described in Section 3.3, and Appendix 3. San Luis Carryover storage is described in Section 3.2 and Appendix 3.

Transfers and Exchanges of Supplies from the Delta Watershed

The transfers and exchanges of supplies from the Delta watershed shown in Table A.11-3 include supplies from the San Bernardino Valley MWD Program, Yuba River Accord Purchase Program, the San Gabriel Valley MWD Program, Irvine Ranch Water District Storage and Exchange Program, and other generic SWP and Central Valley transfers and exchanges. These programs are described in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

Supplies from the Delta Watershed shown in Table A.11-3 are from the following sources:

- Baseline (2010) values – Metropolitan's 2005 UWMP, Table A.3-7: California Aqueduct Program Capabilities Year 2010 (Average Year)

- 2015 values – Metropolitan's 2010 UWMP, Table A.3-7: California Aqueduct Program Capabilities Year 2015 (Average Year)
- 2020 values – Metropolitan's 2015 UWMP, Table A.3-7: California Aqueduct Program Capabilities Year 2020 (Average Year)
- 2025-2045 values – Metropolitan's 2020 UWMP, Table A.3-7: California Aqueduct Program Capabilities Years 2025, 2030, 2035, 2040, 2045 (Normal Water Year)

A.11.4 UWMP Implementation

In addition to the analysis and documentation described above, WR P1 subsection (c)(1)(B) requires that all programs and projects included in the UWMP that are locally cost-effective and technically feasible, which reduce reliance on the Delta, are identified, evaluated, and implemented consistent with the implementation schedule. WR P1 (c)(1)(B) states that:

> *(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta*[.]

In accordance with Water Code Section 10631(f), water suppliers must already include in their UWMP a detailed description of expected future projects and programs that they may implement to increase the amount of water supply available to them in normal and single-dry water years and for a period of drought lasting five consecutive years. The UWMP description must also identify specific projects, include a description of the increase in water supply that is expected to be available from each project, and include an estimate regarding the implementation timeline for each project or program.

Section 3 of Metropolitan's UWMP summarizes the implementation plan and continued progress in developing a diversified water portfolio to meet the region's water needs.

Water Use Efficiency

The water use efficiency numbers used in this analysis include the total water use efficiency savings (conservation) for the service area, including savings from active, code-based, price-effect and pre-1990 savings. The specific water use efficiency programs and their implementation are described in Section 3.4 of Metropolitan's UWMP.

Water Recycling

The water recycling values used in this analysis reflect the total recycled water production in Metropolitan's service area. Water recycling programs and implementation are discussed in Section 3.5 of Metropolitan's UWMP. In addition, individual project-level details are provided in Appendix 5.

Stormwater Capture and Use

The stormwater capture and use data used in this analysis include supplies from local surface water production. Local surface water production and its implementation are discussed in Appendix 2 of Metropolitan's UWMP.

Advanced Water Technologies

The advanced water technologies data used in this analysis include total groundwater recovery and seawater desalination production in Metropolitan's service. Groundwater recovery and seawater desalination programs and implementation are described in Section 3.5 of Metropolitan's UWMP. In addition, individual project-level details are provided in Appendix 5.

Conjunctive Use Projects

The values for conjunctive use projects used in this analysis represent total groundwater production in the region. Groundwater production and its implementation are discussed in Appendix 2 of Metropolitan's UWMP.

Local and Regional Water Supply and Storage Programs

The data for local and regional water supply and storage programs shown this analysis include supplies from the Los Angeles Aqueduct. This program and its implementation are described in Appendix 2 of Metropolitan's UWMP.

Other Programs and Projects that Contribute to Regional Self-Reliance

Other programs and projects that contribute to regional self-reliance used in this analysis include current programs from the Colorado River Aqueduct. Colorado River supplies include Metropolitan's basic Colorado River apportionment, as well as supplies that result from existing and committed programs, including those from the IID-MWD Conservation Program, the implementation of the Quantification Settlement Agreement (QSA), related agreements, and the exchange agreement with SDCWA. Colorado River Aqueduct programs and their implementation are described in Section 3.1 and Appendix 3 of Metropolitan's UWMP.

CVP/SWP Contract Supplies

The CVP/SWP contract supplies shown in this analysis include Metropolitan's SWP Table A and Article 21 supplies. These supplies and their implementation are described in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

Transfers and Exchanges of Supplies from the Delta Watershed

The transfers and exchanges of supplies from the Delta watershed shown in this analysis include supplies from the San Bernardino Valley MWD Program, Yuba River Accord Purchase Program, the San Gabriel Valley MWD Program, Irvine Ranch Water District Storage and Exchange Program, and other generic SWP and Central Valley transfers and exchanges. These programs and their implementation are described in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

A.11.5 2015 UWMP Appendix 11

The information contained in this Appendix 11 is also intended to be a new Appendix 11 attached to Metropolitan's 2015 UWMP consistent with WR P1 subsection (c)(1)(C) (Cal. Code Regs. tit. 23, § 5003). Metropolitan provided notice of the availability of the draft 2020 UWMP (including this Appendix 11 which will also be a new Appendix 11 to its 2015 UWMP) and WSCP and the public hearing to consider adoption of both plans and Appendix 11 to the 2015 UWMP in accordance with CWC Sections 10621(b) and 10642, and Government Code Section 6066, and Chapter 17.5 (starting with Section 7290) of Division 7 of Title 1 of the Government Code. The public review drafts of the 2020 UWMP, Appendix 11 to the 2015 UWMP, and the WSCP were posted prominently on Metropolitan's website, mwdh2o.com, starting February 1, 2021, more than 60 days in advance of the public hearing on April 12, 2021. The notice of availability of the documents was sent to Metropolitan's member agencies, as well as cities and counties in Metropolitan's service area. In addition, a public notice advertising the public hearing in English and Spanish was published in 12 Southern California newspapers. The notification in English language newspapers was published on February 1 and 8, 2021. The notification was published on January 28-30, 2021 and February 1, 4-6, and 8, 2021 in Spanish language newspapers, satisfying the requirement for non-English language notification. Copies of: (1) the notification letter sent to the member agencies, cities and counties in Metropolitan's service area, and (2) the notice published in the newspapers are included in the 2020 UWMP Section 5. Thus, this Appendix 11 to Metropolitan's 2020 UWMP, which was adopted with Metropolitan's 2020 UWMP, will also be recognized and treated as Appendix 11 to Metropolitan's 2015 UWMP.

Metropolitan held the public hearing for the draft 2020 UWMP, draft Appendix 11 to the 2015 UWMP, and draft WSCP on April 12, 2021, at the Board's Water Planning and Stewardship Committee meeting, held online due to COVID-19 concerns. On May 11, 2021, Metropolitan's Board determined that the 2020 UWMP and the WSCP are consistent with the MWD Act and accurately represent the water resources plan for Metropolitan's service area. In addition, Metropolitan's Board determined that Appendix 11 to both the 2015 UWMP and the 2020 UWMP includes all of the elements described in Delta Plan Policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (Cal. Code Regs. tit. 23, § 5003), which need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action. As stated in Resolutions 9279, 9280, and 9281, the Board adopted the 2020 UWMP, Appendix 11 to the 2015 UWMP, and the WSCP and authorized their submittal to the State of California. Copies of Resolutions 9279, 9280, and 9281 are included in the 2020 UWMP Section 5, and Resolution 9281 for the WSCP is attached to the WSCP as Attachment C.

Appendix 11

QUANTIFYING REGIONAL SELF-RELIANCE AND REDUCED RELIANCE ON WATER SUPPLIES FROM THE DELTA WATERSHED

Appendix 11
METROPOLITAN'S
REDUCED DELTA RELIANCE REPORTING

A.11.1 Background

Under the Sacramento-San Joaquin Delta Reform Act of 2009, state and local public agencies proposing a covered action in the Delta,[1] prior to initiating the implementation of that action, must prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with applicable Delta Plan policies and submit that certification to the Delta Stewardship Council.[2] Anyone may appeal a certification of consistency, and if the Delta Stewardship Council grants the appeal, the covered action may not be implemented until the agency proposing the covered action submits a revised certification of consistency, and either no appeal is filed, or the Delta Stewardship Council denies the subsequent appeal.[3]

An urban water supplier that anticipates participating in or receiving water from a proposed covered action such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Delta should provide information in their 2015 and 2020 Urban Water Management Plans (UWMPs) that can then be used in the covered action process to demonstrate consistency with Delta Plan Policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (WR P1).[4]

WR P1 details what is needed for a covered action to demonstrate consistency with reduced reliance on the Delta and improved regional self-reliance. WR P1 subsection (a) states that:

(a) Water shall not be exported from, transferred through, or used in the Delta if all of the following apply:

> *(1) One or more water suppliers that would receive water as a result of the export, transfer, or use have failed to adequately contribute to reduced reliance on the Delta and improved regional self-reliance consistent with all of the requirements listed in paragraph (1) of subsection (c);*
>
> *(2) That failure has significantly caused the need for the export, transfer, or use; and*
>
> *(3) The export, transfer, or use would have a significant adverse environmental impact in the Delta.*

WR P1 subsection (c)(1) further defines what adequately contributing to reduced reliance on the Delta means in terms of (a)(1) above.

(c)(1) Water suppliers that have done all the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:

> *(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;*

[1] Water Code, § 85057.5; Cal. Code Regs. tit. 23, § 5001.
[2] Water Code, § 85225; Delta Plan, App. D.
[3] Water Code, §§ 85225.10-85225.25; Delta Plan, App. D.
[4] Cal. Code Regs., tit. 23, § 5003.

(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and

(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code Section 1011(a).

The analysis and documentation provided below include all of the elements described in WR P1(c)(1) that need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action.

A.11.2 Summary of Expected Outcomes for Reduced Reliance on the Delta

As stated in WR P1(c)(1)(C), the policy requires that, commencing in 2015, UWMPs include expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance. WR P1 further states that those outcomes shall be reported in the UWMP as the reduction in the amount of water used, or in the percentage of water used, from the Delta.

The expected outcomes for Metropolitan's Delta reliance and regional self-reliance were developed using the approach and guidance described in Appendix C of DWR's Urban Water Management Plan Guidebook 2020 (Guidebook Appendix C) issued in March 2021.

The data used in this analysis represent the total regional efforts of Metropolitan and its member agencies and their customers (many of them, retail agencies) and were developed in conjunction with Metropolitan's member agencies as part of the UWMP coordination process as described in Section 5 of Metropolitan's UWMP. In accordance with UMWP requirements, Metropolitan's member agencies and their customers (many of them, retail agencies) also report demands and supplies for their service areas in their respective UWMPs. The data reported by those agencies are not additive to the regional totals shown in Metropolitan's UWMP; rather, their reporting represents subtotals of the regional total and should be considered as such for the purposes of determining reduced reliance on the Delta.

While the demands that Metropolitan's member agencies and their customers report in their UWMPs are a good reflection of the demands in their respective service areas, they do not adequately represent each water supplier's contributions to reduced reliance on the Delta. In order to calculate and report their reliance on water supplies from the Delta watershed, water suppliers that receive water from the Delta through other regional or wholesale water suppliers would need to determine the amount of Delta water that they receive from the regional or wholesale supplier. Two specific pieces of information are needed to accomplish this: first is the quantity of demands on the regional or wholesale water supplier that accurately reflect a supplier's contributions to reduced reliance on the Delta, and second is the quantity of a supplier's demands on the regional or wholesale water supplier that are met by supplies from the Delta watershed.

For water suppliers that make investments in regional projects or programs it may be infeasible to quantify their demands on the regional or wholesale water supplier in a way that accurately reflects their individual contributions to reduced reliance on the Delta. Due to the extensive, long-

standing and successful implementation of regional demand management and local resource incentive programs in Metropolitan's service area, this infeasibility holds true for Metropolitan's members as well their customers. For Metropolitan's service area, reduced reliance on supplies from the Delta watershed can only be accurately accounted at the regional level, as is demonstrated in this analysis.

The following provides a summary of the near-term (2025) and long-term (2045) expected outcomes for Metropolitan's Delta reliance and regional self-reliance. The results show that as a region, Metropolitan and its members as well as their customers are measurably reducing reliance on the Delta and improving regional self-reliance, both as an amount of water used and as a percentage of water used.

Expected Outcomes for Regional Self-Reliance

- Near-term (2025) – Normal water year regional self-reliance is expected to increase by 813 TAF from the 2010 baseline; this represents an increase of almost 25 percent of 2025 normal water year retail demands (Table A.11-2).
- Long-term (2045) – Normal water year regional self-reliance is expected to increase by more than 1.28 MAF from the 2010 baseline, this represents an increase of more than 25 percent of 2045 normal water year retail demands (Table A.11-2).

Expected Outcomes for Reduced Reliance on Supplies from the Delta Watershed

- Near-term (2025) – Normal water year reliance on supplies from the Delta watershed decreased by 301 TAF from the 2010 baseline, this represents a decrease of 3 percent of 2025 normal water year retail demands (Table A.11-3).
- Long-term (2045) – Normal water year reliance on supplies from the Delta watershed decreased by 314 TAF from the 2010 baseline, this represents a decrease of just over 5 percent of 2045 normal water year retail demands (Table A.11-3).

A11.3 Demonstration of Reduced Reliance on the Delta

The methodology used to determine Metropolitan's reduced Delta reliance and improved regional self-reliance is consistent with the approach detailed in DWR's UWMP Guidebook Appendix C, including the use of narrative justifications for the accounting of supplies and the documentation of specific data sources. Some of the key assumptions underlying Metropolitan's demonstration of reduced reliance include:

- All data were obtained from the current 2020 UWMP or previously adopted UWMPs and represent average or normal water year conditions.
- All analyses were conducted at the service area level, and all data reflect the total contributions of Metropolitan and its members as well as their customers.
- No projects or programs that are described in the UWMPs as "Projects Under Development" were included in the accounting of supplies.

Baseline and Expected Outcomes

In order to calculate the expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance, a baseline is needed to compare against. This analysis uses a normal water year representation of 2010 as the baseline, which is consistent with the approach described in the Guidebook Appendix C. Data for the 2010 baseline were taken from Metropolitan's 2005 UWMP as the UWMPs generally do not provide normal water year data for

the year that they are adopted (i.e., 2005 UWMP forecasts begin in 2010, 2010 UWMP forecasts begin in 2015, and so on).

Consistent with the 2010 baseline data approach, the expected outcomes for reduced Delta reliance and improved regional self-reliance for 2015 and 2020 were taken from Metropolitan's 2010 and 2015 UWMPs respectively. Expected outcomes for 2025-2045 are from the current 2020 UWMP. Documentation of the specific data sources and assumptions are included in the discussions below.

Service Area Demands without Water Use Efficiency

In alignment with the Guidebook Appendix C, this analysis uses normal water year demands, rather than normal water year supplies to calculate expected outcomes in terms of the percentage of water used. Using normal water year demands serves as a proxy for the amount of supplies that would be used in a normal water year, which helps alleviate issues associated with how supply capability is presented to fulfill requirements of the Act versus how supplies might be accounted for to demonstrate consistency with WR P1.

Because WR P1 considers water use efficiency savings a source of water supply, water suppliers such as Metropolitan that explicitly calculate and report water use efficiency savings in their UWMP will need to make an adjustment to properly reflect normal water year demands in the calculation of reduced reliance. As explained in the Guidebook Appendix C, water use efficiency savings must be added back to the normal year demands to represent demands without water use efficiency savings accounted for; otherwise the effect of water use efficiency savings on regional self-reliance would be overestimated. Table A.11-1 shows the results of this adjustment for Metropolitan. Supporting narratives and documentation for all of the data shown in Table A.11-1 are provided below.

Table A.11-1
Demands without Water Use Efficiency Accounted For

Total Service Area Water Demands (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Demands with Water Use Efficiency Accounted For	4,628,000	4,563,000	4,163,000	3,763,000	3,821,000	3,893,000	3,936,000	3,985,000
Reported Water Use Efficiency	865,000	936,000	1,056,000	1,162,000	1,211,000	1,263,000	1,325,000	1,389,000
Service Area Demands without Water Use Efficiency Accounted For	**5,493,000**	**5,499,000**	**5,219,000**	**4,925,000**	**5,032,000**	**5,156,000**	**5,261,000**	**5,374,000**

Service Area Demands without Water Use Efficiency

The service area demands shown in Table A.11-1 represent the total retail water demands for Metropolitan's service area and include municipal and industrial demands, agricultural demands, seawater barrier demands, and storage replenishment demands. These demand types and the modeling methodologies used to calculate them are described in Section 2.2 and Appendix 1 of Metropolitan's UWMP.

Water Use Efficiency

The water use efficiency numbers shown in Table A.11-1 represent the total water use efficiency savings (conservation) for Metropolitan's region, including savings from active, code-based, price-effect and pre-1990 sources. These sources of water use efficiency and the methodologies used to calculate them are described in Section 2.2, Section 3.4, Section 3.7 and Appendix 1 of Metropolitan's UWMP.

The demand and water use efficiency data shown in Table A.11-1 were collected from the following sources:

- Baseline (2010) values – Metropolitan's 2005 UWMP, Table 2-6: Metropolitan Regional Water Demand Average Year
- 2015 values – Metropolitan's 2010 UWMP, Table 2-8: Metropolitan Regional Water Demands Average Year
- 2020 values – Metropolitan's 2015 UWMP, Table 2-3: Metropolitan Regional Water Demands Average Year
- 2025-2045 values – Metropolitan's 2020 UWMP, Table 2-3: Metropolitan Regional Water Demands Normal Water Year

Supplies Contributing to Regional Self-Reliance

For a covered action to demonstrate consistency with the Delta Plan, WR P1 subsection (c)(1)(C) states that water suppliers must report the expected outcomes for measurable improvement in regional self-reliance. Table A.11-2 shows expected outcomes for supplies contributing to regional self-reliance both in amount and as a percentage. The numbers shown in Table A.11-2 represent efforts to improve regional self-reliance for Metropolitan's entire service area and include the total contributions of Metropolitan and its members as well as their customers. Supporting narratives and documentation for the all of the data shown in Table A.11-2 are provided below.

The results shown in Table A.11-2 demonstrate that Metropolitan's service area is measurably improving its regional self-reliance. In the near-term (2025), the expected outcome for normal water year regional self-reliance increases by 747 TAF from the 2010 baseline; this represents an increase of about 23 percent of 2025 normal water year retail demands. In the long-term (2045), normal water year regional self-reliance is expected to increase by more than 1.2 MAF from the 2010 baseline; this represents an increase of 25 percent of 2045 normal water year retail demands.

Table A.11-2
Supplies Contributing to Regional Self-Reliance

Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Use Efficiency	865,000	936,000	1,056,000	1,162,000	1,211,000	1,263,000	1,325,000	1,389,000
Water Recycling	316,000	348,000	436,000	550,000	613,000	687,000	698,000	706,000
Stormwater Capture and Use	100,000	103,000	110,000	80,000	82,000	82,000	82,000	82,000
Advanced Water Technologies	111,000	101,000	194,000	194,000	208,000	209,000	209,000	210,000
Conjunctive Use Projects	1,416,000	1,429,000	1,303,000	1,255,000	1,273,000	1,296,000	1,311,000	1,326,000
Local and Regional Water Supply and Storage Projects	252,000	224,000	261,000	257,000	257,000	258,000	258,000	258,000
Other Programs and Projects that Contribute to Regional Self-Reliance	875,000	1,250,000	1,200,000	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Water Supplies Contributing to Regional Self-Reliance	**3,935,000**	**4,391,000**	**4,560,000**	**4,748,000**	**4,894,000**	**5,045,000**	**5,133,000**	**5,221,000**

Service Area Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Demands without Water Use Efficiency Accounted For	5,493,000	5,499,000	5,219,000	4,925,000	5,032,000	5,156,000	5,261,000	5,374,000

Change in Regional Self Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Supplies Contributing to Regional Self-Reliance	3,935,000	4,391,000	4,560,000	4,748,000	4,894,000	5,045,000	5,133,000	5,221,000
Change in Supplies Contributing to Regional Self-Reliance	**NA**	**456,000**	**625,000**	**813,000**	**959,000**	**1,110,000**	**1,198,000**	**1,286,000**

Percent Change in Regional Self Reliance (As Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Percent of Supplies Contributing to Regional Self-Reliance	71.6%	79.9%	87.4%	96.4%	97.3%	97.8%	97.6%	97.2%
Change in Percent of Supplies Contributing to Regional Self-Reliance	**NA**	**8.2%**	**15.7%**	**24.8%**	**25.6%**	**26.2%**	**25.9%**	**25.5%**

Water Use Efficiency

The water use efficiency information shown in Table A.11-2 is taken directly from Table A.11-1 above.

Water Recycling

The water recycling values shown in Table A.11-2 reflect the total recycled water production in Metropolitan's service area as described in Section 3.5 and Appendix 2 of Metropolitan's UWMP.

Stormwater Capture and Use

The stormwater capture and use data shown in Table A.11-2 include supplies from local surface water production as described in Section 1.4 and Appendix 2 of Metropolitan's UWMP.

These values do not include production from regional storage reservoirs; storage in these reservoirs is comprised of previously stored water from sources already reflected in Tables A.11-2 and A.11-3. These regional storage resources are generally used to provide additional regional self-reliance in dry years, which is not reflected in this normal water year analysis. The regional storage reservoirs and their yields are described in Section 3.6, Appendix 2 and Appendix 3 of Metropolitan's UWMP.

The stormwater capture and use values shown in Table A.11-2 also do not include stormwater capture that is used to recharge local groundwater basins. Stormwater capture for groundwater recharge supports production of groundwater in the region, and for the purposes of this analysis that production is already captured in Table A.11-2 under conjunctive use projects.

Advanced Water Technologies

The advanced water technologies data shown in Table A.11-2 include total groundwater recovery and seawater desalination production in Metropolitan's service area as described in Section 3.5 and Appendix 2 of Metropolitan's UWMP.

Conjunctive Use Projects

The values for conjunctive use projects shown in Table A.11-2 represent total groundwater production in the region as described in Section 1.4 and Appendix 2 of Metropolitan's UWMP.

The conjunctive use projects numbers shown in Table A.11-2 do not include production from regional groundwater conjunctive use programs. As described in the stormwater capture and use discussion above, these regional storage programs rely on previously stored water from sources already reflected in Tables A.11-2 and A.11-3 and are generally used to provide additional regional self-reliance in dry-years. The regional groundwater conjunctive use programs and their yields are described in Section 3.6 and Appendix 3.

Local and Regional Water Supply and Storage Programs

The data for local and regional water supply and storage programs shown in Table A.11-2 include supplies from the Los Angeles Aqueduct. This supply is described in Section 1.4 and Appendix 2 of Metropolitan's UWMP.

The local and regional supply numbers shown in Table A.11-2, except for "Other Programs and Projects that Contribute to Regional Self-Reliance" which is discussed below, were obtained from the following sources:

- Baseline (2010) values – Metropolitan's 2005 UWMP, Table 2-6: Metropolitan Regional Water Demand Average Year

- 2015 values – Metropolitan's 2010 UWMP, Table 2-8: Metropolitan Regional Water Demands Average Year
- 2020 values – Metropolitan's 2015 UWMP, Table 2-3: Metropolitan Regional Water Demands Average Year
- 2025-2045 values – Metropolitan's 2020 UWMP, Table 2-3: Metropolitan Regional Water Demands Normal Water Year

Other Programs and Projects that Contribute to Regional Self-Reliance

Other programs and projects that contribute to regional self-reliance shown in Table A.11-2 include current programs from the Colorado River Aqueduct. Colorado River supplies include Metropolitan's basic Colorado River apportionment, as well as supplies that result from existing and committed programs, including those from the IID-MWD Conservation Program, the implementation of the Quantification Settlement Agreement (QSA), related agreements, and the exchange agreement with SDCWA. Colorado River Aqueduct supplies and programs are described in Section 3.1 and Appendix 3 of Metropolitan's UWMP.

The values shown in Table A.11-2 for other programs and projects that contribute to regional self-reliance come from the following sources:

- Baseline (2010) values – Metropolitan's 2005 UWMP, Table A.3-7: Maximum Expected Colorado River Aqueduct Deliveries Year 2010 (Average Year)
- 2015 values – Metropolitan's 2010 UWMP, Table A.3-7: Maximum Expected Colorado River Aqueduct Deliveries Year 2015 (Average Year)
- 2020 values – Metropolitan's 2015 UWMP, Table A.3-7: Maximum Expected Colorado River Aqueduct Deliveries Year 2020 (Average Year)
- 2025-2045 values – Metropolitan's 2020 UWMP, Table A.3-7: Maximum Expected Colorado River Aqueduct Deliveries Years 2025, 2030, 2035, 2040, 2045 (Normal Water Year)

Reliance on Water Supplies from the Delta Watershed

In order for a covered action to demonstrate consistency with the Delta Plan, WR P1 subsection (c)(1)(C) requires that water suppliers report the expected outcomes for measurable reductions in supplies from the Delta watershed either as an amount or as a percentage. This analysis provides both calculations. Based on the methodology described in Guidebook Appendix C, and consistent with the approach of this analysis in not including projects under development, this accounting does not include any supplies from potential future covered actions. Table A.11-3 shows the expected outcomes for reliance on supplies from the Delta watershed for Metropolitan's service area. Supporting narratives and documentation for the all of the data shown in Table A.11-3 are provided below.

The results shown in Table A.11-3 demonstrate that Metropolitan's service area is measurably reducing its Delta reliance. In the near-term (2025), the expected outcome for normal water year reliance on supplies from the Delta watershed decreased by 301 TAF from the 2010 baseline; this represents a decrease of 3 percent of 2025 normal water year retail demands. In the long-term (2045), normal water year reliance on supplies from the Delta watershed decreased by 314 TAF from the 2010 baseline; this represents a decrease of just over 5 percent of 2045 normal water year retail demands.

Table A.11-3
Reliance on Water Supplies from the Delta Watershed

Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
CVP/SWP Contract Supplies	1,472,000	1,029,000	984,000	1,133,000	1,130,000	1,128,000	1,126,000	1,126,000
Delta/Delta Tributary Diversions	-	-	-	-	-	-	-	-
Transfers and Exchanges of Supplies from the Delta Watershed	20,000	44,000	91,000	58,000	52,000	52,000	52,000	52,000
Other Water Supplies from the Delta Watershed	-	-	-	-	-	-	-	-
Total Water Supplies from the Delta Watershed	**1,492,000**	**1,073,000**	**1,075,000**	**1,191,000**	**1,182,000**	**1,180,000**	**1,178,000**	**1,178,000**

Service Area Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Demands without Water Use Efficiency Accounted For	5,493,000	5,499,000	5,219,000	4,925,000	5,032,000	5,156,000	5,261,000	5,374,000

Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000
Change in Supplies from the Delta Watershed	**NA**	**(419,000)**	**(417,000)**	**(301,000)**	**(310,000)**	**(312,000)**	**(314,000)**	**(314,000)**

Percent Change in Supplies from the Delta Watershed (As a Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Percent of Supplies from the Delta Watershed	27.2%	19.5%	20.6%	24.2%	23.5%	22.9%	22.4%	21.9%
Change in Percent of Supplies from the Delta Watershed	**NA**	**-7.6%**	**-6.6%**	**-3.0%**	**-3.7%**	**-4.3%**	**-4.8%**	**-5.2%**

CVP/SWP Contract Supplies

The CVP/SWP contract supplies shown in Table A.11-3 include Metropolitan's SWP Table A and Article 21 supplies. These supplies are described in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

The values shown in Table A.11-3 do not include Desert Water Agency/Coachella Valley Water District SWP contract supplies. These supplies are exchanged with Desert Water Agency and Coachella Valley Water District for an equal amount of Colorado River water, which is reflected in the Colorado River Aqueduct supplies shown in Table A.11-2. In addition, Desert Water Agency and Coachella Valley Water District should include their SWP contract supplies in their own accountings of reduced reliance. Additional information on these exchange agreements can be found in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

These values also do not include supplies from San Luis Carryover storage or Central Valley storage programs because storage in these programs comprises previously stored water from sources already reflected in Table A.11-3. These storage programs are generally used to provide additional regional self-reliance in dry years, which is not reflected in this normal water year analysis. The Central Valley storage projects and their yields are described in Section 3.3, and Appendix 3. San Luis Carryover storage is described in Section 3.2 and Appendix 3.

Transfers and Exchanges of Supplies from the Delta Watershed

The transfers and exchanges of supplies from the Delta watershed shown in Table A.11-3 include supplies from the San Bernardino Valley MWD Program, Yuba River Accord Purchase Program, the San Gabriel Valley MWD Program, Irvine Ranch Water District Storage and Exchange Program, and other generic SWP and Central Valley transfers and exchanges. These programs are described in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

Supplies from the Delta Watershed shown in Table A.11-3 are from the following sources:

- Baseline (2010) values – Metropolitan's 2005 UWMP, Table A.3-7: California Aqueduct Program Capabilities Year 2010 (Average Year)

- 2015 values – Metropolitan's 2010 UWMP, Table A.3-7: California Aqueduct Program Capabilities Year 2015 (Average Year)
- 2020 values – Metropolitan's 2015 UWMP, Table A.3-7: California Aqueduct Program Capabilities Year 2020 (Average Year)
- 2025-2045 values – Metropolitan's 2020 UWMP, Table A.3-7: California Aqueduct Program Capabilities Years 2025, 2030, 2035, 2040, 2045 (Normal Water Year)

A.11.4 UWMP Implementation

In addition to the analysis and documentation described above, WR P1 subsection (c)(1)(B) requires that all programs and projects included in the UWMP that are locally cost-effective and technically feasible, which reduce reliance on the Delta, are identified, evaluated, and implemented consistent with the implementation schedule. WR P1 (c)(1)(B) states that:

> *(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta*[.]

In accordance with Water Code Section 10631(f), water suppliers must already include in their UWMP a detailed description of expected future projects and programs that they may implement to increase the amount of water supply available to them in normal and single-dry water years and for a period of drought lasting five consecutive years. The UWMP description must also identify specific projects, include a description of the increase in water supply that is expected to be available from each project, and include an estimate regarding the implementation timeline for each project or program.

Section 3 of Metropolitan's UWMP summarizes the implementation plan and continued progress in developing a diversified water portfolio to meet the region's water needs.

Water Use Efficiency

The water use efficiency numbers used in this analysis include the total water use efficiency savings (conservation) for the service area, including savings from active, code-based, price-effect and pre-1990 savings. The specific water use efficiency programs and their implementation are described in Section 3.4 of Metropolitan's UWMP.

Water Recycling

The water recycling values used in this analysis reflect the total recycled water production in Metropolitan's service area. Water recycling programs and implementation are discussed in Section 3.5 of Metropolitan's UWMP. In addition, individual project-level details are provided in Appendix 5.

Stormwater Capture and Use

The stormwater capture and use data used in this analysis include supplies from local surface water production. Local surface water production and its implementation are discussed in Appendix 2 of Metropolitan's UWMP.

Advanced Water Technologies

The advanced water technologies data used in this analysis include total groundwater recovery and seawater desalination production in Metropolitan's service. Groundwater recovery and seawater desalination programs and implementation are described in Section 3.5 of Metropolitan's UWMP. In addition, individual project-level details are provided in Appendix 5.

Conjunctive Use Projects

The values for conjunctive use projects used in this analysis represent total groundwater production in the region. Groundwater production and its implementation are discussed in Appendix 2 of Metropolitan's UWMP.

Local and Regional Water Supply and Storage Programs

The data for local and regional water supply and storage programs shown this analysis include supplies from the Los Angeles Aqueduct. This program and its implementation are described in Appendix 2 of Metropolitan's UWMP.

Other Programs and Projects that Contribute to Regional Self-Reliance

Other programs and projects that contribute to regional self-reliance used in this analysis include current programs from the Colorado River Aqueduct. Colorado River supplies include Metropolitan's basic Colorado River apportionment, as well as supplies that result from existing and committed programs, including those from the IID-MWD Conservation Program, the implementation of the Quantification Settlement Agreement (QSA), related agreements, and the exchange agreement with SDCWA. Colorado River Aqueduct programs and their implementation are described in Section 3.1 and Appendix 3 of Metropolitan's UWMP.

CVP/SWP Contract Supplies

The CVP/SWP contract supplies shown in this analysis include Metropolitan's SWP Table A and Article 21 supplies. These supplies and their implementation are described in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

Transfers and Exchanges of Supplies from the Delta Watershed

The transfers and exchanges of supplies from the Delta watershed shown in this analysis include supplies from the San Bernardino Valley MWD Program, Yuba River Accord Purchase Program, the San Gabriel Valley MWD Program, Irvine Ranch Water District Storage and Exchange Program, and other generic SWP and Central Valley transfers and exchanges. These programs and their implementation are described in Section 3.2 and Appendix 3 of Metropolitan's UWMP.

A.11.5 2015 UWMP Appendix 11

The information contained in this Appendix 11 is also intended to be a new Appendix 11 attached to Metropolitan's 2015 UWMP consistent with WR P1 subsection (c)(1)(C) (Cal. Code Regs. tit. 23, § 5003). Metropolitan provided notice of the availability of the draft 2020 UWMP (including this Appendix 11 which will also be a new Appendix 11 to its 2015 UWMP) and WSCP and the public hearing to consider adoption of both plans and Appendix 11 to the 2015 UWMP in accordance with CWC Sections 10621(b) and 10642, and Government Code Section 6066, and Chapter 17.5 (starting with Section 7290) of Division 7 of Title 1 of the Government Code. The public review drafts of the 2020 UWMP, Appendix 11 to the 2015 UWMP, and the WSCP were posted prominently on Metropolitan's website, mwdh2o.com, starting February 1, 2021, more than 60 days in advance of the public hearing on April 12, 2021. The notice of availability of the documents was sent to Metropolitan's member agencies, as well as cities and counties in Metropolitan's service area. In addition, a public notice advertising the public hearing in English and Spanish was published in 12 Southern California newspapers. The notification in English language newspapers was published on February 1 and 8, 2021. The notification was published on January 28-30, 2021 and February 1, 4-6, and 8, 2021 in Spanish language newspapers, satisfying the requirement for non-English language notification. Copies of: (1) the notification letter sent to the member agencies, cities and counties in Metropolitan's service area, and (2) the notice published in the newspapers are included in the 2020 UWMP Section 5. Thus, this Appendix 11 to Metropolitan's 2020 UWMP, which was adopted with Metropolitan's 2020 UWMP, will also be recognized and treated as Appendix 11 to Metropolitan's 2015 UWMP.

Metropolitan held the public hearing for the draft 2020 UWMP, draft Appendix 11 to the 2015 UWMP, and draft WSCP on April 12, 2021, at the Board's Water Planning and Stewardship Committee meeting, held online due to COVID-19 concerns. On May 11, 2021, Metropolitan's Board determined that the 2020 UWMP and the WSCP are consistent with the MWD Act and accurately represent the water resources plan for Metropolitan's service area. In addition, Metropolitan's Board determined that Appendix 11 to both the 2015 UWMP and the 2020 UWMP includes all of the elements described in Delta Plan Policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (Cal. Code Regs. tit. 23, § 5003), which need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action. As stated in Resolutions 9279, 9280, and 9281, the Board adopted the 2020 UWMP, Appendix 11 to the 2015 UWMP, and the WSCP and authorized their submittal to the State of California. Copies of Resolutions 9279, 9280, and 9281 are included in the 2020 UWMP Section 5, and Resolution 9281 for the WSCP is attached to the WSCP as Attachment C.

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APPENDIX B
ATTACHMENT 2

- **Appendix G "Inland Empire Utilities Agency Reduced Delta Reliance Reporting", Inland Empire Utilities Agency's 2020 Urban Water Management Plan**

Kennedy Jenks

ARCADIS Design & Consultancy for natural and built assets

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

ADDENDUM TO THE 2015 URBAN WATER MANAGEMENT PLAN

Addendum prepared by Kennedy Jenks Consultants

June 2021

2020 UWMP Appendix G
& 2015 UWMP Appendix P

Reduced Delta Reliance Reporting



6/29/2021

Inland Empire Utilities Agency Reduced Delta Reliance Reporting

G.1 Background

IEUA is an urban water supplier and a member agency of MWD. MWD provides IEUA with imported water supplies, which IEUA in turn distributes on a wholesale basis to its retail water purveyors. MWD is a contractor on the State Water Project (SWP) and, due to water quality considerations, all imported water supplies IEUA receives from MWD originate from the SWP system. The SWP system runs from Lake Oroville in Northern California to Southern California, crossing the Sacramento-San Joaquin Delta (Delta) along the way. MWD and its member agencies have made investments into water supply and demand management to regionally reduce impacts on the Delta. These investments bring regional reliability and reduced Delta reliance that make it infeasible for individual MWD member agencies to determine their individual Delta reliance.

As a recipient of imported water from the SWP delivered via MWD, IEUA may indirectly receive water through a proposed covered action, such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Delta. Through this appendix, IEUA is providing information in its 2015 and 2020 UWMPs that may be used in the covered action process, to demonstrate consistency with Delta Plan Policy WR P1, *Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance* (WR P1) [California Code of Regulations (CCR), Title 23, § 5003].

The Delta Plan is a comprehensive, long-term resource management plan for the Sacramento-San Joaquin Delta (Delta) that was developed as part of the Delta Reform Act of 2009 (Water code section 85000 et seq) and includes both regulatory policies and recommendations, aimed at promoting a healthy Delta ecosystem. Delta Plan Policy WR P1 is one of 14 regulatory policies in the Delta Plan. WR P1 identifies UWMPs as the tool to demonstrate consistency with state policy to reduce reliance on the Delta for any Supplier that is participating in or carrying out a proposed covered action or receiving Delta water from a proposed covered action.

Within the supplier's UWMP, information should be provided that can be used to demonstrate consistency with this policy. Section (c)(1) of WR P1 states that suppliers that have (A) completed an urban water management plan, (B) implemented the efficiency measures in that plan, and (C) shown a measurable reduction in Delta reliance and improvement in regional self-reliance in the plan, are contributing to reduced reliance on the Delta and are therefore consistent with WR P1 [CCR, Title 23, § 5003(c)(1)].

The analysis and documentation provided below include all elements described in WR P1(c)(1) and are included in IEUA's 2015 and 2020 UWMP to support a certification of consistency in the case of a future covered action.

G.2 Demonstration of Reduced Reliance

The methodology used to determine IEUA's reduced Delta reliance and improved regional self-reliance is consistent with the approach detailed in DWR's UWMP Guidebook Appendix C, including the use of narrative justifications for the accounting of supplies and the documentation of specific data sources. Some of the key assumptions underlying IEUA's demonstration of reduced reliance includes:

- All data were obtained from the current 2020 UWMP or previously adopted UWMPs and represent average or normal water year conditions.

- All analyses were conducted at the IEUA service area level. Demands on IEUA are the total demands from all its retail agencies. Supplies are the total supplies IEUA manages, which are imported water from MWD and recycled water from its regional water recycling plants.

- No projects or programs that are described in the UWMPs as "Projects Under Development" were included in the accounting of supplies.

G.3 Summary of Expected Outcomes for Reduced Reliance on the Delta

As stated in WR P1(c)(1), the policy requires that, commencing in 2015, UWMPs include expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance. WR P1 further states that those outcomes shall be reported in the UWMP as the reduction in the amount of water used, or in the percentage of water used, from the Delta.

It is important to note that MWD has prepared a detailed analysis that demonstrates the consistency with the Delta Plan Policy in its 2020 UWMP on a region-wide scale that includes its Member Agencies (MWD 2020 UWMP, Appendix 11). From its 2010 baseline, both long-term Regional Self-Reliance and Reduced Reliance on Supplies from the Delta are expected to increase over time. IEUA has adopted MWD's calculation of Reduced Reliance on Supplies from the Delta due to the infeasibility of separating out the delta supplies that IEUA receives from MWD (see Section G.6 and G.7 for details).

IEUA will report its own expected outcomes for Regional Self-Reliance in the following sections (G.4 and G.5). These expected outcomes use the approach and guidance described in Appendix C of DWR's Urban Water Management Plan Guidebook 2020 (Guidebook Appendix C), finalized on March 29, 2021.

The following provides a summary of the near-term (2025) and long-term (2045) expected outcomes for IEUA's regional self-reliance and MWD's regional reduction in reliance on Delta water supplies. The results show that IEUA is measurably improving regional self-reliance and MWD and its member agencies are reducing reliance on Delta supplies, both as an amount of water used and as a percentage of water used.

- Near-term (2025) – IEUA's normal water regional self-reliance is expected to increase by 25 thousand acre-feet (TAF) from the 2010 baseline; this represents an increase of about 10 percent of 2025 normal water year demands (Table G-2).

- Long-term (2045) – IEUA's normal water regional self-reliance is expected to increase by 50 TAF from the 2010 baseline; this represents an increase of about 17 percent of 2045 normal water year demands (Table G-2).

- Near-term (2025) – MWD's normal reliance on water supplies from the Delta Watershed is expected to decrease by 300 thousand acre-feet (TAF) from the 2010 baseline; this represents a decrease of about 3 percent of 2025 normal water year demands (Table G-3).

- Long-term (2045) – MWD's normal reliance on water supplies from the Delta Watershed is expected to decrease by 314 thousand acre-feet (TAF) from the 2010 baseline; this represents a decrease of about 5 percent of 2045 normal water year demands (Table G-3).

G.4 Baseline and Calculation of Service Area Water Demands

In order to calculate the expected outcomes for measurable reduction in Delta reliance and improved regional self-reliance, a baseline is needed to compare against. This analysis uses a normal water year representation of 2010 as the baseline, which is consistent with the approach described in the Guidebook Appendix C.

Table G-1 shows the total service area water demands for IEUA for 2010 through 2045. These water demands include recycled water and imported water demand on IEUA from its retail agencies. The table also shows reported water use efficiency and calculates the total service area water demands without water use efficiency.

The data sources for the values in this table and calculations are explained below.

Service Area Demands with Water Use Efficiency Accounted For:

- Baseline (2010) value: The sum of the imported water and recycled water demands, as reported in IEUA's 2010 UWMP, Tables 3-10 and 3-15.

- 2015 value: The sum of the imported water and recycled water demands on IEUA, as reported in IEUA's 2015 UWMP, Table 2-8: IEUA Total Water Demands.

- 2020-2045 values: The sum of imported water and recycled water demands, from IEUA's 2020 UWMP, Table 2-4: Total Water Use (Potable and Non-Potable).

Reported Water Use Efficiency:

- Baseline (2010) value: No water use efficiency value is estimated to establish a conservative baseline.

- 2015 value: From IEUA's 2015 UWMP, Table 3-1. Only the 2015 value for WUE was selected.

- 2020 value: The volume of savings over the lifetime of water use efficiency measures implemented during FY 19/20, as reported in IEUA's Annual UWE FY19/20 report and detailed in Section 8.8 of IEUA's 2020 UWMP.

- 2025-2045 values: Projected water use efficiency savings, from IEUA's 2020 UWMP, Table 7-2.

The Service Area Water Demands without Water Use Efficiency Accounted For is the sum of the two volumes above for each year.

G.5 Calculation of Supplies Contributing to Regional Self-Reliance

For a covered action to demonstrate consistency with the Delta Plan, WR P1(c)(1) states that water suppliers must report the expected outcomes for measurable improvement in regional self-reliance. Table G-2 shows expected outcomes for supplies contributing to regional self-reliance both in amount and as a percentage. The numbers shown in Table G-2 represent efforts to improve regional self-reliance for the IEUA service area, focused only on the supplies IEUA manages, which are water use efficiency and water recycling. Supporting narratives and documentation for the all the data shown in the table are provided below:

Water Use Efficiency

The water use efficiency information shown in Table G-2 is taken directly from Table G-1. It is now reflected as a supply contributing to regional self-reliance.

Water Recycling

The water recycling values shown in Table G-2 are the recycled water supplies to meet the recycled water portion of the projected "service area water demands with water use efficiency accounted for" shown in Table G-1. These values come from IEUA's 2010 UWMP Table 3-15, IEUA's 2015 UWMP Table 2-8, and IEUA's 2020 UWMP Table 2-4. A description on these water supplies can be found in Section 5.4 – Current Recycled Water Uses in IEUA's 2020 UWMP.

The results shown in Table G-2 demonstrate that IEUA is improving its regional self-reliance, since the volume of water supplies contributing to regional self-reliance are projected to increase over time. In the near term (2025), the expected outcome for normal water year regional self-reliance increases by over 25,000 AF from the 2010 baseline; this represents an increase of about 10 percent of 2025 normal water year demands. In the long term (2045), normal water year regional self-reliance is expected to increase by more than 50,000 AF from the 2010 baseline.

G.6 Calculation of Reliance on Water Supplies from the Delta Watershed

WR P1(c)(1) requires that water suppliers report the expected outcomes for measurable reductions in supplies from the Delta watershed either as an amount or as a percentage. This analysis provides both calculations.

Although IEUA is currently a SWP-exclusive MWD member agency, it is infeasible to individually account for the independent impact on the Delta. IEUA participates, through MWD, in various water supply investment and demand management programs that reduce reliance on the Delta. Reliance on water supplies from the Delta are taken from MWD's Reduced Delta Reliance assessment (MWD 2020 UWMP, Appendix 11).

Regional reliance on supplies from the Delta watershed are expected to decrease by 314 TAF over the 2010 baseline, a decrease of about 5.2% of 2045 demands. Increased regional self-reliance primarily comes from water use efficiency, conjunctive use projects, water recycling, and local/regional water supply and storage projects. The water supply accounting completed by MWD does not include any supplies from potential future covered actions.

G.7 Infeasibility of Accounting Supplies from the Delta Watershed for Metropolitan's Member Agencies and their Customers

Metropolitan's service area, as a whole, reduces reliance on the Delta through investments in non-Delta water supplies, local water supplies, and regional and local demand management measures. Metropolitan's member agencies coordinate reliance on the Delta through their membership in Metropolitan, a regional cooperative providing wholesale water service to its 26 member agencies. Accordingly, regional reliance on the Delta can only be measured regionally—not by individual Metropolitan member agencies and not by the customers of those member agencies.

Metropolitan's member agencies, and those agencies' customers, indirectly reduce reliance on the Delta through their collective efforts as a cooperative. Metropolitan's member agencies do not control the amount of Delta water they receive from Metropolitan. Metropolitan manages a statewide integrated conveyance system consisting of its participation in the State Water Project (SWP), its Colorado River Aqueduct (CRA) including Colorado River water resources, programs and water exchanges, and its regional storage portfolio. Along with the SWP, CRA, storage programs, and Metropolitan's conveyance and distribution facilities, demand management programs increase the future reliability of water resources for the region. In addition, demand management programs provide system-wide benefits by decreasing the demand for imported water, which helps to decrease the burden on Metropolitan's infrastructure and reduce system costs, and free up conveyance capacity to the benefit of all member agencies.

Metropolitan's costs are funded almost entirely from its service area, with the exception of grants and other assistance from government programs. Most of Metropolitan's revenues are collected directly from its member agencies. Properties within Metropolitan's service area pay a property tax that currently provides approximately 8 percent of the fiscal year 2021 annual budgeted revenues. The rest of Metropolitan's costs are funded through rates and charges paid by Metropolitan's member agencies for the wholesale services it provides to them. Thus, Metropolitan's member agencies fund nearly all operations Metropolitan undertakes to reduce reliance on the Delta, including Colorado River Programs, storage facilities, Local Resources Programs and Conservation Programs within Metropolitan's service area.

Because of the integrated nature of Metropolitan's systems and operations, and the collective nature of Metropolitan's regional efforts, it is infeasible to quantify each of Metropolitan member agencies' individual reliance on the Delta. It is infeasible to attempt to segregate an entity and a system that were designed to work as an integrated regional cooperative.

In addition to the member agencies funding Metropolitan's regional efforts, they also invest in their own local programs to reduce their reliance on any imported water. Moreover, the customers of those member agencies may also invest in their own local programs to reduce water demand. However, to the extent those efforts result in reduction of demands on Metropolitan, that reduction may not equate to a like reduction of reliance on the Delta. Demands on Metropolitan are not commensurate with demands on the Delta because most of Metropolitan member agencies receive blended resources from Metropolitan as determined by Metropolitan—not the individual member agency—and for most member agencies, the blend varies from month-to-month and year-to-year due to hydrology, operational constraints, use of storage and other factors.

The accounting of regional investments that contribute to reduced reliance on supplies from the Delta watershed is straightforward to calculate and report at the regional aggregate level. However, any similar accounting is infeasible for the individual member agencies or their customers. As described above, the region (through Metropolitan) makes significant investments in projects, programs and other resources that reduce reliance on the Delta. In fact, all of Metropolitan's investments in Colorado River supplies, groundwater and surface storage, local resources development and demand management measures that reduce reliance on the Delta are collectively funded by revenues generated from the member agencies through rates and charges.

Metropolitan's revenues cannot be matched to the demands or supply production history of an individual agency, or consistently across the agencies within the service area. Each project or program funded by the region has a different online date, useful life, incentive rate and structure, and production schedule. It is infeasible to account for all these things over the life of each project or program and provide a nexus to each member agency's contributions to Metropolitan's revenue stream over time. Accounting at the regional level allows for the incorporation of the local supplies and water use efficiency programs done by member agencies and their customers through both the regional programs and through their own specific local programs. As shown above, despite the infeasibility of accounting reduced Delta reliance below the regional level, Metropolitan's member agencies and their customers have together made substantial contributions to the region's reduced reliance.

Colorado River Programs

As a regional cooperative of member agencies, Metropolitan invests in programs to ensure the continued reliability and sustainability of Colorado River supplies. Metropolitan was established to obtain an allotment of Colorado River water, and its first mission was to construct and operate the CRA. The CRA consists of five pumping plants, 450 miles of high voltage power lines, one electric substation, four regulating reservoirs, and 242 miles of aqueducts, siphons, canals, conduits and pipelines terminating at Lake Mathews in Riverside County. Metropolitan owns, operates, and manages the CRA. Metropolitan is responsible for operating, maintaining, rehabilitating, and repairing the CRA, and is responsible for obtaining and scheduling energy resources adequate to power pumps at the CRA's five pumping stations.

Colorado River supplies include Metropolitan's basic Colorado River apportionment, along with supplies that result from existing and committed programs, including supplies from the Imperial Irrigation District (IID)-Metropolitan Conservation Program, the implementation of the Quantification Settlement Agreement (QSA) and related agreements, and the exchange agreement with San Diego County Water Authority (SDCWA). The QSA established the baseline water use for each of the agreement parties and facilitates the transfer of water from agricultural agencies to urban uses. Since the QSA, additional programs have been implemented to increase Metropolitan's CRA supplies. These include the PVID Land Management, Crop Rotation, and Water Supply Program, as well as the Lower Colorado River Water Supply Project. The 2007 Interim Guidelines provided for the coordinated operation of Lake Powell and Lake Mead, as well as the Intentionally Created Surplus (ICS) program that allows Metropolitan to store water in Lake Mead.

IEUA has emergency service connections to the MWD's Upper Feeder, which includes CRA supplies. However, these connections are not currently utilized due to water quality concerns.

Storage Investments/Facilities

Surface and groundwater storage are critical elements of Southern California's water resources strategy and help Metropolitan reduce its reliance on the Delta. Because California experiences dramatic swings in weather and hydrology, storage is important to regulate those swings and mitigate possible supply shortages. Surface and groundwater storage provide a means of storing water during normal and wet years for later use during dry years, when imported supplies are limited. The Metropolitan system, for purposes of meeting demands during times of shortage, regulating system flows, and ensuring system reliability in the event of a system outage, provides over 1,000,000 acre-feet of system storage capacity. Diamond Valley Lake provides 810,000 acre-feet of that storage capacity, effectively doubling Southern California's previous surface water storage capacity. Other existing imported water storage available to the region consists of Metropolitan's raw water reservoirs, a share of the SWP's raw water reservoirs in and near the service area, and the portion of the groundwater basins used for conjunctive-use storage.

Since the early twentieth century, DWR and Metropolitan have constructed surface water reservoirs to meet emergency, drought/seasonal, and regulatory water needs for Southern California. These reservoirs include Pyramid Lake, Castaic Lake, Elderberry Forebay, Silverwood Lake, Lake Perris, Lake Skinner, Lake Mathews, Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, Orange County Reservoir, and Metropolitan's Diamond Valley Lake (DVL). Some reservoirs such as Live Oak Reservoir, Garvey Reservoir, Palos Verdes Reservoir, and Orange County Reservoir, which have a total combined capacity of about 3,500 AF, are used solely for regulating purposes. The total gross storage capacity for the larger remaining reservoirs is 1,757,600 AF. However, not all of the gross storage capacity is available to Metropolitan; dead storage and storage allocated to others reduce the amount of storage that is available to Metropolitan to 1,665,200 AF.

Conjunctive use of the aquifers offers another important source of dry year supplies. Unused storage in Southern California groundwater basins can be used to optimize imported water supplies, and the development of groundwater storage projects allows effective management and regulation of the region's major imported supplies from the Colorado River and SWP. Over the years, Metropolitan has implemented conjunctive use through various programs in the service area; the following table lists the groundwater conjunctive use programs that have been developed in the region.

MWD Table 1: Metropolitan Groundwater Conjunctive Use Programs

Program	Metropolitan Agreement Partners	Program Term	Max Storage AF	Dry-Year Yield AF/Yr
Long Beach Conjunctive Use Storage Project (Central Basin)	Long Beach	June 2002-2027	13,000	4,300
Foothill Area Groundwater Storage Program (Monkhill/ Raymond Basin)	Foothill MWD	February 2003-2028	9,000	3,000
Orange County Groundwater Conjunctive Use Program	MWDOC OCWD	June 2003-2028	66,000+	22,000
Chino Basin Conjunctive Use Programs	IEUA TVMWD Watermaster	June 2003-2028	100,000	33,000
Live Oak Basin Conjunctive Use Project (Six Basins)	TVMWD City of La Verne	October 2002-2027	3,000	1,000
City of Compton Conjunctive Use Project (Central Basin)	Compton	February 2005-2030	2,289	763
Long Beach Conjunctive Use Program Expansion in Lakewood (Central Basin)	Long Beach	July 2005-2030	3,600	1,200
Upper Claremont Basin Groundwater Storage Program (Six Basins)	TVMWD	Sept. 2005- 2030	3,000	1,000
Elsinore Basin Conjunctive Use Storage Program	Western MWD Elsinore Valley MWD	May 2008- 2033	12,000	4,000
TOTAL			**211,889**	**70,263**

Metropolitan Demand Management Programs

Demand management costs are Metropolitan's expenditures for funding local water resource development programs and water conservation programs. These Demand Management Programs incentivize the development of local water supplies and the conservation of water to reduce the need to import water to deliver to Metropolitan's member agencies. These programs are implemented below the delivery points between Metropolitan's and its member agencies' distribution systems and, as such, do not add any water to Metropolitan's supplies. Rather, the effect of these downstream programs is to produce a local supply of water for the local agencies and to reduce demands by member agencies for water imported through Metropolitan's system. The following discussions outline how Metropolitan funds local resources and conservation programs for the benefit of all of its member agencies and the entire Metropolitan service area. Notably, the history of demand management by Metropolitan's member agencies and the local agencies that purchase water from Metropolitan's members has spanned more than four decades. The significant history of the programs is another reason it would be difficult to attempt to assign a portion of such funding to any one individual member agency.

Section 1: Local Resources Programs

In 1982, Metropolitan began providing financial incentives to its member agencies to develop new local supplies to assist in meeting the region's water needs. Because of Metropolitan's regional distribution system, these programs benefit all member agencies regardless of project location because they help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs and free up conveyance capacity to the benefit of all the agencies that rely on water from Metropolitan.

For example, the Groundwater Replenishment System (GWRS) operated by the Orange County Water District is the world's largest water purification system for indirect potable reuse. It was funded, in part, by Metropolitan's member agencies through the Local Resources Program. Annually, the GWRS produces approximately 103,000 acre-feet of reliable, locally controlled, drought-proof supply of high-quality water to recharge the Orange County Groundwater Basin and protect it from seawater intrusion. The GWRS is a premier example of a regional project that significantly reduced the need to utilize imported water for groundwater replenishment in Metropolitan's service area, increasing regional and local supply reliability and reducing the region's reliance on imported supplies, including supplies from the State Water Project.

Metropolitan's local resource programs have evolved through the years to better assist Metropolitan's member agencies in increasing local supply production. The following is a description and history of the local supply incentive programs.

Local Projects Program

In 1982, Metropolitan initiated the Local Projects Program (LPP), which provided funding to member agencies to facilitate the development of recycled water projects. Under this approach, Metropolitan contributed a negotiated up-front funding amount to help finance project capital costs. Participating member agencies were obligated to reimburse Metropolitan over time. In 1986, the LPP was revised, changing the up-front funding approach to an incentive-based approach. Metropolitan contributed an amount equal to the avoided State Water Project pumping costs for each acre-foot of recycled water delivered to end-use consumers. This funding incentive was based on the premise that local projects resulted in the reduction of water imported from the Delta and the associated pumping cost. The incentive amount varied from year to year depending on the actual variable power cost paid for State Water Project imports. In 1990, Metropolitan's Board increased the LPP contribution to a fixed rate of $154 per acre-foot, which was calculated based on Metropolitan's avoided capital and operational costs to convey, treat, and distribute water, and included considerations of reliability and service area demands.

Groundwater Recovery Program

The drought of the early 1990s sparked the need to develop additional local water resources, aside from recycled water, to meet regional demand and increase regional water supply reliability. In 1991, Metropolitan conducted the Brackish Groundwater Reclamation Study which determined that large amounts of degraded groundwater in the region were not being utilized. Subsequently, the Groundwater Recovery Program (GRP) was established to assist the recovery of otherwise unusable groundwater degraded by minerals and other contaminants,

provide access to the storage assets of the degraded groundwater, and maintain the quality of groundwater resources by reducing the spread of degraded plumes.

Local Resources Program

In 1995, Metropolitan's Board adopted the Local Resources Program (LRP), which combined the LPP and GRP into one program. The Board allowed for existing LPP agreements with a fixed incentive rate to convert to the sliding scale up to $250 per acre-foot, similar to GRP incentive terms. Those agreements that were converted to LRP are known as "LRP Conversions."

Competitive Local Projects Program

In 1998, the Competitive Local Resources Program (Competitive Program) was established. The Competitive Program encouraged the development of recycled water and recovered groundwater through a process that emphasized cost-efficiency to Metropolitan, timing new production according to regional need while minimizing program administration cost. Under the Competitive Program, agencies requested an incentive rate up to $250 per acre-foot of production over 25 years under a Request for Proposals (RFP) for the development of up to 53,000 acre-feet per year of new water recycling and groundwater recovery projects. In 2003, a second RFP was issued for the development of an additional 65,000 acre-feet of new recycled water and recovered groundwater projects through the LRP.

Seawater Desalination Program

Metropolitan established the Seawater Desalination Program (SDP) in 2001 to provide financial incentives to member agencies for the development of seawater desalination projects. In 2014, seawater desalination projects became eligible for funding under the LRP, and the SDP was ended.

2007 Local Resources Program

In 2006, a task force comprised of member agency representatives was formed to identify and recommend program improvements to the LRP. As a result of the task force process, the 2007 LRP was established with a goal of 174,000 acre-feet per year of additional local water resource development. The new program allowed for an open application process and eliminated the previous competitive process. This program offered sliding scale incentives of up to $250 per acre-foot, calculated annually based on a member agency's actual local resource project costs exceeding Metropolitan's prevailing water rate.

2014 Local Resources Program

A series of workgroup meetings with member agencies was held to identify the reasons why there was a lack of new LRP applications coming into the program. The main constraint identified by the member agencies was that the $250 per acre-foot was not providing enough of an incentive for developing new projects due to higher construction costs to meet water quality requirements and to develop the infrastructure to reach end-use consumers located further from treatment plants. As a result, in 2014, the Board authorized an increase in the maximum incentive amount, provided alternative payment structures, included onsite retrofit costs and reimbursable services as part of the LRP, and added eligibility for seawater desalination projects. The current LRP incentive payment options are structured as follows:

- Option 1 – Sliding scale incentive up to $340/AF for a 25-year agreement term
- Option 2 – Sliding scale incentive up to $475/AF for a 15-year agreement term
- Option 3 – Fixed incentive up to $305/AF for a 25-year agreement term

On-site Retrofit Programs

In 2014, Metropolitan's Board also approved the On-site Retrofit Pilot Program which provided financial incentives to public or private entities toward the cost of small-scale improvements to their existing irrigation and industrial systems to allow connection to existing recycled water pipelines. The On-site Retrofit Pilot Program helped reduce recycled water retrofit costs to the end-use consumer which is a key constraint that limited recycled water LRP projects from reaching full production capacity. The program incentive was equal to the actual eligible costs of the on-site retrofit, or $975 per acre-foot of up-front cost, which equates to $195 per acre-foot for an estimated five years of water savings ($195/AF x 5 years) multiplied by the average annual water use in previous three years, whichever is less. The Pilot Program lasted two years and was successful in meeting its goal of accelerating the use of recycled water.

In 2016, Metropolitan's Board authorized the On-site Retrofit Program (ORP), with an additional budget of $10 million. This program encompassed lessons learned from the Pilot Program and feedback from member agencies to make the program more streamlined and improve its efficiency. As of fiscal year 2019/20, the ORP has successfully converted 440 sites, increasing the use of recycled water by 12,691 acre-feet per year.

Stormwater Pilot Programs

In 2019, Metropolitan's Board authorized both the Stormwater for Direct Use Pilot Program and a Stormwater for Recharge Pilot Program to study the feasibility of reusing stormwater to help meet regional demands in Southern California. These pilot programs are intended to encourage the development, monitoring, and study of new and existing stormwater projects by providing financial incentives for their construction/retrofit and monitoring/reporting costs. These pilot programs will help evaluate the potential benefits delivered by stormwater capture projects and provide a basis for potential future funding approaches. Metropolitan's Board authorized a total of $12.5 million for the stormwater pilot programs ($5 million for the District Use Pilot and $7.5 million for the Recharge Pilot).

Current Status and Results of Metropolitan's Local Resource Programs

Today, nearly one-half of the total recycled water and groundwater recovery production in the region has been developed with an incentive from one or more of Metropolitan's local resource programs. During fiscal year 2020, Metropolitan provided about $13 million for production of 71,000 acre-feet of recycled water for non-potable and indirect potable uses. Metropolitan provided about $4 million to support projects that produced about 50,000 acre-feet of recovered groundwater for municipal use. Since 1982, Metropolitan has invested $680 million to fund 85 recycled water projects and 27 groundwater recovery projects that have produced a cumulative total of about 4 million acre-feet.

Conservation Programs

Metropolitan's regional conservation programs and approaches have a long history. Decades ago, Metropolitan recognized that demand management at the consumer level would be an

important part of balancing regional supplies and demands. Water conservation efforts were seen as a way to reduce the need for imported supplies and offset the need to transport or store additional water into or within the Metropolitan service area. The actual conservation of water takes place at the retail consumer level. Regional conservation approaches have proven to be effective at reaching retail consumers throughout Metropolitan's service area and successfully implementing water saving devices, programs and practices. Through the pooling of funding by Metropolitan's member agencies, Metropolitan is able to engage in regional campaigns with wide-reaching impact. Regional investments in demand management programs, of which conservation is a key part along with local supply programs, benefit all member agencies regardless of project location. These programs help to increase regional water supply reliability, reduce demands for imported water supplies, decrease the burden on Metropolitan's infrastructure, reduce system costs, and free up conveyance capacity to the benefit of all member agencies.

Incentive-Based Conservation Programs

Conservation Credits Program

In 1988, Metropolitan's Board approved the Water Conservation Credits Program (Credits Program). The Credits Program is similar in concept to the Local Projects Program (LPP). The purpose of the Credits Program is to encourage local water agencies to implement effective water conservation projects through the use of financial incentives. The Credits Program provides financial assistance for water conservation projects that reduce demands on Metropolitan's imported water supplies and require Metropolitan's assistance to be financially feasible.

Initially, the Credits Program provided 50 percent of a member agency's program cost, up to a maximum of $75 per acre-foot of estimated water savings. The $75 Base Conservation Rate was established based Metropolitan's avoided cost of pumping SWP supplies. The Base Conservation Rate has been revisited by Metropolitan's Board and revised twice since 1988, from $75 to $154 per acre-foot in 1990 and from $154 to $195 per acre-foot in 2005.

In fiscal year 2020 Metropolitan processed more than 30,400 rebate applications totaling $18.9 million.

Member Agency Administered Program

Some member agencies also have unique programs within their service areas that provide local rebates that may differ from Metropolitan's regional program. Metropolitan continues to support these local efforts through a member agency administered funding program that adheres to the same funding guidelines as the Credits Program. The Member Agency Administered Program allows member agencies to receive funding for local conservation efforts that supplement, but do not duplicate, the rebates offered through Metropolitan's regional rebate program.

Water Savings Incentive Program

There are numerous commercial entities and industries within Metropolitan's service area that pursue unique savings opportunities that do not fall within the general rebate programs that Metropolitan provides. In 2012, Metropolitan designed the Water Savings Incentive Program (WSIP) to target these unique commercial and industrial projects. In addition to rebates for devices, under this program, Metropolitan provides financial incentives to businesses and

industries that created their own custom water efficiency projects. Qualifying custom projects can receive funding for permanent water efficiency changes that result in reduced potable demand.

Non-Incentive Conservation Programs

In addition to its incentive-based conservation programs, Metropolitan also undertakes additional efforts throughout its service area that help achieve water savings without the use of rebates. Metropolitan's non-incentive conservation efforts include:

- residential and professional water efficient landscape training classes
- water audits for large landscapes
- research, development and studies of new water saving technologies
- advertising and outreach campaigns
- community outreach and education programs
- advocacy for legislation, codes, and standards that lead to increased water savings

Current Status and Results of Metropolitan's Conservation Programs

Since 1990, Metropolitan has invested $824 million in conservation rebates that have resulted in a cumulative savings of 3.27 million acre-feet of water. These investments include $450 million in turf removal and other rebates during the last drought which resulted in 175 million square feet of lawn turf removed. During fiscal year 2020, 1.06 million acre-feet of water is estimated to have been conserved. This annual total includes Metropolitan's Conservation Credits Program; code-based conservation achieved through Metropolitan-sponsored legislation; building plumbing codes and ordinances; reduced consumption resulting from changes in water pricing; and pre-1990 device retrofits.

Infeasibility of Accounting Regional Investments in Reduced Reliance Below the Regional Level

The accounting of regional investments that contribute to reduced reliance on supplies from the Delta watershed is straightforward to calculate and report at the regional aggregate level. However, any similar accounting is infeasible for the individual member agencies or their customers. As described above, the region (through Metropolitan) makes significant investments in projects, programs and other resources that reduce reliance on the Delta. In fact, all of Metropolitan's investments in Colorado River supplies, groundwater and surface storage, local resources development and demand management measures that reduce reliance on the Delta are collectively funded by revenues generated from the member agencies through rates and charges.

Metropolitan's revenues cannot be matched to the demands or supply production history of an individual agency, or consistently across the agencies within the service area. Each project or program funded by the region has a different online date, useful life, incentive rate and structure, and production schedule. It is infeasible to account for all these things over the life of each project or program and provide a nexus to each member agency's contributions to Metropolitan's revenue stream over time. Accounting at the regional level allows for the incorporation of the local supplies and water use efficiency programs done by member agencies

and their customers through both the regional programs and through their own specific local programs. As shown above, despite the infeasibility of accounting reduced Delta reliance below the regional level, Metropolitan's member agencies and their customers have together made substantial contributions to the region's reduced reliance.

G.8 2015 UWMP Appendix P

The information contained in this Appendix G is also intended to be a new Appendix P attached to IEUA's 2015 UWMP consistent with WR P1 subsection (c)(1)(C) (Cal. Code Regs. tit. 23, § 5003). IEUA provided notice of the availability of the draft 2020 UWMP (including this Appendix G which will also be a new Appendix P to its 2015 UWMP) and WSCP and the public hearing to consider adoption of both plans and the addendum to the 2015 UWMP in accordance with CWC Sections 10621(b) and 10642, and Government Code Section 6066, and Chapter 17.5 (starting with Section 7290) of Division 7 of Title 1 of the Government Code. The notice of availability of the documents was sent to IEUA's member agencies, as well as cities and counties in IEUA service area. In addition, a public notice advertising the public hearing in English was published in the Inland Valley Daily Bulletin. The notification in English language newspapers was published on 17 May and 24 May 2021. Copies of: (1) the notification letter sent to the member agencies, cities and counties in IEUA service area, and (2) the notice published in the newspapers are included in the 2020 UWMP Appendix E.

Thus, this Appendix G to IEUA's 2020 UWMP, which was adopted with IEUA's 2020 UWMP, will also be recognized and treated as Appendix P to IEUA's 2015 UWMP. IEUA held the public hearing for the draft 2020 UWMP, draft Appendix G as an addendum to the 2015 UWMP, and draft WSCP on June 16, 2021, at the Board of Directors meeting, held online due to COVID-19 concerns. On June 16, IEUA's Board determined that the 2020 UWMP and the WSCP accurately represent the water resources plan for IEUA's service area. IEUA's Board determined that Appendix G to the 2020 UWMP and Appendix P to the 2015 UWMP includes all of the elements described in Delta Plan Policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (Cal. Code Regs. tit. 23, § 5003), which need to be included in a water supplier's UWMP to support a certification of consistency for a future covered action. As stated in Resolution No. 2021-06-10, the Board adopted the 2020 UWMP, Appendix G as an addendum to the 2015 UWMP, and the WSCP and authorized their submittal to the State of California. Copies of Resolution No. 2021-06-10 is included in the 2020 UWMP Appendix D.

Table G-1: Calculation of IEUA Service Area Water Demands Without Water Use Efficiency

Total Service Area Water Demands (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands with Water Use Efficiency Accounted For*	79,440	92,325	96,934	113,280	117,752	121,438	126,072	126,664
Reported Water Use Efficiency or Estimated Water Use Efficiency Since Baseline	-	1,975	3,292	9,788	11,984	17,257	22,570	27,802
Service Area Water Demands without Water Use Efficiency Accounted For	79,440	94,300	100,226	123,068	129,736	138,695	148,642	154,466

*Demands include imported and recycled water, as found in 2020 UWMP Table 4-3W

Table G-2: Calculation of IEUA Supplies Contributing to Regional Self-Reliance

Water Supplies Contributing to Regional Self-Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Use Efficiency	-	1,975	3,292	9,788	11,984	17,257	22,570	27,802
Water Recycling	24,506	33,419	30,495	40,495	42,697	44,122	46,504	46,844
Stormwater Capture and Use	-	-	-	-	-	-	-	-
Advanced Water Technologies	-	-	-	-	-	-	-	-
Conjunctive Use Projects	-	-	-	-	-	-	-	-
Local and Regional Water Supply and Storage Projects	-	-	-	-	-	-	-	-
Other Programs and Projects the Contribute to Regional Self-Reliance	-	-	-	-	-	-	-	-
Water Supplies Contributing to Regional Self-Reliance	24,506	35,394	33,787	50,283	54,681	61,379	69,074	74,646

Service Area Water Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands without Water Use Efficiency Accounted For	79,440	94,300	100,226	123,068	129,736	138,695	148,642	154,466

Change in Regional Self Reliance (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Supplies Contributing to Regional Self-Reliance	24,506	35,394	33,787	50,283	54,681	61,379	69,074	74,646
Change in Water Supplies Contributing to Regional Self-Reliance		10,888	9,281	25,777	30,175	36,873	44,568	50,140

Percent Change in Regional Self Reliance (As Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Percent of Water Supplies Contributing to Regional Self-Reliance	30.8%	37.5%	33.7%	40.9%	42.1%	44.3%	46.5%	48.3%
Change in Percent of Water Supplies Contributing to Regional Self-Reliance		6.7%	2.9%	10.0%	11.3%	13.4%	15.6%	17.5%

Table G-3: Calculation of MWD Reliance on Water Supplies from the Delta Watershed

Water Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
CVP/SWP Contract Supplies	1,472,000	1,029,000	984,000	1,133,000	1,130,000	1,128,000	1,126,000	1,126,000
Delta/Delta Tributary Diversions								
Transfers and Exchanges	20,000	44,000	91,000	58,000	52,000	52,000	52,000	52,000
Other Water Supplies from the Delta Watershed								
Total Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000

Service Area Water Demands without Water Use Efficiency (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Service Area Water Demands without Water Use Efficiency Accounted For	5,493,000	5,499,000	5,219,000	4,925,000	5,032,000	5,156,000	5,261,000	5,374,000

Change in Supplies from the Delta Watershed (Acre-Feet)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Water Supplies from the Delta Watershed	1,492,000	1,073,000	1,075,000	1,191,000	1,182,000	1,180,000	1,178,000	1,178,000
Change in Water Supplies from the Delta Watershed		(419,000)	(417,000)	(301,000)	(310,000)	(312,000)	(314,000)	(314,000)

Percent Change in Supplies from the Delta Watershed (As a Percent of Demand w/out WUE)	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045 (Optional)
Percent of Water Supplies from the Delta Watershed	27.2%	19.5%	20.6%	24.2%	23.5%	22.9%	22.4%	21.9%
Change in Percent of Water Supplies from the Delta Watershed		-7.6%	-6.6%	-3.0%	-3.7%	-4.3%	-4.8%	-5.2%

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	Not applicable
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	Not applicable
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

Cucamonga Valley Water District
Service Beyond Expectation

10440 Ashford Street, Rancho Cucamonga, CA 91730-2799
P.O. Box 638, Rancho Cucamonga, CA 91729-0638
(909) 987-2591 Fax (909) 476-8032

John Bosler
Secretary/General Manager/CEO

December 11, 2020

Mr. Peter Kavounas
General Manager
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO pkavounas@cbwm.org

Dear Mr. Kavounas:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

As an urban water supplier, Cucamonga Valley Water District 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, Cucamonga Valley Water District will be reviewing the UWMP and will make amendments or changes, as appropriate. Cucamonga Valley Water District invites you to submit comments in anticipation of the development of our 2020 UWMP Update. Please provide comments by email within the next 30 days to Cucamonga Valley Water District.

Send comments to: Praseetha Krishnan
Water Resources and Planning Manager
PraseethaK@CVWDwater.com

Sincerely,

John Bosler
General Manager / CEO

Cc: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

James V. Curatalo Jr. President | **Randall James Reed** Vice President | **Luis Cetina** Director | **Kevin Kenley** Director | **Mark Gibboney** Director

Cucamonga Valley® Water District
Service Beyond Expectation

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(909) 987-2591 Fax (909) 476-8032

John Bosler
Secretary/General Manager/CEO

December 11, 2020

Mr. Keith Kramer
Public Works Director
City of Fontana
16489 Orange Way
Fontana, CA 92335

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO kkramer@fontana.org

Dear Mr. Kramer:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

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Send comments to: Praseetha Krishnan
Water Resources and Planning Manager
PraseethaK@CVWDwater.com

Sincerely,

John Bosler
General Manager / CEO

Cc: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

James V. Curatalo Jr. President | **Randall James Reed** Vice President | **Luis Cetina** Director | **Kevin Kenley** Director | **Mark Gibboney** Director

Cucamonga Valley Water District
Service Beyond Expectation

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(909) 987-2591 Fax (909) 476-8032

John Bosler
Secretary/General Manager/CEO

December 7, 2020

Mr. Scott Burton
Utilities General Manager
City of Ontario
1425 South Bon View Avenue
Ontario, CA 91761

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO sburton@ci.ontario.ca.us

Dear Mr. Burton:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

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Send comments to: Praseetha Krishnan
Water Resources and Planning Manager
PraseethaK@CVWDwater.com

Sincerely,

John Bosler
General Manager / CEO

Cc: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

James V. Curatalo Jr. President | **Randall James Reed** Vice President | **Luis Cetina** Director | **Kevin Kenley** Director | **Mark Gibboney** Director

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John Bosler
Secretary/General Manager/CEO

December 11, 2020

Mr. William Wittkopf
Public Works Services Director
City of Rancho Cucamonga
8794 Lion Street
Rancho Cucamonga, CA 91730

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO william.wittkopf@cityofrc.us

Dear Mr. Wittkopf:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

As an urban water supplier, Cucamonga Valley Water District 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, Cucamonga Valley Water District will be reviewing the UWMP and will make amendments or changes, as appropriate. Cucamonga Valley Water District invites you to submit comments in anticipation of the development of our 2020 UWMP Update. Please provide comments by email within the next 30 days to Cucamonga Valley Water District.

Send comments to: Praseetha Krishnan
Water Resources and Planning Manager
PraseethaK@CVWDwater.com

Sincerely,

John Bosler
General Manager/CEO

Copy:
Anne McIntosh, City of RC, Planning Director (Anne.McIntosh@cityofrc.us)
Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

James V. Curatalo Jr. President | **Randall James Reed** Vice President | **Luis Cetina** Director | **Kevin Kenley** Director | **Mark Gibboney** Director

Cucamonga Valley Water District
Service Beyond Expectation

10440 Ashford Street, Rancho Cucamonga, CA 91730-2799
P.O. Box 638, Rancho Cucamonga, CA 91729-0638
(909) 987-2591 Fax (909) 476-8032

John Bosler
Secretary/General Manager/CEO

December 11, 2020

Ms. Rosemary Hoerning
City Manager
City of Upland
460 N. Euclid Avenue
Upland, CA 91786

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO rhoerning@ci.upland.ca.us

Dear Ms. Hoerning:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

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Send comments to: Praseetha Krishnan
Water Resources and Planning Manager
PraseethaK@CVWDwater.com

Sincerely,

John Bosler
General Manager / CEO

Cc: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

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John Bosler
Secretary/General Manager/CEO

December 11, 2020

Mr. Gerry Newcombe
Director of Public Works
County of San Bernardino
825 East Third Street
San Bernardino, CA 92415

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO gnewcombe@dpw.sbcounty.gov

Dear Mr. Newcombe:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

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Send comments to: Praseetha Krishnan
Water Resources and Planning Manager
PraseethaK@CVWDwater.com

Sincerely,

John Bosler
General Manager / CEO

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John Bosler
Secretary/General Manager/CEO

December 11, 2020

Josh Swift
General Manager
Fontana Water Company
15966 Arrow Route
Fontana, CA 92335

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO jmswift@fontanawater.com

Dear Mr. Swift:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

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Water Resources and Planning Manager
PraseethaK@CVWDwater.com

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Cc: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

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John Bosler
Secretary/General Manager/CEO

December 11, 2020

Mr. Shivaji Deshmukh
General Manager
Inland Empire Utilities Agency
P.O Box 9020
Chino Hills, CA 91709

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO sdeshmukh@ieua.org

Dear Mr. Deshmukh:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

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John Bosler
Secretary/General Manager/CEO

December 11, 2020

Mr. Daniel R. Ferons
General Manager
Santa Margarita Water District
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO danielf@smwd.com

Dear Mr. Ferons:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

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Water Resources and Planning Manager
PraseethaK@CVWDwater.com

Sincerely,

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John Bosler
Secretary/General Manager/CEO

December 7, 2020

Mr. Brian Lee
General Manager
San Antonio Water Company
139 N. Euclid Avenue
Upland, CA 91786

SUBJECT: **2020 Urban Water Management Plan Update**
TRANSMITTED VIA E-MAIL TO blee@sawaterco.com

Dear Mr. Lee:

Cucamonga Valley Water District 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. Cucamonga Valley Water District is currently in the process of preparing the 2020 UWMP Update.

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Send comments to: Praseetha Krishnan
Water Resources and Planning Manager
PraseethaK@CVWDwater.com

Sincerely,

John Bosler
General Manager / CEO

Cc: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

James V. Curatalo Jr. President | **Randall James Reed** Vice President | **Luis Cetina** Director | **Kevin Kenley** Director | **Mark Gibboney** Director

Inland Valley Daily Bulletin
(formerly The Daily Report)
9616 Archibald Avenue Suite 100
Rancho Cucamonga, CA 91730
909-987-6397
legals@inlandnewspapers.com

CUCAMONGA CO WATER DIST
10440 ASHFORD STREET
RANCHO CUCAMONGA, CA 91729

Account Number:	5009266
Ad Order Number:	0011464489
Customer's Reference / PO Number:	
Publication:	Inland Valley Daily Bulletin
Publication Dates:	05/25/2021, 06/01/2021
Total Amount:	$643.04
Payment Amount:	$0.00
Amount Due:	$643.04

Invoice Text: NOTICE OF PUBLIC HEARING

NOTICE OF PUBLIC HEARING FOR THE ADOPTION OF THE 2020 URBAN WATER MANAGEMENT PLAN AND WATER SHORTAGE CONTINGENCY PLAN

NOTICE IS HEREBY GIVEN that on June 8, 2021 at 6:00 p.m. in the virtual meeting room of the Board of Directors of the Cucamonga Valley Water District, the Board of Directors will conduct a public hearing to consider the adoption of the 2020 Urban Water Management Plan and Water Shortage Contingency Plan. The meeting link will be posted on the District 's website in the Board of Directors Regular Meeting Agenda at the following address three days ahead of the public hearing: **https://www.cvwdwater.com/AgendaCenter/Board-of-Directors-1/**

NOTICE IS FURTHER GIVEN that a copy of the Draft Year 2020 Urban Water Management Plan will be available for public review on May 25, 2021 on the District's website at the following address:
https://www.cvwdwater.com/189/Reports-Studies-Regulations

Summary of Urban Water Management Plan

Cucamonga Valley Water District has developed a 2020 Urban Water Management Plan and Water Shortage Contingency Plan which complies with the requirements set forth by the California Urban Water Management Planning Act (Act), Water Code Sections 10610 through 10657.

Date: May 25, 2021
CUCAMONGA VALLEY WATER DISTRICT
Published: May 25 & June 1, 2021
Inalnd Valley Daily Bulletin Ad#11464489

Inland Valley Daily Bulletin
(formerly The Daily Report)
9616 Archibald Avenue Suite 100
Rancho Cucamonga, CA 91730
909-987-6397
legals@inlandnewspapers.com

(Space below for use of County Clerk Only)

5009266

CUCAMONGA CO WATER DIST
10440 ASHFORD STREET
RANCHO CUCAMONGA, CA 91729

Legal No. **0011464489**

PROOF OF PUBLICATION
(2015.5 C.C.P.)

STATE OF CALIFORNIA
County of San Bernardino

I am a citizen of the United States, 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 printer of INLAND VALLEY DAILY BULLETIN, a newspaper of general circulation printed and published daily for the City of Ontario, County of San Bernardino, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of San Bernardino, State of California, on the date of August 24, 1951, Case Number 70663. The notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

05/25/2021, 06/01/2021

I declare under the penalty of perjury that the foregoing is true and correct.

Executed at Rancho Cucamonga, San Bernardino Co., California, on this 3rd day of June, 2021.

Signature

NOTICE OF PUBLIC HEARING

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Date: May 25, 2021
CUCAMONGA VALLEY WATER DISTRICT
Published: May 25 & June 1, 2021
Inalnd Valley Daily Bulletin **Ad#11464489**

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John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Peter Kavounas
General Manager
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO pkavounas@cbwm.org

Dear Mr. Kavounas,

The Cucamonga Valley Water District (District) Board of Directors (Board) will conduct a **virtual public hearing on June 8, 2021 at 6 PM** to receive public comments on and consider adoption of a Draft 2020 Urban Water Management Plan (UWMP) and Draft Water Shortage Contingency Plan (WSCP).

The Draft 2020 UWMP and Draft WSCP were prepared pursuant to the "Urban Water Management Planning Act" and the California Water Code. The 2020 UWMP documents the District's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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The District invites all interested entities to attend and present their comments. A copy of the Draft 2020 UWMP and Draft WSCP will be available on May 25, 2021 at the District's website:
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Written comments may be submitted **by 5 PM on June 4, 2021** via email to Eduardo Espinoza, Director of Engineering Services, at EduardoE@CVWDwater.com.

Sincerely,

John Bosler
General Manager / CEO

CC: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

Randall James Reed President | **Luis Cetina** Vice President | **James V. Curatalo, Jr.** Director | **Mark Gibboney** Director | **Kevin Kenley** Director

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John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Keith Kramer
Public Works Director
City of Fontana
16489 Orange Way
Fontana, CA 92335

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO kkramer@fontana.org

Dear Mr. Kramer,

The Cucamonga Valley Water District (District) Board of Directors (Board) will conduct a **virtual public hearing on June 8, 2021 at 6 PM** to receive public comments on and consider adoption of a Draft 2020 Urban Water Management Plan (UWMP) and Draft Water Shortage Contingency Plan (WSCP).

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John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Josh Swift
General Manager
Fontana Water Company
15966 Arrow Route
Fontana, CA 92335

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO jmswift@fontanawater.com

Dear Mr. Swift,

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John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Shivaji Deshmukh
General Manager
Inland Empire Utilities Agency
P.O Box 9020
Chino Hills, CA 91709

SUBJECT: Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan
TRANSMITTED VIA E-MAIL TO sdeshmukh@ieua.org

Dear Mr. Deshmukh,

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John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Scott Burton
Utilities General Manager
City of Ontario
1425 South Bon View Avenue
Ontario, CA 91761

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO sburton@ci.ontario.ca.us

Dear Mr. Burton,

The Cucamonga Valley Water District (District) Board of Directors (Board) will conduct a **virtual public hearing on June 8, 2021 at 6 PM** to receive public comments on and consider adoption of a Draft 2020 Urban Water Management Plan (UWMP) and Draft Water Shortage Contingency Plan (WSCP).

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John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. William Wittkopf
Public Works Services Director
City of Rancho Cucamonga
8794 Lion Street
Rancho Cucamonga, CA 91730

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO william.wittkopf@cityofrc.us

Dear Mr. Wittkopf,

The Cucamonga Valley Water District (District) Board of Directors (Board) will conduct a **virtual public hearing on June 8, 2021 at 6 PM** to receive public comments on and consider adoption of a Draft 2020 Urban Water Management Plan (UWMP) and Draft Water Shortage Contingency Plan (WSCP).

The Draft 2020 UWMP and Draft WSCP were prepared pursuant to the "Urban Water Management Planning Act" and the California Water Code. The 2020 UWMP documents the District's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

The meeting link will be posted on the District's website in the Board of Directors Regular Meeting Agenda at the following address on June 4, 2021 at 5 PM:
https://www.cvwdwater.com/AgendaCenter/Board-of-Directors-1/

The District invites all interested entities to attend and present their comments. A copy of the Draft 2020 UWMP and Draft WSCP will be available on May 25, 2021 at the District's website:
https://www.cvwdwater.com/189/Reports-Studies-Regulations

Written comments may be submitted **by 5 PM on June 4, 2021** via email to Eduardo Espinoza, Director of Engineering Services, at EduardoE@CVWDwater.com.

Sincerely,

John Bosler
General Manager / CEO

CC: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

Randall James Reed President | **Luis Cetina** Vice President | **James V. Curatalo, Jr.** Director | **Mark Gibboney** Director | **Kevin Kenley** Director

Cucamonga Valley Water District
Service Beyond Expectation

10440 Ashford Street, Rancho Cucamonga, CA 91730-2799
P.O. Box 638, Rancho Cucamonga, CA 91729-0638
(909) 987-2591 Fax (909) 476-8032

John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Brian Lee
General Manager
San Antonio Water Company
139 N. Euclid Avenue
Upland, CA 91786

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO blee@sawaterco.com

Dear Mr. Lee,

The Cucamonga Valley Water District (District) Board of Directors (Board) will conduct a **virtual public hearing on June 8, 2021 at 6 PM** to receive public comments on and consider adoption of a Draft 2020 Urban Water Management Plan (UWMP) and Draft Water Shortage Contingency Plan (WSCP).

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Sincerely,

John Bosler
General Manager / CEO

CC: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

Randall James Reed President | **Luis Cetina** Vice President | **James V. Curatalo, Jr.** Director | **Mark Gibboney** Director | **Kevin Kenley** Director

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John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Brendon Biggs
Director of Public Works
County of San Bernardino
825 East Third Street
San Bernardino, CA 92415

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO bbiggs@dpw.sbcounty.gov

Dear Mr. Biggs,

The Cucamonga Valley Water District (District) Board of Directors (Board) will conduct a **virtual public hearing on June 8, 2021 at 6 PM** to receive public comments on and consider adoption of a Draft 2020 Urban Water Management Plan (UWMP) and Draft Water Shortage Contingency Plan (WSCP).

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https://www.cvwdwater.com/189/Reports-Studies-Regulations

Written comments may be submitted **by 5 PM on June 4, 2021** via email to Eduardo Espinoza, Director of Engineering Services, at EduardoE@CVWDwater.com.

Sincerely,

John Bosler
General Manager / CEO

CC: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

Randall James Reed President | **Luis Cetina** Vice President | **James V. Curatalo, Jr.** Director | **Mark Gibboney** Director | **Kevin Kenley** Director

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P.O. Box 638, Rancho Cucamonga, CA 91729-0638
(909) 987-2591 Fax (909) 476-8032

John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Dan Ferons
General Manager
Santa Margarita Water District
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO danf@smwd.com

Dear Mr. Ferons,

The Cucamonga Valley Water District (District) Board of Directors (Board) will conduct a **virtual public hearing on June 8, 2021 at 6 PM** to receive public comments on and consider adoption of a Draft 2020 Urban Water Management Plan (UWMP) and Draft Water Shortage Contingency Plan (WSCP).

The Draft 2020 UWMP and Draft WSCP were prepared pursuant to the "Urban Water Management Planning Act" and the California Water Code. The 2020 UWMP documents the District's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

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The District invites all interested entities to attend and present their comments. A copy of the Draft 2020 UWMP and Draft WSCP will be available on May 25, 2021 at the District's website:
https://www.cvwdwater.com/189/Reports-Studies-Regulations

Written comments may be submitted **by 5 PM on June 4, 2021** via email to Eduardo Espinoza, Director of Engineering Services, at EduardoE@CVWDwater.com.

Sincerely,

John Bosler
General Manager / CEO

CC: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

Randall James Reed President | **Luis Cetina** Vice President | **James V. Curatalo, Jr.** Director | **Mark Gibboney** Director | **Kevin Kenley** Director

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P.O. Box 638, Rancho Cucamonga, CA 91729-0638
(909) 987-2591 Fax (909) 476-8032

John Bosler
Secretary/General Manager/CEO

May 19, 2021

Mr. Braden Yu
Public Works Director
City of Upland
460 N. Euclid Avenue
Upland, CA 91786

SUBJECT: **Notice of Public Hearing for 2020 Urban Water Management Plan and Water Shortage Contingency Plan**
TRANSMITTED VIA E-MAIL TO byu@ci.upland.ca.us

Dear Mr. Yu,

The Cucamonga Valley Water District (District) Board of Directors (Board) will conduct a **virtual public hearing on June 8, 2021 at 6 PM** to receive public comments on and consider adoption of a Draft 2020 Urban Water Management Plan (UWMP) and Draft Water Shortage Contingency Plan (WSCP).

The Draft 2020 UWMP and Draft WSCP were prepared pursuant to the "Urban Water Management Planning Act" and the California Water Code. The 2020 UWMP documents the District's plans to ensure adequate water supplies to meet existing and future demands under a range of water supply conditions, including water shortages.

The meeting link will be posted on the District's website in the Board of Directors Regular Meeting Agenda at the following address on June 4, 2021 at 5 PM:
https://www.cvwdwater.com/AgendaCenter/Board-of-Directors-1/

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https://www.cvwdwater.com/189/Reports-Studies-Regulations

Written comments may be submitted **by 5 PM on June 4, 2021** via email to Eduardo Espinoza, Director of Engineering Services, at EduardoE@CVWDwater.com.

Sincerely,

John Bosler
General Manager / CEO

CC: Stan Chen, Stetson Engineers (stanc@stetsonengineers.com)

Randall James Reed President | **Luis Cetina** Vice President | **James V. Curatalo, Jr.** Director | **Mark Gibboney** Director | **Kevin Kenley** Director

APPENDIX E

AWWA WATER LOSS AUDITS

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: Cucamonga Valley Water District (CA3610018)
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	30,657.643	acre-ft/yr			acre-ft/yr
Water imported:	7	11,073.952	acre-ft/yr	0.06%		acre-ft/yr
Water exported:	3	73.090	acre-ft/yr			acre-ft/yr
WATER SUPPLIED:		**41,651.865**	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	38,875.296	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	9	196.972	acre-ft/yr			
Unbilled unmetered:	5	104.130	acre-ft/yr		104.130	acre-ft/yr
AUTHORIZED CONSUMPTION:		**39,176.398**	acre-ft/yr			

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

WATER LOSSES (Water Supplied - Authorized Consumption)

2,475.467 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		104.130	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:	4	797.393	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:		97.188	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: **998.711** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **1,476.756** acre-ft/yr

WATER LOSSES: **2,475.467** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **2,776.569** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	710.0	miles
Number of active AND inactive service connections:	8	48,080	
Service connection density:		68	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:	8	80.0	psi

COST DATA

Total annual cost of operating water system:	10	$38,442,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$2.28	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	6	$420.18	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 65 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: Customer metering inaccuracies
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: Cucamonga Valley Water District (CA3610018)
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:	6	16,374.890	acre-ft/yr	3	-0.59%		acre-ft/yr
Water imported:	7	28,816.072	acre-ft/yr	4	0.00%		acre-ft/yr
Water exported:	3	7.860	acre-ft/yr	3			acre-ft/yr

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

WATER SUPPLIED: 45,280.287 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	7	42,711.860	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	9	269.550	acre-ft/yr			
Unbilled unmetered:	5	113.201	acre-ft/yr		113.201	acre-ft/yr

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

AUTHORIZED CONSUMPTION: 43,094.611 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 2,185.677 acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		113.201	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:	4	544.068	acre-ft/yr	1.25%	acre-ft/yr
Systematic data handling errors:		106.780	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: 764.049 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 1,421.628 acre-ft/yr

WATER LOSSES: 2,185.677 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 2,568.427 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	710.0	miles
Number of active AND inactive service connections:	8	48,315	
Service connection density:		68	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	80.0	psi

COST DATA

Total annual cost of operating water system:	10	$40,991,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	10	$2.53	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	6	$430.33	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 70 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: Water imported
2: Volume from own sources
3: Customer metering inaccuracies

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: Cucamonga Valley Water District (CA3610018)
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' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

				Pcnt:	Value:	
Volume from own sources:	6	19,004.958	acre-ft/yr	3	0.14%	acre-ft/yr
Water imported:	7	27,010.100	acre-ft/yr	4	0.09%	acre-ft/yr
Water exported:	3	159.347	acre-ft/yr	3		acre-ft/yr

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

WATER SUPPLIED: 45,804.854 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	42,733.860	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	9	73.820	acre-ft/yr			
Unbilled unmetered:	5	114.512	acre-ft/yr		114.512	acre-ft/yr

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: 42,922.192 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 2,882.662 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		114.512	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:	5	873.626	acre-ft/yr	2.00%	acre-ft/yr
Systematic data handling errors:		106.835	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: 1,094.973 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 1,787.689 acre-ft/yr

WATER LOSSES: 2,882.662 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 3,070.994 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	710.0	miles
Number of active AND inactive service connections:	8	49,689	
Service connection density:		70	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 | 80.0 | psi

COST DATA

Total annual cost of operating water system:	10	$46,751,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$2.79	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	6	$612.68	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 69 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: Water imported
2: Volume from own sources
3: Customer metering inaccuracies

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: Cucamonga Valley Water District (CA3610018)
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.

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

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	7	23,838.510	acre-ft/yr	3	-0.92%		acre-ft/yr
Water imported:	7	18,714.150	acre-ft/yr	4	-0.32%		acre-ft/yr
Water exported:	3	0.280	acre-ft/yr	3			acre-ft/yr
WATER SUPPLIED:		**42,833.808**	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:	8	41,126.160	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	9	67.980	acre-ft/yr			
Unbilled unmetered:	5	107.085	acre-ft/yr		107.085	acre-ft/yr
AUTHORIZED CONSUMPTION:		**41,301.225**	acre-ft/yr			

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

WATER LOSSES (Water Supplied - Authorized Consumption) **1,532.584** acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		107.085	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:	6	840.697	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:		102.815	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: **1,050.597** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **481.987** acre-ft/yr

WATER LOSSES: **1,532.584** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **1,707.648** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	710.0	miles
Number of active AND inactive service connections:	8	49,770	
Service connection density:		70	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	80.0	psi

COST DATA

Total annual cost of operating water system:	10	$43,079,569	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$2.71	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	6	$589.21	$/acre-ft	☑ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 72 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: Water imported
3: Customer metering inaccuracies

APPENDIX F

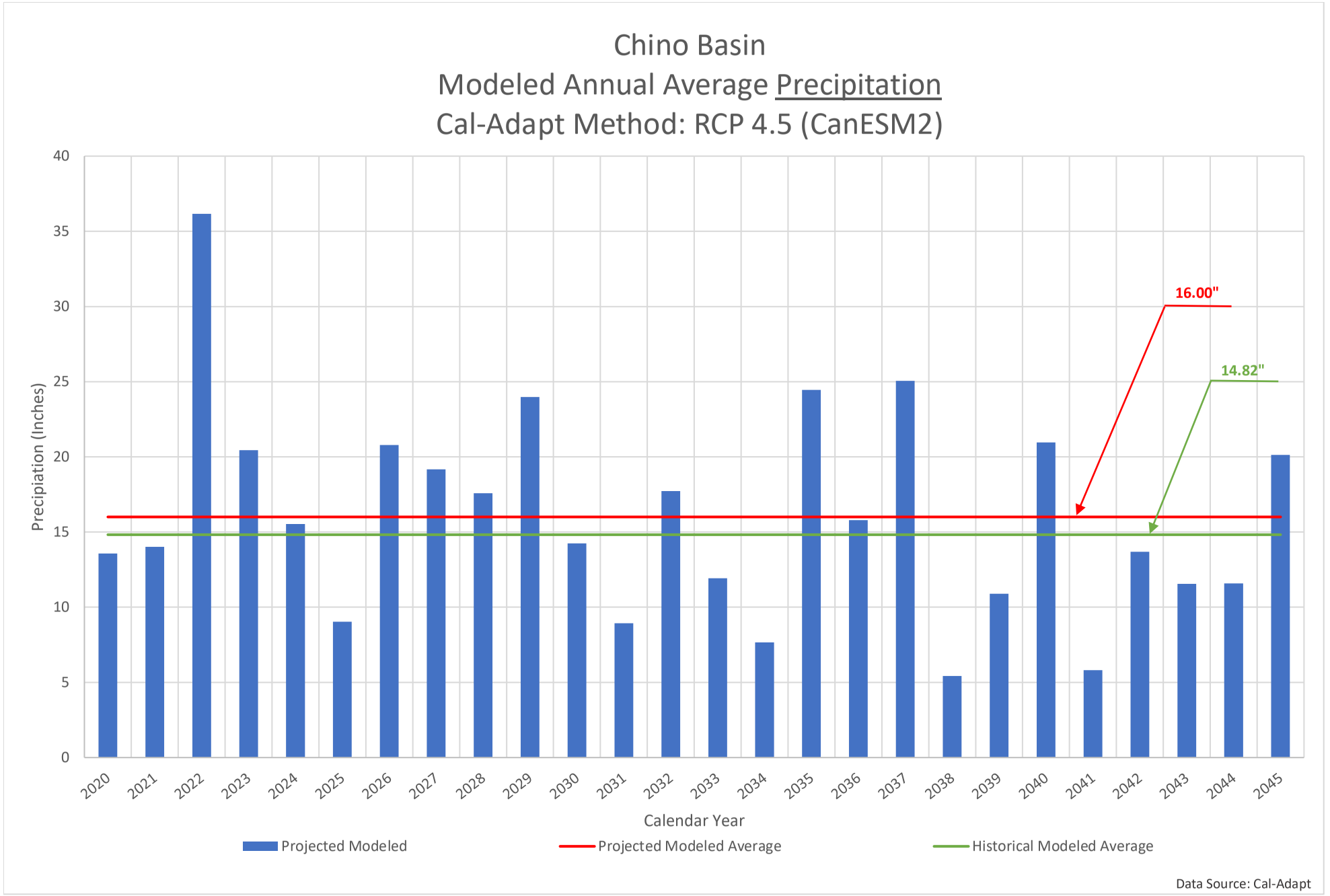
CLIMATE CHANGE CONSIDERATIONS (CAL- ADAPT DATA)

CHINO BASIN

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
Chino Basin

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

Projected Modeled Average: **16.00382 [inches]**
Historical Modeled Average: **14.82172 [inches]**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sun Jan 01 1950 00:00:00 GMT-0800 (Pacific Standard Time)	1950			3.700919
CanESM2	Mon Jan 01 1951 00:00:00 GMT-0800 (Pacific Standard Time)	1951			17.30468
CanESM2	Tue Jan 01 1952 00:00:00 GMT-0800 (Pacific Standard Time)	1952			16.11378
CanESM2	Thu Jan 01 1953 00:00:00 GMT-0800 (Pacific Standard Time)	1953			10.44193
CanESM2	Fri Jan 01 1954 00:00:00 GMT-0800 (Pacific Standard Time)	1954			16.90721
CanESM2	Sat Jan 01 1955 00:00:00 GMT-0800 (Pacific Standard Time)	1955			27.84166
CanESM2	Sun Jan 01 1956 00:00:00 GMT-0800 (Pacific Standard Time)	1956			6.855331
CanESM2	Tue Jan 01 1957 00:00:00 GMT-0800 (Pacific Standard Time)	1957			13.16045
CanESM2	Wed Jan 01 1958 00:00:00 GMT-0800 (Pacific Standard Time)	1958			6.55614
CanESM2	Thu Jan 01 1959 00:00:00 GMT-0800 (Pacific Standard Time)	1959			10.76282
CanESM2	Fri Jan 01 1960 00:00:00 GMT-0800 (Pacific Standard Time)	1960			12.93886
CanESM2	Sun Jan 01 1961 00:00:00 GMT-0800 (Pacific Standard Time)	1961			13.40765
CanESM2	Mon Jan 01 1962 00:00:00 GMT-0800 (Pacific Standard Time)	1962			22.24209
CanESM2	Tue Jan 01 1963 00:00:00 GMT-0800 (Pacific Standard Time)	1963			4.005351
CanESM2	Wed Jan 01 1964 00:00:00 GMT-0800 (Pacific Standard Time)	1964			28.86021
CanESM2	Fri Jan 01 1965 00:00:00 GMT-0800 (Pacific Standard Time)	1965			31.07789
CanESM2	Sat Jan 01 1966 00:00:00 GMT-0800 (Pacific Standard Time)	1966			12.44217
CanESM2	Sun Jan 01 1967 00:00:00 GMT-0800 (Pacific Standard Time)	1967			18.94751
CanESM2	Mon Jan 01 1968 00:00:00 GMT-0800 (Pacific Standard Time)	1968			14.70134
CanESM2	Wed Jan 01 1969 00:00:00 GMT-0800 (Pacific Standard Time)	1969			28.35504
CanESM2	Thu Jan 01 1970 00:00:00 GMT-0800 (Pacific Standard Time)	1970			12.84907
CanESM2	Fri Jan 01 1971 00:00:00 GMT-0800 (Pacific Standard Time)	1971			5.034394
CanESM2	Sat Jan 01 1972 00:00:00 GMT-0800 (Pacific Standard Time)	1972			15.57366
CanESM2	Mon Jan 01 1973 00:00:00 GMT-0800 (Pacific Standard Time)	1973			11.2481
CanESM2	Tue Jan 01 1974 00:00:00 GMT-0800 (Pacific Standard Time)	1974			33.87335
CanESM2	Wed Jan 01 1975 00:00:00 GMT-0800 (Pacific Standard Time)	1975			7.778772
CanESM2	Thu Jan 01 1976 00:00:00 GMT-0800 (Pacific Standard Time)	1976			14.5049
CanESM2	Sat Jan 01 1977 00:00:00 GMT-0800 (Pacific Standard Time)	1977			17.09041
CanESM2	Sun Jan 01 1978 00:00:00 GMT-0800 (Pacific Standard Time)	1978			12.02995
CanESM2	Mon Jan 01 1979 00:00:00 GMT-0800 (Pacific Standard Time)	1979			9.315764
CanESM2	Tue Jan 01 1980 00:00:00 GMT-0800 (Pacific Standard Time)	1980			6.179051
CanESM2	Thu Jan 01 1981 00:00:00 GMT-0800 (Pacific Standard Time)	1981			14.84229
CanESM2	Fri Jan 01 1982 00:00:00 GMT-0800 (Pacific Standard Time)	1982			22.44051
CanESM2	Sat Jan 01 1983 00:00:00 GMT-0800 (Pacific Standard Time)	1983			13.11271
CanESM2	Sun Jan 01 1984 00:00:00 GMT-0800 (Pacific Standard Time)	1984			14.20105
CanESM2	Tue Jan 01 1985 00:00:00 GMT-0800 (Pacific Standard Time)	1985			38.64678
CanESM2	Wed Jan 01 1986 00:00:00 GMT-0800 (Pacific Standard Time)	1986			8.24916
CanESM2	Thu Jan 01 1987 00:00:00 GMT-0800 (Pacific Standard Time)	1987			15.51612
CanESM2	Fri Jan 01 1988 00:00:00 GMT-0800 (Pacific Standard Time)	1988			10.61193
CanESM2	Sun Jan 01 1989 00:00:00 GMT-0800 (Pacific Standard Time)	1989			16.53263
CanESM2	Mon Jan 01 1990 00:00:00 GMT-0800 (Pacific Standard Time)	1990			18.66699
CanESM2	Tue Jan 01 1991 00:00:00 GMT-0800 (Pacific Standard Time)	1991			15.20903
CanESM2	Wed Jan 01 1992 00:00:00 GMT-0800 (Pacific Standard Time)	1992			16.66478
CanESM2	Fri Jan 01 1993 00:00:00 GMT-0800 (Pacific Standard Time)	1993			14.48983
CanESM2	Sat Jan 01 1994 00:00:00 GMT-0800 (Pacific Standard Time)	1994			14.7208
CanESM2	Sun Jan 01 1995 00:00:00 GMT-0800 (Pacific Standard Time)	1995			12.91328
CanESM2	Mon Jan 01 1996 00:00:00 GMT-0800 (Pacific Standard Time)	1996			10.69114
CanESM2	Wed Jan 01 1997 00:00:00 GMT-0800 (Pacific Standard Time)	1997			38.9727
CanESM2	Thu Jan 01 1998 00:00:00 GMT-0800 (Pacific Standard Time)	1998			9.558335
CanESM2	Fri Jan 01 1999 00:00:00 GMT-0800 (Pacific Standard Time)	1999			8.267488

Cal-Adapt
Annual Averages Tool - Precipitation
Chino Basin

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

Projected Modeled Average: **16.00382 [inches]**
Historical Modeled Average: **14.82172 [inches]**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sat Jan 01 2000 00:00:00 GMT-0800 (Pacific Standard Time)	2000			7.5434
CanESM2	Mon Jan 01 2001 00:00:00 GMT-0800 (Pacific Standard Time)	2001			10.20602
CanESM2	Tue Jan 01 2002 00:00:00 GMT-0800 (Pacific Standard Time)	2002			10.39491
CanESM2	Wed Jan 01 2003 00:00:00 GMT-0800 (Pacific Standard Time)	2003			13.12482
CanESM2	Thu Jan 01 2004 00:00:00 GMT-0800 (Pacific Standard Time)	2004			15.43004
CanESM2	Sat Jan 01 2005 00:00:00 GMT-0800 (Pacific Standard Time)	2005			22.94388
CanESM2	Sun Jan 01 2006 00:00:00 GMT-0800 (Pacific Standard Time)	2006			13.6766
CanESM2	Mon Jan 01 2007 00:00:00 GMT-0800 (Pacific Standard Time)	2007			4.089872
CanESM2	Tue Jan 01 2008 00:00:00 GMT-0800 (Pacific Standard Time)	2008			12.94551
CanESM2	Thu Jan 01 2009 00:00:00 GMT-0800 (Pacific Standard Time)	2009			11.81959
CanESM2	Fri Jan 01 2010 00:00:00 GMT-0800 (Pacific Standard Time)	2010			12.88253
CanESM2	Sat Jan 01 2011 00:00:00 GMT-0800 (Pacific Standard Time)	2011			19.71187
CanESM2	Sun Jan 01 2012 00:00:00 GMT-0800 (Pacific Standard Time)	2012			6.488277
CanESM2	Tue Jan 01 2013 00:00:00 GMT-0800 (Pacific Standard Time)	2013			8.959759
CanESM2	Wed Jan 01 2014 00:00:00 GMT-0800 (Pacific Standard Time)	2014			8.655361
CanESM2	Thu Jan 01 2015 00:00:00 GMT-0800 (Pacific Standard Time)	2015			22.86486
CanESM2	Fri Jan 01 2016 00:00:00 GMT-0800 (Pacific Standard Time)	2016			32.64576
CanESM2	Sun Jan 01 2017 00:00:00 GMT-0800 (Pacific Standard Time)	2017			11.00626
CanESM2	Mon Jan 01 2018 00:00:00 GMT-0800 (Pacific Standard Time)	2018			5.236335
CanESM2	Tue Jan 01 2019 00:00:00 GMT-0800 (Pacific Standard Time)	2019	14.82171851		10.48662
CanESM2	Wed Jan 01 2020 00:00:00 GMT-0800 (Pacific Standard Time)	2020	14.82171851	16.00381971	13.56974
CanESM2	Fri Jan 01 2021 00:00:00 GMT-0800 (Pacific Standard Time)	2021	14.82171851	16.00381971	14.0193
CanESM2	Sat Jan 01 2022 00:00:00 GMT-0800 (Pacific Standard Time)	2022	14.82171851	16.00381971	36.16642
CanESM2	Sun Jan 01 2023 00:00:00 GMT-0800 (Pacific Standard Time)	2023	14.82171851	16.00381971	20.44454
CanESM2	Mon Jan 01 2024 00:00:00 GMT-0800 (Pacific Standard Time)	2024	14.82171851	16.00381971	15.54037
CanESM2	Wed Jan 01 2025 00:00:00 GMT-0800 (Pacific Standard Time)	2025	14.82171851	16.00381971	9.026577
CanESM2	Thu Jan 01 2026 00:00:00 GMT-0800 (Pacific Standard Time)	2026	14.82171851	16.00381971	20.78657
CanESM2	Fri Jan 01 2027 00:00:00 GMT-0800 (Pacific Standard Time)	2027	14.82171851	16.00381971	19.1704
CanESM2	Sat Jan 01 2028 00:00:00 GMT-0800 (Pacific Standard Time)	2028	14.82171851	16.00381971	17.57344
CanESM2	Mon Jan 01 2029 00:00:00 GMT-0800 (Pacific Standard Time)	2029	14.82171851	16.00381971	23.98247
CanESM2	Tue Jan 01 2030 00:00:00 GMT-0800 (Pacific Standard Time)	2030	14.82171851	16.00381971	14.24796
CanESM2	Wed Jan 01 2031 00:00:00 GMT-0800 (Pacific Standard Time)	2031	14.82171851	16.00381971	8.938649
CanESM2	Thu Jan 01 2032 00:00:00 GMT-0800 (Pacific Standard Time)	2032	14.82171851	16.00381971	17.72878
CanESM2	Sat Jan 01 2033 00:00:00 GMT-0800 (Pacific Standard Time)	2033	14.82171851	16.00381971	11.93111
CanESM2	Sun Jan 01 2034 00:00:00 GMT-0800 (Pacific Standard Time)	2034	14.82171851	16.00381971	7.658487
CanESM2	Mon Jan 01 2035 00:00:00 GMT-0800 (Pacific Standard Time)	2035	14.82171851	16.00381971	24.44704
CanESM2	Tue Jan 01 2036 00:00:00 GMT-0800 (Pacific Standard Time)	2036	14.82171851	16.00381971	15.78679
CanESM2	Thu Jan 01 2037 00:00:00 GMT-0800 (Pacific Standard Time)	2037	14.82171851	16.00381971	25.06106
CanESM2	Fri Jan 01 2038 00:00:00 GMT-0800 (Pacific Standard Time)	2038	14.82171851	16.00381971	5.425917
CanESM2	Sat Jan 01 2039 00:00:00 GMT-0800 (Pacific Standard Time)	2039	14.82171851	16.00381971	10.89829
CanESM2	Sun Jan 01 2040 00:00:00 GMT-0800 (Pacific Standard Time)	2040	14.82171851	16.00381971	20.95617
CanESM2	Tue Jan 01 2041 00:00:00 GMT-0800 (Pacific Standard Time)	2041	14.82171851	16.00381971	5.807901
CanESM2	Wed Jan 01 2042 00:00:00 GMT-0800 (Pacific Standard Time)	2042	14.82171851	16.00381971	13.67965
CanESM2	Thu Jan 01 2043 00:00:00 GMT-0800 (Pacific Standard Time)	2043	14.82171851	16.00381971	11.55361
CanESM2	Fri Jan 01 2044 00:00:00 GMT-0800 (Pacific Standard Time)	2044	14.82171851	16.00381971	11.57526
CanESM2	Sun Jan 01 2045 00:00:00 GMT-0800 (Pacific Standard Time)	2045	14.82171851	16.00381971	20.12281
CanESM2	Mon Jan 01 2046 00:00:00 GMT-0800 (Pacific Standard Time)	2046	14.82171851		24.22683
CanESM2	Tue Jan 01 2047 00:00:00 GMT-0800 (Pacific Standard Time)	2047	14.82171851		21.37718
CanESM2	Wed Jan 01 2048 00:00:00 GMT-0800 (Pacific Standard Time)	2048	14.82171851		21.08418
CanESM2	Fri Jan 01 2049 00:00:00 GMT-0800 (Pacific Standard Time)	2049	14.82171851		9.34067

Cal-Adapt
Annual Averages Tool - Precipitation
Chino Basin

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

Projected Modeled Average: **16.00382 [inches]**
Historical Modeled Average: **14.82172 [inches]**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sat Jan 01 2050 00:00:00 GMT-0800 (Pacific Standard Time)	2050	14.82171851		10.41989
CanESM2	Sun Jan 01 2051 00:00:00 GMT-0800 (Pacific Standard Time)	2051	14.82171851		7.530774
CanESM2	Mon Jan 01 2052 00:00:00 GMT-0800 (Pacific Standard Time)	2052	14.82171851		25.96643
CanESM2	Wed Jan 01 2053 00:00:00 GMT-0800 (Pacific Standard Time)	2053	14.82171851		10.15468
CanESM2	Thu Jan 01 2054 00:00:00 GMT-0800 (Pacific Standard Time)	2054	14.82171851		13.14192
CanESM2	Fri Jan 01 2055 00:00:00 GMT-0800 (Pacific Standard Time)	2055	14.82171851		9.733803
CanESM2	Sat Jan 01 2056 00:00:00 GMT-0800 (Pacific Standard Time)	2056	14.82171851		17.25331
CanESM2	Mon Jan 01 2057 00:00:00 GMT-0800 (Pacific Standard Time)	2057	14.82171851		15.37966
CanESM2	Tue Jan 01 2058 00:00:00 GMT-0800 (Pacific Standard Time)	2058	14.82171851		7.574648
CanESM2	Wed Jan 01 2059 00:00:00 GMT-0800 (Pacific Standard Time)	2059	14.82171851		26.23963
CanESM2	Thu Jan 01 2060 00:00:00 GMT-0800 (Pacific Standard Time)	2060	14.82171851		28.2625
CanESM2	Sat Jan 01 2061 00:00:00 GMT-0800 (Pacific Standard Time)	2061	14.82171851		6.729702
CanESM2	Sun Jan 01 2062 00:00:00 GMT-0800 (Pacific Standard Time)	2062	14.82171851		11.89579
CanESM2	Mon Jan 01 2063 00:00:00 GMT-0800 (Pacific Standard Time)	2063	14.82171851		4.432257
CanESM2	Tue Jan 01 2064 00:00:00 GMT-0800 (Pacific Standard Time)	2064	14.82171851		9.655321
CanESM2	Thu Jan 01 2065 00:00:00 GMT-0800 (Pacific Standard Time)	2065	14.82171851		13.74902
CanESM2	Fri Jan 01 2066 00:00:00 GMT-0800 (Pacific Standard Time)	2066	14.82171851		14.30761
CanESM2	Sat Jan 01 2067 00:00:00 GMT-0800 (Pacific Standard Time)	2067	14.82171851		20.97347
CanESM2	Sun Jan 01 2068 00:00:00 GMT-0800 (Pacific Standard Time)	2068	14.82171851		16.44066
CanESM2	Tue Jan 01 2069 00:00:00 GMT-0800 (Pacific Standard Time)	2069	14.82171851		24.30653
CanESM2	Wed Jan 01 2070 00:00:00 GMT-0800 (Pacific Standard Time)	2070	14.82171851		22.69732
CanESM2	Thu Jan 01 2071 00:00:00 GMT-0800 (Pacific Standard Time)	2071	14.82171851		23.40727
CanESM2	Fri Jan 01 2072 00:00:00 GMT-0800 (Pacific Standard Time)	2072	14.82171851		6.820724
CanESM2	Sun Jan 01 2073 00:00:00 GMT-0800 (Pacific Standard Time)	2073	14.82171851		22.87705
CanESM2	Mon Jan 01 2074 00:00:00 GMT-0800 (Pacific Standard Time)	2074	14.82171851		17.81223
CanESM2	Tue Jan 01 2075 00:00:00 GMT-0800 (Pacific Standard Time)	2075	14.82171851		20.5584
CanESM2	Wed Jan 01 2076 00:00:00 GMT-0800 (Pacific Standard Time)	2076	14.82171851		11.00267
CanESM2	Fri Jan 01 2077 00:00:00 GMT-0800 (Pacific Standard Time)	2077	14.82171851		22.60738
CanESM2	Sat Jan 01 2078 00:00:00 GMT-0800 (Pacific Standard Time)	2078	14.82171851		19.72153
CanESM2	Sun Jan 01 2079 00:00:00 GMT-0800 (Pacific Standard Time)	2079	14.82171851		19.46532
CanESM2	Mon Jan 01 2080 00:00:00 GMT-0800 (Pacific Standard Time)	2080	14.82171851		44.25279
CanESM2	Wed Jan 01 2081 00:00:00 GMT-0800 (Pacific Standard Time)	2081	14.82171851		17.91737
CanESM2	Thu Jan 01 2082 00:00:00 GMT-0800 (Pacific Standard Time)	2082	14.82171851		14.49597
CanESM2	Fri Jan 01 2083 00:00:00 GMT-0800 (Pacific Standard Time)	2083	14.82171851		16.34221
CanESM2	Sat Jan 01 2084 00:00:00 GMT-0800 (Pacific Standard Time)	2084	14.82171851		22.17847
CanESM2	Mon Jan 01 2085 00:00:00 GMT-0800 (Pacific Standard Time)	2085	14.82171851		8.313108
CanESM2	Tue Jan 01 2086 00:00:00 GMT-0800 (Pacific Standard Time)	2086	14.82171851		23.80699
CanESM2	Wed Jan 01 2087 00:00:00 GMT-0800 (Pacific Standard Time)	2087	14.82171851		8.932599
CanESM2	Thu Jan 01 2088 00:00:00 GMT-0800 (Pacific Standard Time)	2088	14.82171851		36.03347
CanESM2	Sat Jan 01 2089 00:00:00 GMT-0800 (Pacific Standard Time)	2089	14.82171851		17.28937
CanESM2	Sun Jan 01 2090 00:00:00 GMT-0800 (Pacific Standard Time)	2090	14.82171851		11.13247
CanESM2	Mon Jan 01 2091 00:00:00 GMT-0800 (Pacific Standard Time)	2091	14.82171851		6.832503
CanESM2	Tue Jan 01 2092 00:00:00 GMT-0800 (Pacific Standard Time)	2092	14.82171851		4.958314
CanESM2	Thu Jan 01 2093 00:00:00 GMT-0800 (Pacific Standard Time)	2093	14.82171851		27.74233
CanESM2	Fri Jan 01 2094 00:00:00 GMT-0800 (Pacific Standard Time)	2094	14.82171851		16.80191
CanESM2	Sat Jan 01 2095 00:00:00 GMT-0800 (Pacific Standard Time)	2095	14.82171851		6.707868
CanESM2	Sun Jan 01 2096 00:00:00 GMT-0800 (Pacific Standard Time)	2096	14.82171851		11.27541
CanESM2	Tue Jan 01 2097 00:00:00 GMT-0800 (Pacific Standard Time)	2097	14.82171851		15.7764
CanESM2	Wed Jan 01 2098 00:00:00 GMT-0800 (Pacific Standard Time)	2098	14.82171851		23.27202
CanESM2	Thu Jan 01 2099 00:00:00 GMT-0800 (Pacific Standard Time)	2099	14.82171851		12.29473

Cal-Adapt
Annual Averages Tool - Precipitation
Chino Basin

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

Projected Modeled Average: **16.00382 [inches]**
Historical Modeled Average: **14.82172 [inches]**

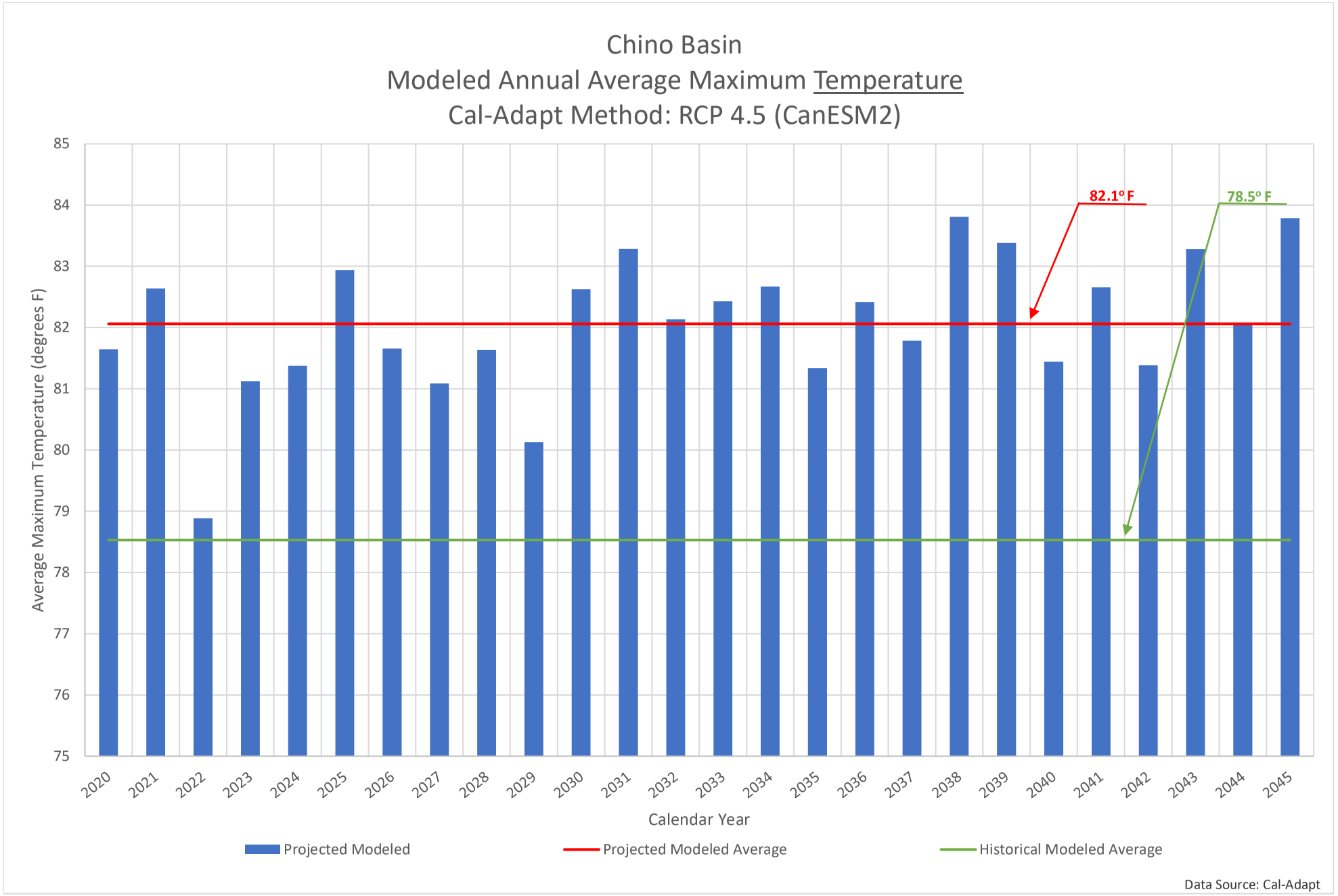
name	date	Year	Historical Average	Modeled Average	value
CanESM2	Fri Jan 01 2100 00:00:00 GMT-0800 (Pacific Standard Time)	2100	14.82171851		16.21604

CHINO BASIN

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
Chino Basin

location	User Defined Boundary - Chino Basin
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **82.06097456 °F**
Historical Modeled Average: **78.5297940 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sun Jan 01 1950 00:00:00 GMT-0800 (Pacific Standard Time)	1950			80.05461
CanESM2	Mon Jan 01 1951 00:00:00 GMT-0800 (Pacific Standard Time)	1951			77.93241
CanESM2	Tue Jan 01 1952 00:00:00 GMT-0800 (Pacific Standard Time)	1952			77.30686
CanESM2	Thu Jan 01 1953 00:00:00 GMT-0800 (Pacific Standard Time)	1953			78.03202
CanESM2	Fri Jan 01 1954 00:00:00 GMT-0800 (Pacific Standard Time)	1954			76.88544
CanESM2	Sat Jan 01 1955 00:00:00 GMT-0800 (Pacific Standard Time)	1955			76.20399
CanESM2	Sun Jan 01 1956 00:00:00 GMT-0800 (Pacific Standard Time)	1956			78.04634
CanESM2	Tue Jan 01 1957 00:00:00 GMT-0800 (Pacific Standard Time)	1957			78.04172
CanESM2	Wed Jan 01 1958 00:00:00 GMT-0800 (Pacific Standard Time)	1958			78.18192
CanESM2	Thu Jan 01 1959 00:00:00 GMT-0800 (Pacific Standard Time)	1959			79.1522
CanESM2	Fri Jan 01 1960 00:00:00 GMT-0800 (Pacific Standard Time)	1960			78.62896
CanESM2	Sun Jan 01 1961 00:00:00 GMT-0800 (Pacific Standard Time)	1961			76.66275
CanESM2	Mon Jan 01 1962 00:00:00 GMT-0800 (Pacific Standard Time)	1962			77.90819
CanESM2	Tue Jan 01 1963 00:00:00 GMT-0800 (Pacific Standard Time)	1963			80.69396
CanESM2	Wed Jan 01 1964 00:00:00 GMT-0800 (Pacific Standard Time)	1964			76.14631
CanESM2	Fri Jan 01 1965 00:00:00 GMT-0800 (Pacific Standard Time)	1965			74.79641
CanESM2	Sat Jan 01 1966 00:00:00 GMT-0800 (Pacific Standard Time)	1966			76.64748
CanESM2	Sun Jan 01 1967 00:00:00 GMT-0800 (Pacific Standard Time)	1967			77.79322
CanESM2	Mon Jan 01 1968 00:00:00 GMT-0800 (Pacific Standard Time)	1968			77.26835
CanESM2	Wed Jan 01 1969 00:00:00 GMT-0800 (Pacific Standard Time)	1969			76.59481
CanESM2	Thu Jan 01 1970 00:00:00 GMT-0800 (Pacific Standard Time)	1970			76.29012
CanESM2	Fri Jan 01 1971 00:00:00 GMT-0800 (Pacific Standard Time)	1971			77.91441
CanESM2	Sat Jan 01 1972 00:00:00 GMT-0800 (Pacific Standard Time)	1972			78.34221
CanESM2	Mon Jan 01 1973 00:00:00 GMT-0800 (Pacific Standard Time)	1973			77.06548
CanESM2	Tue Jan 01 1974 00:00:00 GMT-0800 (Pacific Standard Time)	1974			77.75588
CanESM2	Wed Jan 01 1975 00:00:00 GMT-0800 (Pacific Standard Time)	1975			79.54019
CanESM2	Thu Jan 01 1976 00:00:00 GMT-0800 (Pacific Standard Time)	1976			77.93902
CanESM2	Sat Jan 01 1977 00:00:00 GMT-0800 (Pacific Standard Time)	1977			76.87495
CanESM2	Sun Jan 01 1978 00:00:00 GMT-0800 (Pacific Standard Time)	1978			78.93915
CanESM2	Mon Jan 01 1979 00:00:00 GMT-0800 (Pacific Standard Time)	1979			79.16809
CanESM2	Tue Jan 01 1980 00:00:00 GMT-0800 (Pacific Standard Time)	1980			80.35038
CanESM2	Thu Jan 01 1981 00:00:00 GMT-0800 (Pacific Standard Time)	1981			79.92046
CanESM2	Fri Jan 01 1982 00:00:00 GMT-0800 (Pacific Standard Time)	1982			76.60721
CanESM2	Sat Jan 01 1983 00:00:00 GMT-0800 (Pacific Standard Time)	1983			77.65839
CanESM2	Sun Jan 01 1984 00:00:00 GMT-0800 (Pacific Standard Time)	1984			77.04406
CanESM2	Tue Jan 01 1985 00:00:00 GMT-0800 (Pacific Standard Time)	1985			76.18762
CanESM2	Wed Jan 01 1986 00:00:00 GMT-0800 (Pacific Standard Time)	1986			78.27004
CanESM2	Thu Jan 01 1987 00:00:00 GMT-0800 (Pacific Standard Time)	1987			76.91398
CanESM2	Fri Jan 01 1988 00:00:00 GMT-0800 (Pacific Standard Time)	1988			77.78293
CanESM2	Sun Jan 01 1989 00:00:00 GMT-0800 (Pacific Standard Time)	1989			76.77671
CanESM2	Mon Jan 01 1990 00:00:00 GMT-0800 (Pacific Standard Time)	1990			77.84982
CanESM2	Tue Jan 01 1991 00:00:00 GMT-0800 (Pacific Standard Time)	1991			78.66314
CanESM2	Wed Jan 01 1992 00:00:00 GMT-0800 (Pacific Standard Time)	1992			75.49348
CanESM2	Fri Jan 01 1993 00:00:00 GMT-0800 (Pacific Standard Time)	1993			79.26678
CanESM2	Sat Jan 01 1994 00:00:00 GMT-0800 (Pacific Standard Time)	1994			76.06939
CanESM2	Sun Jan 01 1995 00:00:00 GMT-0800 (Pacific Standard Time)	1995			79.28238
CanESM2	Mon Jan 01 1996 00:00:00 GMT-0800 (Pacific Standard Time)	1996			79.93127
CanESM2	Wed Jan 01 1997 00:00:00 GMT-0800 (Pacific Standard Time)	1997			77.33039
CanESM2	Thu Jan 01 1998 00:00:00 GMT-0800 (Pacific Standard Time)	1998			79.19292
CanESM2	Fri Jan 01 1999 00:00:00 GMT-0800 (Pacific Standard Time)	1999			79.82528
CanESM2	Sat Jan 01 2000 00:00:00 GMT-0800 (Pacific Standard Time)	2000			80.01809
CanESM2	Mon Jan 01 2001 00:00:00 GMT-0800 (Pacific Standard Time)	2001			80.0008
CanESM2	Tue Jan 01 2002 00:00:00 GMT-0800 (Pacific Standard Time)	2002			80.01955

Cal-Adapt
Annual Averages Tool - Maximum Temperature
Chino Basin

location	User Defined Boundary - Chino Basin
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **82.06097456 °F**
Historical Modeled Average: **78.5297940 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Wed Jan 01 2003 00:00:00 GMT-0800 (Pacific Standard Time)	2003			77.9787
CanESM2	Thu Jan 01 2004 00:00:00 GMT-0800 (Pacific Standard Time)	2004			79.48439
CanESM2	Sat Jan 01 2005 00:00:00 GMT-0800 (Pacific Standard Time)	2005			79.10891
CanESM2	Sun Jan 01 2006 00:00:00 GMT-0800 (Pacific Standard Time)	2006			79.14263
CanESM2	Mon Jan 01 2007 00:00:00 GMT-0800 (Pacific Standard Time)	2007			80.50184
CanESM2	Tue Jan 01 2008 00:00:00 GMT-0800 (Pacific Standard Time)	2008			80.24543
CanESM2	Thu Jan 01 2009 00:00:00 GMT-0800 (Pacific Standard Time)	2009			81.01307
CanESM2	Fri Jan 01 2010 00:00:00 GMT-0800 (Pacific Standard Time)	2010			80.00386
CanESM2	Sat Jan 01 2011 00:00:00 GMT-0800 (Pacific Standard Time)	2011			80.69299
CanESM2	Sun Jan 01 2012 00:00:00 GMT-0800 (Pacific Standard Time)	2012			81.46379
CanESM2	Tue Jan 01 2013 00:00:00 GMT-0800 (Pacific Standard Time)	2013			82.42551
CanESM2	Wed Jan 01 2014 00:00:00 GMT-0800 (Pacific Standard Time)	2014			79.39292
CanESM2	Thu Jan 01 2015 00:00:00 GMT-0800 (Pacific Standard Time)	2015			79.47762
CanESM2	Fri Jan 01 2016 00:00:00 GMT-0800 (Pacific Standard Time)	2016			78.58365
CanESM2	Sun Jan 01 2017 00:00:00 GMT-0800 (Pacific Standard Time)	2017			80.4537
CanESM2	Mon Jan 01 2018 00:00:00 GMT-0800 (Pacific Standard Time)	2018			82.82297
CanESM2	Tue Jan 01 2019 00:00:00 GMT-0800 (Pacific Standard Time)	2019	78.52979399		81.03111
CanESM2	Wed Jan 01 2020 00:00:00 GMT-0800 (Pacific Standard Time)	2020	78.52979399	82.06097456	81.64416
CanESM2	Fri Jan 01 2021 00:00:00 GMT-0800 (Pacific Standard Time)	2021	78.52979399	82.06097456	82.63645
CanESM2	Sat Jan 01 2022 00:00:00 GMT-0800 (Pacific Standard Time)	2022	78.52979399	82.06097456	78.88335
CanESM2	Sun Jan 01 2023 00:00:00 GMT-0800 (Pacific Standard Time)	2023	78.52979399	82.06097456	81.12281
CanESM2	Mon Jan 01 2024 00:00:00 GMT-0800 (Pacific Standard Time)	2024	78.52979399	82.06097456	81.37574
CanESM2	Wed Jan 01 2025 00:00:00 GMT-0800 (Pacific Standard Time)	2025	78.52979399	82.06097456	82.93872
CanESM2	Thu Jan 01 2026 00:00:00 GMT-0800 (Pacific Standard Time)	2026	78.52979399	82.06097456	81.65604
CanESM2	Fri Jan 01 2027 00:00:00 GMT-0800 (Pacific Standard Time)	2027	78.52979399	82.06097456	81.08742
CanESM2	Sat Jan 01 2028 00:00:00 GMT-0800 (Pacific Standard Time)	2028	78.52979399	82.06097456	81.63703
CanESM2	Mon Jan 01 2029 00:00:00 GMT-0800 (Pacific Standard Time)	2029	78.52979399	82.06097456	80.12987
CanESM2	Tue Jan 01 2030 00:00:00 GMT-0800 (Pacific Standard Time)	2030	78.52979399	82.06097456	82.62788
CanESM2	Wed Jan 01 2031 00:00:00 GMT-0800 (Pacific Standard Time)	2031	78.52979399	82.06097456	83.28283
CanESM2	Thu Jan 01 2032 00:00:00 GMT-0800 (Pacific Standard Time)	2032	78.52979399	82.06097456	82.13521
CanESM2	Sat Jan 01 2033 00:00:00 GMT-0800 (Pacific Standard Time)	2033	78.52979399	82.06097456	82.42798
CanESM2	Sun Jan 01 2034 00:00:00 GMT-0800 (Pacific Standard Time)	2034	78.52979399	82.06097456	82.66978
CanESM2	Mon Jan 01 2035 00:00:00 GMT-0800 (Pacific Standard Time)	2035	78.52979399	82.06097456	81.33618
CanESM2	Tue Jan 01 2036 00:00:00 GMT-0800 (Pacific Standard Time)	2036	78.52979399	82.06097456	82.41939
CanESM2	Thu Jan 01 2037 00:00:00 GMT-0800 (Pacific Standard Time)	2037	78.52979399	82.06097456	81.78423
CanESM2	Fri Jan 01 2038 00:00:00 GMT-0800 (Pacific Standard Time)	2038	78.52979399	82.06097456	83.80884
CanESM2	Sat Jan 01 2039 00:00:00 GMT-0800 (Pacific Standard Time)	2039	78.52979399	82.06097456	83.38306
CanESM2	Sun Jan 01 2040 00:00:00 GMT-0800 (Pacific Standard Time)	2040	78.52979399	82.06097456	81.4425
CanESM2	Tue Jan 01 2041 00:00:00 GMT-0800 (Pacific Standard Time)	2041	78.52979399	82.06097456	82.65962
CanESM2	Wed Jan 01 2042 00:00:00 GMT-0800 (Pacific Standard Time)	2042	78.52979399	82.06097456	81.38404
CanESM2	Thu Jan 01 2043 00:00:00 GMT-0800 (Pacific Standard Time)	2043	78.52979399	82.06097456	83.28065
CanESM2	Fri Jan 01 2044 00:00:00 GMT-0800 (Pacific Standard Time)	2044	78.52979399	82.06097456	82.04582
CanESM2	Sun Jan 01 2045 00:00:00 GMT-0800 (Pacific Standard Time)	2045	78.52979399	82.06097456	83.78573
CanESM2	Mon Jan 01 2046 00:00:00 GMT-0800 (Pacific Standard Time)	2046			82.28475
CanESM2	Tue Jan 01 2047 00:00:00 GMT-0800 (Pacific Standard Time)	2047			81.89009
CanESM2	Wed Jan 01 2048 00:00:00 GMT-0800 (Pacific Standard Time)	2048			82.47261
CanESM2	Fri Jan 01 2049 00:00:00 GMT-0800 (Pacific Standard Time)	2049			82.634
CanESM2	Sat Jan 01 2050 00:00:00 GMT-0800 (Pacific Standard Time)	2050			83.09914
CanESM2	Sun Jan 01 2051 00:00:00 GMT-0800 (Pacific Standard Time)	2051			83.23967
CanESM2	Mon Jan 01 2052 00:00:00 GMT-0800 (Pacific Standard Time)	2052			82.04439
CanESM2	Wed Jan 01 2053 00:00:00 GMT-0800 (Pacific Standard Time)	2053			83.51766
CanESM2	Thu Jan 01 2054 00:00:00 GMT-0800 (Pacific Standard Time)	2054			84.49722
CanESM2	Fri Jan 01 2055 00:00:00 GMT-0800 (Pacific Standard Time)	2055			85.2758

Cal-Adapt
Annual Averages Tool - Maximum Temperature
Chino Basin

location	User Defined Boundary - Chino Basin
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **82.06097456 °F**
Historical Modeled Average: **78.5297940 °F**

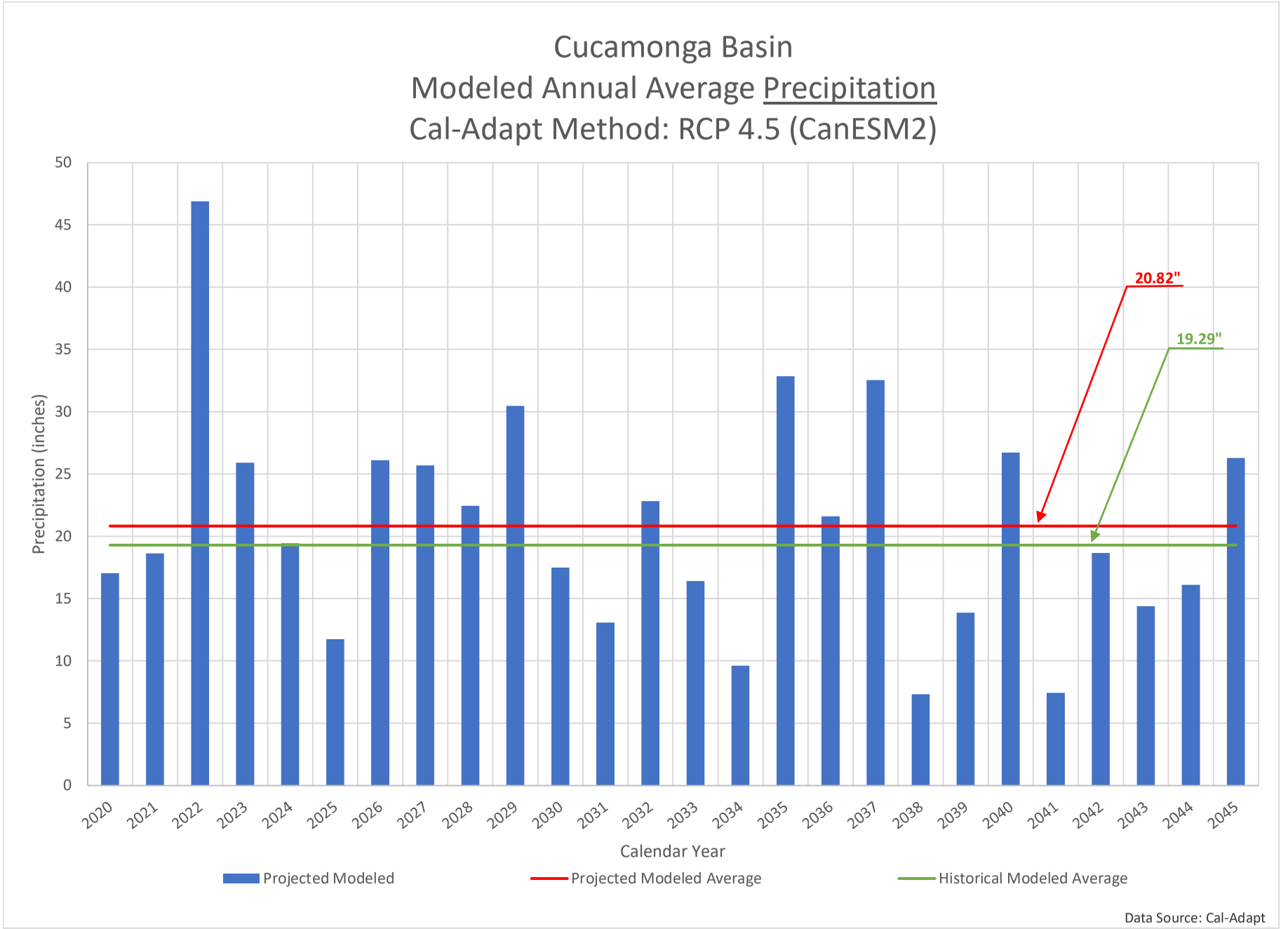
name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sat Jan 01 2056 00:00:00 GMT-0800 (Pacific Standard Time)	2056			83.05529
CanESM2	Mon Jan 01 2057 00:00:00 GMT-0800 (Pacific Standard Time)	2057			82.81477
CanESM2	Tue Jan 01 2058 00:00:00 GMT-0800 (Pacific Standard Time)	2058			85.55165
CanESM2	Wed Jan 01 2059 00:00:00 GMT-0800 (Pacific Standard Time)	2059			83.02395
CanESM2	Thu Jan 01 2060 00:00:00 GMT-0800 (Pacific Standard Time)	2060			82.02668
CanESM2	Sat Jan 01 2061 00:00:00 GMT-0800 (Pacific Standard Time)	2061			84.82128
CanESM2	Sun Jan 01 2062 00:00:00 GMT-0800 (Pacific Standard Time)	2062			84.89628
CanESM2	Mon Jan 01 2063 00:00:00 GMT-0800 (Pacific Standard Time)	2063			85.28423
CanESM2	Tue Jan 01 2064 00:00:00 GMT-0800 (Pacific Standard Time)	2064			85.41835
CanESM2	Thu Jan 01 2065 00:00:00 GMT-0800 (Pacific Standard Time)	2065			83.466
CanESM2	Fri Jan 01 2066 00:00:00 GMT-0800 (Pacific Standard Time)	2066			82.81083
CanESM2	Sat Jan 01 2067 00:00:00 GMT-0800 (Pacific Standard Time)	2067			81.14315
CanESM2	Sun Jan 01 2068 00:00:00 GMT-0800 (Pacific Standard Time)	2068			82.51757
CanESM2	Tue Jan 01 2069 00:00:00 GMT-0800 (Pacific Standard Time)	2069			83.73537
CanESM2	Wed Jan 01 2070 00:00:00 GMT-0800 (Pacific Standard Time)	2070			82.69908
CanESM2	Thu Jan 01 2071 00:00:00 GMT-0800 (Pacific Standard Time)	2071			83.20507
CanESM2	Fri Jan 01 2072 00:00:00 GMT-0800 (Pacific Standard Time)	2072			85.57098
CanESM2	Sun Jan 01 2073 00:00:00 GMT-0800 (Pacific Standard Time)	2073			82.70067
CanESM2	Mon Jan 01 2074 00:00:00 GMT-0800 (Pacific Standard Time)	2074			85.73146
CanESM2	Tue Jan 01 2075 00:00:00 GMT-0800 (Pacific Standard Time)	2075			84.02912
CanESM2	Wed Jan 01 2076 00:00:00 GMT-0800 (Pacific Standard Time)	2076			84.31841
CanESM2	Fri Jan 01 2077 00:00:00 GMT-0800 (Pacific Standard Time)	2077			84.5246
CanESM2	Sat Jan 01 2078 00:00:00 GMT-0800 (Pacific Standard Time)	2078			83.46555
CanESM2	Sun Jan 01 2079 00:00:00 GMT-0800 (Pacific Standard Time)	2079			84.65419
CanESM2	Mon Jan 01 2080 00:00:00 GMT-0800 (Pacific Standard Time)	2080			82.99439
CanESM2	Wed Jan 01 2081 00:00:00 GMT-0800 (Pacific Standard Time)	2081			83.27694
CanESM2	Thu Jan 01 2082 00:00:00 GMT-0800 (Pacific Standard Time)	2082			85.14016
CanESM2	Fri Jan 01 2083 00:00:00 GMT-0800 (Pacific Standard Time)	2083			83.1606
CanESM2	Sat Jan 01 2084 00:00:00 GMT-0800 (Pacific Standard Time)	2084			83.2149
CanESM2	Mon Jan 01 2085 00:00:00 GMT-0800 (Pacific Standard Time)	2085			83.98228
CanESM2	Tue Jan 01 2086 00:00:00 GMT-0800 (Pacific Standard Time)	2086			83.41109
CanESM2	Wed Jan 01 2087 00:00:00 GMT-0800 (Pacific Standard Time)	2087			85.36587
CanESM2	Thu Jan 01 2088 00:00:00 GMT-0800 (Pacific Standard Time)	2088			83.77036
CanESM2	Sat Jan 01 2089 00:00:00 GMT-0800 (Pacific Standard Time)	2089			83.7258
CanESM2	Sun Jan 01 2090 00:00:00 GMT-0800 (Pacific Standard Time)	2090			83.86174
CanESM2	Mon Jan 01 2091 00:00:00 GMT-0800 (Pacific Standard Time)	2091			83.38391
CanESM2	Tue Jan 01 2092 00:00:00 GMT-0800 (Pacific Standard Time)	2092			84.93088
CanESM2	Thu Jan 01 2093 00:00:00 GMT-0800 (Pacific Standard Time)	2093			83.54354
CanESM2	Fri Jan 01 2094 00:00:00 GMT-0800 (Pacific Standard Time)	2094			82.21828
CanESM2	Sat Jan 01 2095 00:00:00 GMT-0800 (Pacific Standard Time)	2095			84.57479
CanESM2	Sun Jan 01 2096 00:00:00 GMT-0800 (Pacific Standard Time)	2096			84.05474
CanESM2	Tue Jan 01 2097 00:00:00 GMT-0800 (Pacific Standard Time)	2097			84.28218
CanESM2	Wed Jan 01 2098 00:00:00 GMT-0800 (Pacific Standard Time)	2098			83.03013
CanESM2	Thu Jan 01 2099 00:00:00 GMT-0800 (Pacific Standard Time)	2099			84.71685
CanESM2	Fri Jan 01 2100 00:00:00 GMT-0800 (Pacific Standard Time)	2100			85.26877

CUCAMONGA BASIN

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
Cucamonga Basin

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

Projected Modeled Average: **20.82445 [inches]**
Historical Modeled Average: **19.29179 [inches]**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sun Jan 01 1950 00:00:00 GMT-0800 (Pacific Standard Time)	1950			4.40059
CanESM2	Mon Jan 01 1951 00:00:00 GMT-0800 (Pacific Standard Time)	1951			22.52692
CanESM2	Tue Jan 01 1952 00:00:00 GMT-0800 (Pacific Standard Time)	1952			22.05698
CanESM2	Thu Jan 01 1953 00:00:00 GMT-0800 (Pacific Standard Time)	1953			13.73285
CanESM2	Fri Jan 01 1954 00:00:00 GMT-0800 (Pacific Standard Time)	1954			22.72539
CanESM2	Sat Jan 01 1955 00:00:00 GMT-0800 (Pacific Standard Time)	1955			36.85291
CanESM2	Sun Jan 01 1956 00:00:00 GMT-0800 (Pacific Standard Time)	1956			9.096657
CanESM2	Tue Jan 01 1957 00:00:00 GMT-0800 (Pacific Standard Time)	1957			18.25972
CanESM2	Wed Jan 01 1958 00:00:00 GMT-0800 (Pacific Standard Time)	1958			8.37237
CanESM2	Thu Jan 01 1959 00:00:00 GMT-0800 (Pacific Standard Time)	1959			14.14318
CanESM2	Fri Jan 01 1960 00:00:00 GMT-0800 (Pacific Standard Time)	1960			16.95409
CanESM2	Sun Jan 01 1961 00:00:00 GMT-0800 (Pacific Standard Time)	1961			18.387
CanESM2	Mon Jan 01 1962 00:00:00 GMT-0800 (Pacific Standard Time)	1962			29.02511
CanESM2	Tue Jan 01 1963 00:00:00 GMT-0800 (Pacific Standard Time)	1963			5.023342
CanESM2	Wed Jan 01 1964 00:00:00 GMT-0800 (Pacific Standard Time)	1964			37.32225
CanESM2	Fri Jan 01 1965 00:00:00 GMT-0800 (Pacific Standard Time)	1965			40.34187
CanESM2	Sat Jan 01 1966 00:00:00 GMT-0800 (Pacific Standard Time)	1966			15.95995
CanESM2	Sun Jan 01 1967 00:00:00 GMT-0800 (Pacific Standard Time)	1967			24.12592
CanESM2	Mon Jan 01 1968 00:00:00 GMT-0800 (Pacific Standard Time)	1968			19.364
CanESM2	Wed Jan 01 1969 00:00:00 GMT-0800 (Pacific Standard Time)	1969			38.33959
CanESM2	Thu Jan 01 1970 00:00:00 GMT-0800 (Pacific Standard Time)	1970			16.23807
CanESM2	Fri Jan 01 1971 00:00:00 GMT-0800 (Pacific Standard Time)	1971			6.572544
CanESM2	Sat Jan 01 1972 00:00:00 GMT-0800 (Pacific Standard Time)	1972			20.74672
CanESM2	Mon Jan 01 1973 00:00:00 GMT-0800 (Pacific Standard Time)	1973			14.18631
CanESM2	Tue Jan 01 1974 00:00:00 GMT-0800 (Pacific Standard Time)	1974			44.64374
CanESM2	Wed Jan 01 1975 00:00:00 GMT-0800 (Pacific Standard Time)	1975			10.22586
CanESM2	Thu Jan 01 1976 00:00:00 GMT-0800 (Pacific Standard Time)	1976			18.29248
CanESM2	Sat Jan 01 1977 00:00:00 GMT-0800 (Pacific Standard Time)	1977			21.29953
CanESM2	Sun Jan 01 1978 00:00:00 GMT-0800 (Pacific Standard Time)	1978			14.39006
CanESM2	Mon Jan 01 1979 00:00:00 GMT-0800 (Pacific Standard Time)	1979			11.73382
CanESM2	Tue Jan 01 1980 00:00:00 GMT-0800 (Pacific Standard Time)	1980			8.046043
CanESM2	Thu Jan 01 1981 00:00:00 GMT-0800 (Pacific Standard Time)	1981			19.37727
CanESM2	Fri Jan 01 1982 00:00:00 GMT-0800 (Pacific Standard Time)	1982			27.90187
CanESM2	Sat Jan 01 1983 00:00:00 GMT-0800 (Pacific Standard Time)	1983			17.62813
CanESM2	Sun Jan 01 1984 00:00:00 GMT-0800 (Pacific Standard Time)	1984			18.95932
CanESM2	Tue Jan 01 1985 00:00:00 GMT-0800 (Pacific Standard Time)	1985			49.88492
CanESM2	Wed Jan 01 1986 00:00:00 GMT-0800 (Pacific Standard Time)	1986			11.29173
CanESM2	Thu Jan 01 1987 00:00:00 GMT-0800 (Pacific Standard Time)	1987			20.97406
CanESM2	Fri Jan 01 1988 00:00:00 GMT-0800 (Pacific Standard Time)	1988			13.99451
CanESM2	Sun Jan 01 1989 00:00:00 GMT-0800 (Pacific Standard Time)	1989			20.89777
CanESM2	Mon Jan 01 1990 00:00:00 GMT-0800 (Pacific Standard Time)	1990			24.81099
CanESM2	Tue Jan 01 1991 00:00:00 GMT-0800 (Pacific Standard Time)	1991			18.10222
CanESM2	Wed Jan 01 1992 00:00:00 GMT-0800 (Pacific Standard Time)	1992			21.46571
CanESM2	Fri Jan 01 1993 00:00:00 GMT-0800 (Pacific Standard Time)	1993			18.82282
CanESM2	Sat Jan 01 1994 00:00:00 GMT-0800 (Pacific Standard Time)	1994			19.73666
CanESM2	Sun Jan 01 1995 00:00:00 GMT-0800 (Pacific Standard Time)	1995			16.1622
CanESM2	Mon Jan 01 1996 00:00:00 GMT-0800 (Pacific Standard Time)	1996			14.39742
CanESM2	Wed Jan 01 1997 00:00:00 GMT-0800 (Pacific Standard Time)	1997			49.71416
CanESM2	Thu Jan 01 1998 00:00:00 GMT-0800 (Pacific Standard Time)	1998			11.87104
CanESM2	Fri Jan 01 1999 00:00:00 GMT-0800 (Pacific Standard Time)	1999			10.49207
CanESM2	Sat Jan 01 2000 00:00:00 GMT-0800 (Pacific Standard Time)	2000			10.04646

Cal-Adapt
Annual Averages Tool - Precipitation
Cucamonga Basin

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

Projected Modeled Average: **20.82445 [inches]**
Historical Modeled Average: **19.29179 [inches]**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Mon Jan 01 2001 00:00:00 GMT-0800 (Pacific Standard Time)	2001			12.89581
CanESM2	Tue Jan 01 2002 00:00:00 GMT-0800 (Pacific Standard Time)	2002			12.96122
CanESM2	Wed Jan 01 2003 00:00:00 GMT-0800 (Pacific Standard Time)	2003			18.55249
CanESM2	Thu Jan 01 2004 00:00:00 GMT-0800 (Pacific Standard Time)	2004			19.00016
CanESM2	Sat Jan 01 2005 00:00:00 GMT-0800 (Pacific Standard Time)	2005			31.16209
CanESM2	Sun Jan 01 2006 00:00:00 GMT-0800 (Pacific Standard Time)	2006			18.5522
CanESM2	Mon Jan 01 2007 00:00:00 GMT-0800 (Pacific Standard Time)	2007			4.537141
CanESM2	Tue Jan 01 2008 00:00:00 GMT-0800 (Pacific Standard Time)	2008			16.93996
CanESM2	Thu Jan 01 2009 00:00:00 GMT-0800 (Pacific Standard Time)	2009			15.42307
CanESM2	Fri Jan 01 2010 00:00:00 GMT-0800 (Pacific Standard Time)	2010			16.26144
CanESM2	Sat Jan 01 2011 00:00:00 GMT-0800 (Pacific Standard Time)	2011			25.64423
CanESM2	Sun Jan 01 2012 00:00:00 GMT-0800 (Pacific Standard Time)	2012			8.331514
CanESM2	Tue Jan 01 2013 00:00:00 GMT-0800 (Pacific Standard Time)	2013			11.95644
CanESM2	Wed Jan 01 2014 00:00:00 GMT-0800 (Pacific Standard Time)	2014			12.2311
CanESM2	Thu Jan 01 2015 00:00:00 GMT-0800 (Pacific Standard Time)	2015			28.92597
CanESM2	Fri Jan 01 2016 00:00:00 GMT-0800 (Pacific Standard Time)	2016			42.58793
CanESM2	Sun Jan 01 2017 00:00:00 GMT-0800 (Pacific Standard Time)	2017			14.18048
CanESM2	Mon Jan 01 2018 00:00:00 GMT-0800 (Pacific Standard Time)	2018			6.505455
CanESM2	Tue Jan 01 2019 00:00:00 GMT-0800 (Pacific Standard Time)	2019	19.29178831		13.85932
CanESM2	Wed Jan 01 2020 00:00:00 GMT-0800 (Pacific Standard Time)	2020	19.29178831	20.82445039	17.04347
CanESM2	Fri Jan 01 2021 00:00:00 GMT-0800 (Pacific Standard Time)	2021	19.29178831	20.82445039	18.6145
CanESM2	Sat Jan 01 2022 00:00:00 GMT-0800 (Pacific Standard Time)	2022	19.29178831	20.82445039	46.87834
CanESM2	Sun Jan 01 2023 00:00:00 GMT-0800 (Pacific Standard Time)	2023	19.29178831	20.82445039	25.90982
CanESM2	Mon Jan 01 2024 00:00:00 GMT-0800 (Pacific Standard Time)	2024	19.29178831	20.82445039	19.42655
CanESM2	Wed Jan 01 2025 00:00:00 GMT-0800 (Pacific Standard Time)	2025	19.29178831	20.82445039	11.73476
CanESM2	Thu Jan 01 2026 00:00:00 GMT-0800 (Pacific Standard Time)	2026	19.29178831	20.82445039	26.10331
CanESM2	Fri Jan 01 2027 00:00:00 GMT-0800 (Pacific Standard Time)	2027	19.29178831	20.82445039	25.67916
CanESM2	Sat Jan 01 2028 00:00:00 GMT-0800 (Pacific Standard Time)	2028	19.29178831	20.82445039	22.44266
CanESM2	Mon Jan 01 2029 00:00:00 GMT-0800 (Pacific Standard Time)	2029	19.29178831	20.82445039	30.45575
CanESM2	Tue Jan 01 2030 00:00:00 GMT-0800 (Pacific Standard Time)	2030	19.29178831	20.82445039	17.48237
CanESM2	Wed Jan 01 2031 00:00:00 GMT-0800 (Pacific Standard Time)	2031	19.29178831	20.82445039	13.06496
CanESM2	Thu Jan 01 2032 00:00:00 GMT-0800 (Pacific Standard Time)	2032	19.29178831	20.82445039	22.82911
CanESM2	Sat Jan 01 2033 00:00:00 GMT-0800 (Pacific Standard Time)	2033	19.29178831	20.82445039	16.40533
CanESM2	Sun Jan 01 2034 00:00:00 GMT-0800 (Pacific Standard Time)	2034	19.29178831	20.82445039	9.61259
CanESM2	Mon Jan 01 2035 00:00:00 GMT-0800 (Pacific Standard Time)	2035	19.29178831	20.82445039	32.85049
CanESM2	Tue Jan 01 2036 00:00:00 GMT-0800 (Pacific Standard Time)	2036	19.29178831	20.82445039	21.6037
CanESM2	Thu Jan 01 2037 00:00:00 GMT-0800 (Pacific Standard Time)	2037	19.29178831	20.82445039	32.53024
CanESM2	Fri Jan 01 2038 00:00:00 GMT-0800 (Pacific Standard Time)	2038	19.29178831	20.82445039	7.321542
CanESM2	Sat Jan 01 2039 00:00:00 GMT-0800 (Pacific Standard Time)	2039	19.29178831	20.82445039	13.87029
CanESM2	Sun Jan 01 2040 00:00:00 GMT-0800 (Pacific Standard Time)	2040	19.29178831	20.82445039	26.71684
CanESM2	Tue Jan 01 2041 00:00:00 GMT-0800 (Pacific Standard Time)	2041	19.29178831	20.82445039	7.424374
CanESM2	Wed Jan 01 2042 00:00:00 GMT-0800 (Pacific Standard Time)	2042	19.29178831	20.82445039	18.66455
CanESM2	Thu Jan 01 2043 00:00:00 GMT-0800 (Pacific Standard Time)	2043	19.29178831	20.82445039	14.38684
CanESM2	Fri Jan 01 2044 00:00:00 GMT-0800 (Pacific Standard Time)	2044	19.29178831	20.82445039	16.09589
CanESM2	Sun Jan 01 2045 00:00:00 GMT-0800 (Pacific Standard Time)	2045	19.29178831	20.82445039	26.28829
CanESM2	Mon Jan 01 2046 00:00:00 GMT-0800 (Pacific Standard Time)	2046	19.29178831	20.82445039	31.94664
CanESM2	Tue Jan 01 2047 00:00:00 GMT-0800 (Pacific Standard Time)	2047	19.29178831		27.73071
CanESM2	Wed Jan 01 2048 00:00:00 GMT-0800 (Pacific Standard Time)	2048	19.29178831		27.86374
CanESM2	Fri Jan 01 2049 00:00:00 GMT-0800 (Pacific Standard Time)	2049	19.29178831		11.79762
CanESM2	Sat Jan 01 2050 00:00:00 GMT-0800 (Pacific Standard Time)	2050	19.29178831		14.05542
CanESM2	Sun Jan 01 2051 00:00:00 GMT-0800 (Pacific Standard Time)	2051	19.29178831		9.842028

Cal-Adapt
Annual Averages Tool - Precipitation
Cucamonga Basin

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

Projected Modeled Average: **20.82445 [inches]**
Historical Modeled Average: **19.29179 [inches]**

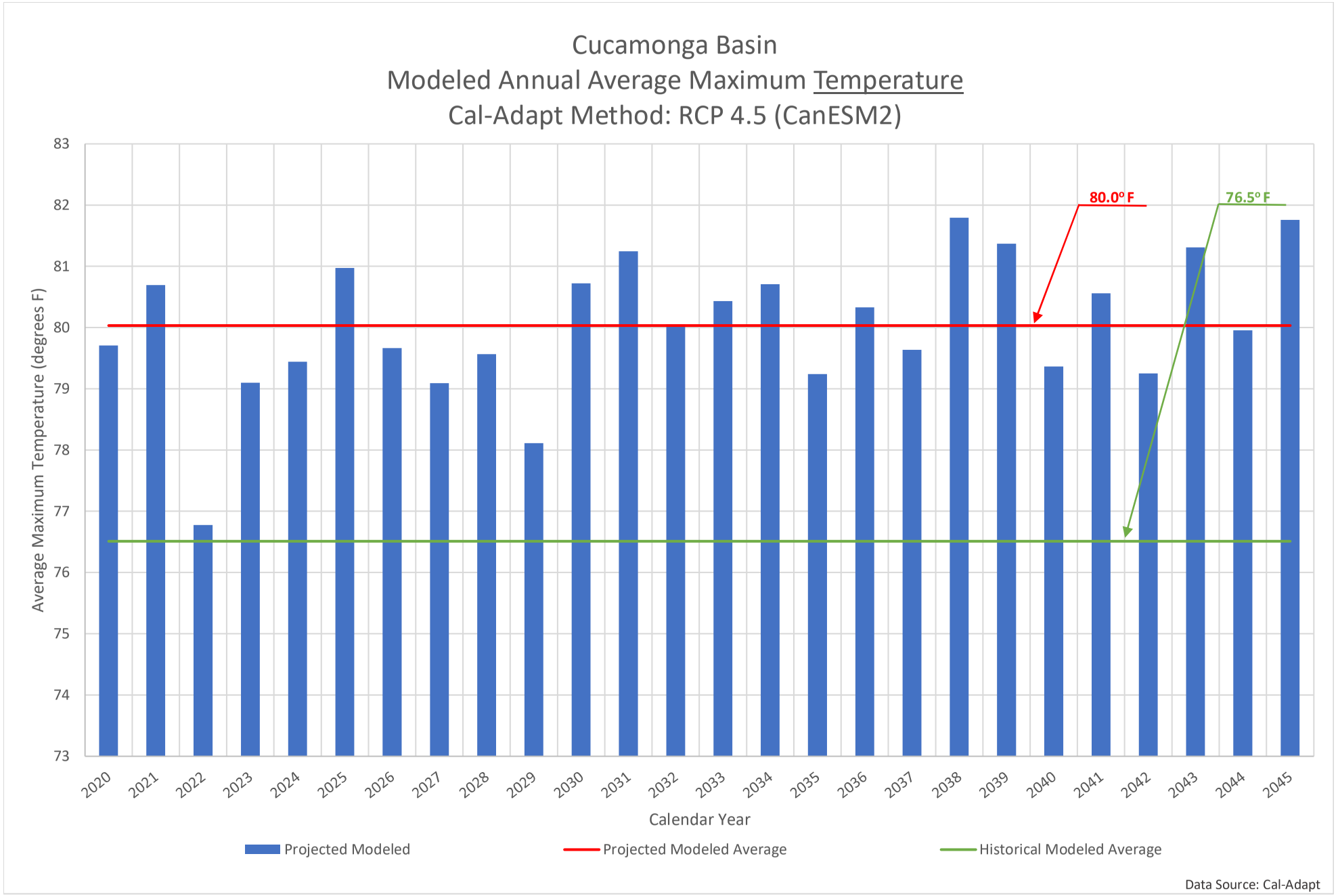
name	date	Year	Historical Average	Modeled Average	value
CanESM2	Mon Jan 01 2052 00:00:00 GMT-0800 (Pacific Standard Time)	2052	19.29178831		31.66943
CanESM2	Wed Jan 01 2053 00:00:00 GMT-0800 (Pacific Standard Time)	2053	19.29178831		13.89321
CanESM2	Thu Jan 01 2054 00:00:00 GMT-0800 (Pacific Standard Time)	2054	19.29178831		16.87538
CanESM2	Fri Jan 01 2055 00:00:00 GMT-0800 (Pacific Standard Time)	2055	19.29178831		12.90055
CanESM2	Sat Jan 01 2056 00:00:00 GMT-0800 (Pacific Standard Time)	2056	19.29178831		22.15154
CanESM2	Mon Jan 01 2057 00:00:00 GMT-0800 (Pacific Standard Time)	2057	19.29178831		19.72571
CanESM2	Tue Jan 01 2058 00:00:00 GMT-0800 (Pacific Standard Time)	2058	19.29178831		10.70986
CanESM2	Wed Jan 01 2059 00:00:00 GMT-0800 (Pacific Standard Time)	2059	19.29178831		33.38056
CanESM2	Thu Jan 01 2060 00:00:00 GMT-0800 (Pacific Standard Time)	2060	19.29178831		37.46101
CanESM2	Sat Jan 01 2061 00:00:00 GMT-0800 (Pacific Standard Time)	2061	19.29178831		9.428464
CanESM2	Sun Jan 01 2062 00:00:00 GMT-0800 (Pacific Standard Time)	2062	19.29178831		16.23314
CanESM2	Mon Jan 01 2063 00:00:00 GMT-0800 (Pacific Standard Time)	2063	19.29178831		5.626847
CanESM2	Tue Jan 01 2064 00:00:00 GMT-0800 (Pacific Standard Time)	2064	19.29178831		12.24993
CanESM2	Thu Jan 01 2065 00:00:00 GMT-0800 (Pacific Standard Time)	2065	19.29178831		18.04127
CanESM2	Fri Jan 01 2066 00:00:00 GMT-0800 (Pacific Standard Time)	2066	19.29178831		18.74802
CanESM2	Sat Jan 01 2067 00:00:00 GMT-0800 (Pacific Standard Time)	2067	19.29178831		28.11294
CanESM2	Sun Jan 01 2068 00:00:00 GMT-0800 (Pacific Standard Time)	2068	19.29178831		21.73679
CanESM2	Tue Jan 01 2069 00:00:00 GMT-0800 (Pacific Standard Time)	2069	19.29178831		32.00304
CanESM2	Wed Jan 01 2070 00:00:00 GMT-0800 (Pacific Standard Time)	2070	19.29178831		28.97354
CanESM2	Thu Jan 01 2071 00:00:00 GMT-0800 (Pacific Standard Time)	2071	19.29178831		30.21861
CanESM2	Fri Jan 01 2072 00:00:00 GMT-0800 (Pacific Standard Time)	2072	19.29178831		8.932683
CanESM2	Sun Jan 01 2073 00:00:00 GMT-0800 (Pacific Standard Time)	2073	19.29178831		28.73521
CanESM2	Mon Jan 01 2074 00:00:00 GMT-0800 (Pacific Standard Time)	2074	19.29178831		24.60559
CanESM2	Tue Jan 01 2075 00:00:00 GMT-0800 (Pacific Standard Time)	2075	19.29178831		26.17722
CanESM2	Wed Jan 01 2076 00:00:00 GMT-0800 (Pacific Standard Time)	2076	19.29178831		14.84798
CanESM2	Fri Jan 01 2077 00:00:00 GMT-0800 (Pacific Standard Time)	2077	19.29178831		30.97199
CanESM2	Sat Jan 01 2078 00:00:00 GMT-0800 (Pacific Standard Time)	2078	19.29178831		25.05014
CanESM2	Sun Jan 01 2079 00:00:00 GMT-0800 (Pacific Standard Time)	2079	19.29178831		25.0611
CanESM2	Mon Jan 01 2080 00:00:00 GMT-0800 (Pacific Standard Time)	2080	19.29178831		56.2787
CanESM2	Wed Jan 01 2081 00:00:00 GMT-0800 (Pacific Standard Time)	2081	19.29178831		22.81339
CanESM2	Thu Jan 01 2082 00:00:00 GMT-0800 (Pacific Standard Time)	2082	19.29178831		18.05719
CanESM2	Fri Jan 01 2083 00:00:00 GMT-0800 (Pacific Standard Time)	2083	19.29178831		20.27045
CanESM2	Sat Jan 01 2084 00:00:00 GMT-0800 (Pacific Standard Time)	2084	19.29178831		30.50952
CanESM2	Mon Jan 01 2085 00:00:00 GMT-0800 (Pacific Standard Time)	2085	19.29178831		9.648054
CanESM2	Tue Jan 01 2086 00:00:00 GMT-0800 (Pacific Standard Time)	2086	19.29178831		30.67271
CanESM2	Wed Jan 01 2087 00:00:00 GMT-0800 (Pacific Standard Time)	2087	19.29178831		11.3515
CanESM2	Thu Jan 01 2088 00:00:00 GMT-0800 (Pacific Standard Time)	2088	19.29178831		48.05045
CanESM2	Sat Jan 01 2089 00:00:00 GMT-0800 (Pacific Standard Time)	2089	19.29178831		22.64559
CanESM2	Sun Jan 01 2090 00:00:00 GMT-0800 (Pacific Standard Time)	2090	19.29178831		14.92833
CanESM2	Mon Jan 01 2091 00:00:00 GMT-0800 (Pacific Standard Time)	2091	19.29178831		9.334556
CanESM2	Tue Jan 01 2092 00:00:00 GMT-0800 (Pacific Standard Time)	2092	19.29178831		6.877164
CanESM2	Thu Jan 01 2093 00:00:00 GMT-0800 (Pacific Standard Time)	2093	19.29178831		37.5743
CanESM2	Fri Jan 01 2094 00:00:00 GMT-0800 (Pacific Standard Time)	2094	19.29178831		21.46266
CanESM2	Sat Jan 01 2095 00:00:00 GMT-0800 (Pacific Standard Time)	2095	19.29178831		9.179107
CanESM2	Sun Jan 01 2096 00:00:00 GMT-0800 (Pacific Standard Time)	2096	19.29178831		14.2042
CanESM2	Tue Jan 01 2097 00:00:00 GMT-0800 (Pacific Standard Time)	2097	19.29178831		20.57517
CanESM2	Wed Jan 01 2098 00:00:00 GMT-0800 (Pacific Standard Time)	2098	19.29178831		30.874
CanESM2	Thu Jan 01 2099 00:00:00 GMT-0800 (Pacific Standard Time)	2099	19.29178831		17.24913
CanESM2	Fri Jan 01 2100 00:00:00 GMT-0800 (Pacific Standard Time)	2100	19.29178831		21.11912

CUCAMONGA BASIN

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
Cucamonga Basin

location	User Defined Boundary - Cucamonga Basin
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **80.03246 °F**
Historical Modeled Average: **76.51214 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sun Jan 01 1950 00:00:00 GMT-0800 (Pacific Standard Time)	1950			78.16134
CanESM2	Mon Jan 01 1951 00:00:00 GMT-0800 (Pacific Standard Time)	1951			75.94646
CanESM2	Tue Jan 01 1952 00:00:00 GMT-0800 (Pacific Standard Time)	1952			75.1713
CanESM2	Thu Jan 01 1953 00:00:00 GMT-0800 (Pacific Standard Time)	1953			76.01962
CanESM2	Fri Jan 01 1954 00:00:00 GMT-0800 (Pacific Standard Time)	1954			74.81337
CanESM2	Sat Jan 01 1955 00:00:00 GMT-0800 (Pacific Standard Time)	1955			74.2176
CanESM2	Sun Jan 01 1956 00:00:00 GMT-0800 (Pacific Standard Time)	1956			76.06906
CanESM2	Tue Jan 01 1957 00:00:00 GMT-0800 (Pacific Standard Time)	1957			75.98188
CanESM2	Wed Jan 01 1958 00:00:00 GMT-0800 (Pacific Standard Time)	1958			76.15168
CanESM2	Thu Jan 01 1959 00:00:00 GMT-0800 (Pacific Standard Time)	1959			77.18606
CanESM2	Fri Jan 01 1960 00:00:00 GMT-0800 (Pacific Standard Time)	1960			76.64896
CanESM2	Sun Jan 01 1961 00:00:00 GMT-0800 (Pacific Standard Time)	1961			74.67604
CanESM2	Mon Jan 01 1962 00:00:00 GMT-0800 (Pacific Standard Time)	1962			75.93402
CanESM2	Tue Jan 01 1963 00:00:00 GMT-0800 (Pacific Standard Time)	1963			78.70284
CanESM2	Wed Jan 01 1964 00:00:00 GMT-0800 (Pacific Standard Time)	1964			74.08502
CanESM2	Fri Jan 01 1965 00:00:00 GMT-0800 (Pacific Standard Time)	1965			72.76002
CanESM2	Sat Jan 01 1966 00:00:00 GMT-0800 (Pacific Standard Time)	1966			74.65771
CanESM2	Sun Jan 01 1967 00:00:00 GMT-0800 (Pacific Standard Time)	1967			75.89565
CanESM2	Mon Jan 01 1968 00:00:00 GMT-0800 (Pacific Standard Time)	1968			75.30336
CanESM2	Wed Jan 01 1969 00:00:00 GMT-0800 (Pacific Standard Time)	1969			74.59874
CanESM2	Thu Jan 01 1970 00:00:00 GMT-0800 (Pacific Standard Time)	1970			74.28211
CanESM2	Fri Jan 01 1971 00:00:00 GMT-0800 (Pacific Standard Time)	1971			75.81515
CanESM2	Sat Jan 01 1972 00:00:00 GMT-0800 (Pacific Standard Time)	1972			76.28026
CanESM2	Mon Jan 01 1973 00:00:00 GMT-0800 (Pacific Standard Time)	1973			74.93624
CanESM2	Tue Jan 01 1974 00:00:00 GMT-0800 (Pacific Standard Time)	1974			75.68555
CanESM2	Wed Jan 01 1975 00:00:00 GMT-0800 (Pacific Standard Time)	1975			77.60056
CanESM2	Thu Jan 01 1976 00:00:00 GMT-0800 (Pacific Standard Time)	1976			75.90607
CanESM2	Sat Jan 01 1977 00:00:00 GMT-0800 (Pacific Standard Time)	1977			74.78243
CanESM2	Sun Jan 01 1978 00:00:00 GMT-0800 (Pacific Standard Time)	1978			76.8527
CanESM2	Mon Jan 01 1979 00:00:00 GMT-0800 (Pacific Standard Time)	1979			77.1321
CanESM2	Tue Jan 01 1980 00:00:00 GMT-0800 (Pacific Standard Time)	1980			78.32794
CanESM2	Thu Jan 01 1981 00:00:00 GMT-0800 (Pacific Standard Time)	1981			77.91925
CanESM2	Fri Jan 01 1982 00:00:00 GMT-0800 (Pacific Standard Time)	1982			74.60564
CanESM2	Sat Jan 01 1983 00:00:00 GMT-0800 (Pacific Standard Time)	1983			75.62271
CanESM2	Sun Jan 01 1984 00:00:00 GMT-0800 (Pacific Standard Time)	1984			75.0334
CanESM2	Tue Jan 01 1985 00:00:00 GMT-0800 (Pacific Standard Time)	1985			74.15212
CanESM2	Wed Jan 01 1986 00:00:00 GMT-0800 (Pacific Standard Time)	1986			76.21821
CanESM2	Thu Jan 01 1987 00:00:00 GMT-0800 (Pacific Standard Time)	1987			74.85033
CanESM2	Fri Jan 01 1988 00:00:00 GMT-0800 (Pacific Standard Time)	1988			75.84257
CanESM2	Sun Jan 01 1989 00:00:00 GMT-0800 (Pacific Standard Time)	1989			74.61175
CanESM2	Mon Jan 01 1990 00:00:00 GMT-0800 (Pacific Standard Time)	1990			75.93661
CanESM2	Tue Jan 01 1991 00:00:00 GMT-0800 (Pacific Standard Time)	1991			76.62743
CanESM2	Wed Jan 01 1992 00:00:00 GMT-0800 (Pacific Standard Time)	1992			73.43889
CanESM2	Fri Jan 01 1993 00:00:00 GMT-0800 (Pacific Standard Time)	1993			77.22096
CanESM2	Sat Jan 01 1994 00:00:00 GMT-0800 (Pacific Standard Time)	1994			73.9574
CanESM2	Sun Jan 01 1995 00:00:00 GMT-0800 (Pacific Standard Time)	1995			77.32533
CanESM2	Mon Jan 01 1996 00:00:00 GMT-0800 (Pacific Standard Time)	1996			77.91608
CanESM2	Wed Jan 01 1997 00:00:00 GMT-0800 (Pacific Standard Time)	1997			75.21169
CanESM2	Thu Jan 01 1998 00:00:00 GMT-0800 (Pacific Standard Time)	1998			77.19916
CanESM2	Fri Jan 01 1999 00:00:00 GMT-0800 (Pacific Standard Time)	1999			77.85896
CanESM2	Sat Jan 01 2000 00:00:00 GMT-0800 (Pacific Standard Time)	2000			78.05943
CanESM2	Mon Jan 01 2001 00:00:00 GMT-0800 (Pacific Standard Time)	2001			78.10931
CanESM2	Tue Jan 01 2002 00:00:00 GMT-0800 (Pacific Standard Time)	2002			78.13796

Cal-Adapt
Annual Averages Tool - Maximum Temperature
Cucamonga Basin

location	User Defined Boundary - Cucamonga Basin
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **80.03246 °F**
Historical Modeled Average: **76.51214 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Wed Jan 01 2003 00:00:00 GMT-0800 (Pacific Standard Time)	2003			75.89196
CanESM2	Thu Jan 01 2004 00:00:00 GMT-0800 (Pacific Standard Time)	2004			77.41845
CanESM2	Sat Jan 01 2005 00:00:00 GMT-0800 (Pacific Standard Time)	2005			77.10731
CanESM2	Sun Jan 01 2006 00:00:00 GMT-0800 (Pacific Standard Time)	2006			77.18018
CanESM2	Mon Jan 01 2007 00:00:00 GMT-0800 (Pacific Standard Time)	2007			78.51334
CanESM2	Tue Jan 01 2008 00:00:00 GMT-0800 (Pacific Standard Time)	2008			78.16503
CanESM2	Thu Jan 01 2009 00:00:00 GMT-0800 (Pacific Standard Time)	2009			78.99384
CanESM2	Fri Jan 01 2010 00:00:00 GMT-0800 (Pacific Standard Time)	2010			77.97752
CanESM2	Sat Jan 01 2011 00:00:00 GMT-0800 (Pacific Standard Time)	2011			78.73584
CanESM2	Sun Jan 01 2012 00:00:00 GMT-0800 (Pacific Standard Time)	2012			79.5374
CanESM2	Tue Jan 01 2013 00:00:00 GMT-0800 (Pacific Standard Time)	2013			80.3757
CanESM2	Wed Jan 01 2014 00:00:00 GMT-0800 (Pacific Standard Time)	2014			77.29949
CanESM2	Thu Jan 01 2015 00:00:00 GMT-0800 (Pacific Standard Time)	2015			77.41933
CanESM2	Fri Jan 01 2016 00:00:00 GMT-0800 (Pacific Standard Time)	2016			76.54903
CanESM2	Sun Jan 01 2017 00:00:00 GMT-0800 (Pacific Standard Time)	2017			78.40396
CanESM2	Mon Jan 01 2018 00:00:00 GMT-0800 (Pacific Standard Time)	2018			80.86771
CanESM2	Tue Jan 01 2019 00:00:00 GMT-0800 (Pacific Standard Time)	2019	76.51214049		78.97666
CanESM2	Wed Jan 01 2020 00:00:00 GMT-0800 (Pacific Standard Time)	2020	76.51214049	80.03245981	79.70589
CanESM2	Fri Jan 01 2021 00:00:00 GMT-0800 (Pacific Standard Time)	2021	76.51214049	80.03245981	80.69435
CanESM2	Sat Jan 01 2022 00:00:00 GMT-0800 (Pacific Standard Time)	2022	76.51214049	80.03245981	76.77658
CanESM2	Sun Jan 01 2023 00:00:00 GMT-0800 (Pacific Standard Time)	2023	76.51214049	80.03245981	79.09742
CanESM2	Mon Jan 01 2024 00:00:00 GMT-0800 (Pacific Standard Time)	2024	76.51214049	80.03245981	79.44187
CanESM2	Wed Jan 01 2025 00:00:00 GMT-0800 (Pacific Standard Time)	2025	76.51214049	80.03245981	80.97195
CanESM2	Thu Jan 01 2026 00:00:00 GMT-0800 (Pacific Standard Time)	2026	76.51214049	80.03245981	79.663
CanESM2	Fri Jan 01 2027 00:00:00 GMT-0800 (Pacific Standard Time)	2027	76.51214049	80.03245981	79.09035
CanESM2	Sat Jan 01 2028 00:00:00 GMT-0800 (Pacific Standard Time)	2028	76.51214049	80.03245981	79.56491
CanESM2	Mon Jan 01 2029 00:00:00 GMT-0800 (Pacific Standard Time)	2029	76.51214049	80.03245981	78.11335
CanESM2	Tue Jan 01 2030 00:00:00 GMT-0800 (Pacific Standard Time)	2030	76.51214049	80.03245981	80.72067
CanESM2	Wed Jan 01 2031 00:00:00 GMT-0800 (Pacific Standard Time)	2031	76.51214049	80.03245981	81.24666
CanESM2	Thu Jan 01 2032 00:00:00 GMT-0800 (Pacific Standard Time)	2032	76.51214049	80.03245981	80.05051
CanESM2	Sat Jan 01 2033 00:00:00 GMT-0800 (Pacific Standard Time)	2033	76.51214049	80.03245981	80.432
CanESM2	Sun Jan 01 2034 00:00:00 GMT-0800 (Pacific Standard Time)	2034	76.51214049	80.03245981	80.70657
CanESM2	Mon Jan 01 2035 00:00:00 GMT-0800 (Pacific Standard Time)	2035	76.51214049	80.03245981	79.24016
CanESM2	Tue Jan 01 2036 00:00:00 GMT-0800 (Pacific Standard Time)	2036	76.51214049	80.03245981	80.32917
CanESM2	Thu Jan 01 2037 00:00:00 GMT-0800 (Pacific Standard Time)	2037	76.51214049	80.03245981	79.63738
CanESM2	Fri Jan 01 2038 00:00:00 GMT-0800 (Pacific Standard Time)	2038	76.51214049	80.03245981	81.79338
CanESM2	Sat Jan 01 2039 00:00:00 GMT-0800 (Pacific Standard Time)	2039	76.51214049	80.03245981	81.37036
CanESM2	Sun Jan 01 2040 00:00:00 GMT-0800 (Pacific Standard Time)	2040	76.51214049	80.03245981	79.36483
CanESM2	Tue Jan 01 2041 00:00:00 GMT-0800 (Pacific Standard Time)	2041	76.51214049	80.03245981	80.5601
CanESM2	Wed Jan 01 2042 00:00:00 GMT-0800 (Pacific Standard Time)	2042	76.51214049	80.03245981	79.24987
CanESM2	Thu Jan 01 2043 00:00:00 GMT-0800 (Pacific Standard Time)	2043	76.51214049	80.03245981	81.31002
CanESM2	Fri Jan 01 2044 00:00:00 GMT-0800 (Pacific Standard Time)	2044	76.51214049	80.03245981	79.95436
CanESM2	Sun Jan 01 2045 00:00:00 GMT-0800 (Pacific Standard Time)	2045	76.51214049	80.03245981	81.75827
CanESM2	Mon Jan 01 2046 00:00:00 GMT-0800 (Pacific Standard Time)	2046			80.24875
CanESM2	Tue Jan 01 2047 00:00:00 GMT-0800 (Pacific Standard Time)	2047			79.82674
CanESM2	Wed Jan 01 2048 00:00:00 GMT-0800 (Pacific Standard Time)	2048			80.44839
CanESM2	Fri Jan 01 2049 00:00:00 GMT-0800 (Pacific Standard Time)	2049			80.5953
CanESM2	Sat Jan 01 2050 00:00:00 GMT-0800 (Pacific Standard Time)	2050			80.98799
CanESM2	Sun Jan 01 2051 00:00:00 GMT-0800 (Pacific Standard Time)	2051			81.1861
CanESM2	Mon Jan 01 2052 00:00:00 GMT-0800 (Pacific Standard Time)	2052			80.01078
CanESM2	Wed Jan 01 2053 00:00:00 GMT-0800 (Pacific Standard Time)	2053			81.47882
CanESM2	Thu Jan 01 2054 00:00:00 GMT-0800 (Pacific Standard Time)	2054			82.48622
CanESM2	Fri Jan 01 2055 00:00:00 GMT-0800 (Pacific Standard Time)	2055			83.23123

Cal-Adapt
Annual Averages Tool - Maximum Temperature
Cucamonga Basin

location	User Defined Boundary - Cucamonga Basin
climate variable	Maximum Temperature
units	°F
scenario	rcp45

Projected Modeled Average: **80.03246 °F**
Historical Modeled Average: **76.51214 °F**

name	date	Year	Historical Average	Modeled Average	value
CanESM2	Sat Jan 01 2056 00:00:00 GMT-0800 (Pacific Standard Time)	2056			81.03664
CanESM2	Mon Jan 01 2057 00:00:00 GMT-0800 (Pacific Standard Time)	2057			80.74533
CanESM2	Tue Jan 01 2058 00:00:00 GMT-0800 (Pacific Standard Time)	2058			83.53278
CanESM2	Wed Jan 01 2059 00:00:00 GMT-0800 (Pacific Standard Time)	2059			80.91162
CanESM2	Thu Jan 01 2060 00:00:00 GMT-0800 (Pacific Standard Time)	2060			79.92324
CanESM2	Sat Jan 01 2061 00:00:00 GMT-0800 (Pacific Standard Time)	2061			82.89104
CanESM2	Sun Jan 01 2062 00:00:00 GMT-0800 (Pacific Standard Time)	2062			82.76716
CanESM2	Mon Jan 01 2063 00:00:00 GMT-0800 (Pacific Standard Time)	2063			83.25329
CanESM2	Tue Jan 01 2064 00:00:00 GMT-0800 (Pacific Standard Time)	2064			83.28972
CanESM2	Thu Jan 01 2065 00:00:00 GMT-0800 (Pacific Standard Time)	2065			81.47403
CanESM2	Fri Jan 01 2066 00:00:00 GMT-0800 (Pacific Standard Time)	2066			80.68877
CanESM2	Sat Jan 01 2067 00:00:00 GMT-0800 (Pacific Standard Time)	2067			79.03128
CanESM2	Sun Jan 01 2068 00:00:00 GMT-0800 (Pacific Standard Time)	2068			80.40102
CanESM2	Tue Jan 01 2069 00:00:00 GMT-0800 (Pacific Standard Time)	2069			81.61786
CanESM2	Wed Jan 01 2070 00:00:00 GMT-0800 (Pacific Standard Time)	2070			80.61775
CanESM2	Thu Jan 01 2071 00:00:00 GMT-0800 (Pacific Standard Time)	2071			81.10432
CanESM2	Fri Jan 01 2072 00:00:00 GMT-0800 (Pacific Standard Time)	2072			83.48993
CanESM2	Sun Jan 01 2073 00:00:00 GMT-0800 (Pacific Standard Time)	2073			80.66952
CanESM2	Mon Jan 01 2074 00:00:00 GMT-0800 (Pacific Standard Time)	2074			83.70465
CanESM2	Tue Jan 01 2075 00:00:00 GMT-0800 (Pacific Standard Time)	2075			82.00265
CanESM2	Wed Jan 01 2076 00:00:00 GMT-0800 (Pacific Standard Time)	2076			82.30745
CanESM2	Fri Jan 01 2077 00:00:00 GMT-0800 (Pacific Standard Time)	2077			82.42628
CanESM2	Sat Jan 01 2078 00:00:00 GMT-0800 (Pacific Standard Time)	2078			81.47328
CanESM2	Sun Jan 01 2079 00:00:00 GMT-0800 (Pacific Standard Time)	2079			82.53953
CanESM2	Mon Jan 01 2080 00:00:00 GMT-0800 (Pacific Standard Time)	2080			80.86209
CanESM2	Wed Jan 01 2081 00:00:00 GMT-0800 (Pacific Standard Time)	2081			81.18197
CanESM2	Thu Jan 01 2082 00:00:00 GMT-0800 (Pacific Standard Time)	2082			83.10871
CanESM2	Fri Jan 01 2083 00:00:00 GMT-0800 (Pacific Standard Time)	2083			81.09724
CanESM2	Sat Jan 01 2084 00:00:00 GMT-0800 (Pacific Standard Time)	2084			81.12941
CanESM2	Mon Jan 01 2085 00:00:00 GMT-0800 (Pacific Standard Time)	2085			81.91792
CanESM2	Tue Jan 01 2086 00:00:00 GMT-0800 (Pacific Standard Time)	2086			81.23396
CanESM2	Wed Jan 01 2087 00:00:00 GMT-0800 (Pacific Standard Time)	2087			83.22534
CanESM2	Thu Jan 01 2088 00:00:00 GMT-0800 (Pacific Standard Time)	2088			81.70694
CanESM2	Sat Jan 01 2089 00:00:00 GMT-0800 (Pacific Standard Time)	2089			81.62322
CanESM2	Sun Jan 01 2090 00:00:00 GMT-0800 (Pacific Standard Time)	2090			81.82814
CanESM2	Mon Jan 01 2091 00:00:00 GMT-0800 (Pacific Standard Time)	2091			81.31292
CanESM2	Tue Jan 01 2092 00:00:00 GMT-0800 (Pacific Standard Time)	2092			82.92932
CanESM2	Thu Jan 01 2093 00:00:00 GMT-0800 (Pacific Standard Time)	2093			81.47495
CanESM2	Fri Jan 01 2094 00:00:00 GMT-0800 (Pacific Standard Time)	2094			80.10794
CanESM2	Sat Jan 01 2095 00:00:00 GMT-0800 (Pacific Standard Time)	2095			82.52889
CanESM2	Sun Jan 01 2096 00:00:00 GMT-0800 (Pacific Standard Time)	2096			81.99065
CanESM2	Tue Jan 01 2097 00:00:00 GMT-0800 (Pacific Standard Time)	2097			82.26953
CanESM2	Wed Jan 01 2098 00:00:00 GMT-0800 (Pacific Standard Time)	2098			80.93785
CanESM2	Thu Jan 01 2099 00:00:00 GMT-0800 (Pacific Standard Time)	2099			82.61076
CanESM2	Fri Jan 01 2100 00:00:00 GMT-0800 (Pacific Standard Time)	2100			83.08744

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	58,175	Acre Feet
	2008 total volume of delivered recycled water	635	Acre Feet
	2008 recycled water as a percent of total deliveries	1.09%	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	2004	
	Year ending baseline period range[4]	2008	

[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	132,882
Year 2	1996	135,001
Year 3	1997	136,874
Year 4	1998	139,556
Year 5	1999	143,175
Year 6	2000	148,159
Year 7	2001	152,221
Year 8	2002	161,267
Year 9	2003	166,359
Year 10	2004	170,784
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2004	170,784
Year 2	2005	179,523
Year 3	2006	182,035
Year 4	2007	184,369
Year 5	2008	184,669
2015 Compliance Year Population		
2015		200,466
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	42,132	-		-	101	-	42,031
Year 2	1996	45,476	-		-	151	-	45,325
Year 3	1997	47,219	-		-	133	-	47,086
Year 4	1998	41,865	-		-	88	-	41,777
Year 5	1999	49,410	-		-	103	-	49,307
Year 6	2000	50,717	73		-	112	-	50,532
Year 7	2001	48,063	-		-	73	-	47,990
Year 8	2002	52,422	307		-	80	-	52,035
Year 9	2003	51,899	437		-	54	-	51,409
Year 10	2004	54,826	385		-	55	-	54,386
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**48,188**
5 Year Baseline - Gross Water Use								
Year 1	2004	54,826	385		-	55	-	54,386
Year 2	2005	55,978	437		-	18	-	55,523
Year 3	2006	57,977	165		-	18	-	57,794
Year 4	2007	61,035	165		-	22	-	60,848
Year 5	2008	57,541	-		-	16	-	57,524
5 year baseline average gross water use								**57,215**
2015 Compliance Year - Gross Water Use								
2015		41,451	16		-	33	-	**41,403**

* 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	Chino Basin Groundwater
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	6,297		6,297
Year 2	1996	7,311		7,311
Year 3	1997	7,764		7,764
Year 4	1998	5,101		5,101
Year 5	1999	7,737		7,737
Year 6	2000	6,195		6,195
Year 7	2001	6,899		6,899
Year 8	2002	10,580		10,580
Year 9	2003	10,020		10,020
Year 10	2004	12,582		12,582
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2004	12,582		12,582
Year 2	2005	13,328		13,328
Year 3	2006	16,814		16,814
Year 4	2007	16,781		16,781
Year 5	2008	19,232		19,232
2015 Compliance Year - Water into Distribution System				
2015		18,760		18,760

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

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Cucamonga Basin Groundwater			
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	1,995	14,200		14,200
Year 2	1,996	15,319		15,319
Year 3	1,997	14,180		14,180
Year 4	1,998	9,764		9,764
Year 5	1,999	13,661		13,661
Year 6	2,000	10,642		10,642
Year 7	2,001	6,604		6,604
Year 8	2,002	6,719		6,719
Year 9	2,003	5,051		5,051
Year 10	2,004	6,714		6,714
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,004	6,714		6,714
Year 2	2,005	7,518		7,518
Year 3	2,006	6,497		6,497
Year 4	2,007	5,019		5,019
Year 5	2,008	4,450		4,450
2015 Compliance Year - Water into Distribution System				
2015		8,439		8,439
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Imported Water (State Water Project)			
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	1,995	12,412		12,412
Year 2	1,996	16,932		16,932
Year 3	1,997	18,587		18,587
Year 4	1,998	17,419		17,419
Year 5	1,999	21,854		21,854
Year 6	2,000	29,460		29,460
Year 7	2,001	28,905		28,905
Year 8	2,002	32,635		32,635
Year 9	2,003	33,329		33,329
Year 10	2,004	33,638		33,638
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,004	33,638		33,638
Year 2	2,005	28,109		28,109
Year 3	2,006	29,318		29,318
Year 4	2,007	36,041		36,041
Year 5	2,008	28,551		28,551
2015 Compliance Year - Water into Distribution System				
2015		13,195		13,195
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Cucamonga Canyon Water			
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	1,995	0		0
Year 2	1,996	0		0
Year 3	1,997	586		586
Year 4	1,998	1,612		1,612
Year 5	1,999	1,664		1,664
Year 6	2,000	1,053		1,053
Year 7	2,001	1,648		1,648
Year 8	2,002	492		492
Year 9	2,003	958		958
Year 10	2,004	410		410
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,004	410		410
Year 2	2,005	0		0
Year 3	2,006	0		0
Year 4	2,007	141		141
Year 5	2,008	1,700		1,700
2015 Compliance Year - Water into Distribution System				
2015		363		363
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Deer Canyon Water			
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	1,995	2,355		2,355
Year 2	1,996	1,091		1,091
Year 3	1,997	1,033		1,033
Year 4	1,998	2,028		2,028
Year 5	1,999	640		640
Year 6	2,000	504		504
Year 7	2,001	579		579
Year 8	2,002	209		209
Year 9	2,003	453		453
Year 10	2,004	249		249
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,004	249		249
Year 2	2,005	603		603
Year 3	2,006	187		187
Year 4	2,007	73		73
Year 5	2,008	78		78
2015 Compliance Year - Water into Distribution System				
2015		189		189
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	Day/East Canyon Water			
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	1,995	6,867		6,867
Year 2	1,996	4,823		4,823
Year 3	1,997	5,069		5,069
Year 4	1,998	5,940		5,940
Year 5	1,999	3,853		3,853
Year 6	2,000	2,864		2,864
Year 7	2,001	3,428		3,428
Year 8	2,002	1,775		1,775
Year 9	2,003	2,088		2,088
Year 10	2,004	1,233		1,233
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,004	1,233		1,233
Year 2	2,005	6,374		6,374
Year 3	2,006	5,161		5,161
Year 4	2,007	2,979		2,979
Year 5	2,008	3,485		3,485
2015 Compliance Year - Water into Distribution System				
2015		498		498
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source	FWC Interconnection - Transfer from FWC			
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	1,995	0		0
Year 2	1,996	0		0
Year 3	1,997	0		0
Year 4	1,998	0		0
Year 5	1,999	0		0
Year 6	2,000	0		0
Year 7	2,001	0		0
Year 8	2,002	13		13
Year 9	2,003	0		0
Year 10	2,004	0		0
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,004	0		0
Year 2	2,005	45.51		46
Year 3	2,006	0.18		0
Year 4	2,007	0		0
Year 5	2,008	45		45
2015 Compliance Year - Water into Distribution System				
2015		8		8
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-C.1: Process Water Deduction Eligibility

Criteria 1

Industrial water use is equal to or greater than 12% of gross water use

Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction	Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	1995	42,031	2,220	5%	NO
Year 2	1996	45,325	2,020	4%	NO
Year 3	1997	47,086	2,317	5%	NO
Year 4	1998	41,777	2,254	5%	NO
Year 5	1999	49,307	2,367	5%	NO
Year 6	2000	50,532	2,598	5%	NO
Year 7	2001	47,990	2,426	5%	NO
Year 8	2002	52,035	2,465	5%	NO
Year 9	2003	51,409	2,462	5%	NO
Year 10	2004	54,386	2,495	5%	NO
Year 11	0	-			NO
Year 12	0	-			NO
Year 13	0	-			NO
Year 14	0	-			NO
Year 15	0	-			NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2004	54,386	2,495	5%	NO
Year 2	2005	55,523	2,446	4%	NO
Year 3	2006	57,794	2,755	5%	NO
Year 4	2007	60,848	2,506	4%	NO
Year 5	2008	57,524	2,589	5%	NO
2015 Compliance Year - Process Water Deduction Eligiblity					
2015		41,403	2,126	5%	NO

NOTES:

SB X7-7 Table 4-C.2: Process Water Deduction Eligibility

Criteria 2

Industrial water use is equal to or greater than 15 GPCD

Baseline Year *Fm SB X7-7 Table 3*		Industrial Water Use	Population	Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility					
Year 1	1995	2,220	132,882	15	NO
Year 2	1996	2,020	135,001	13	NO
Year 3	1997	2,317	136,874	15	YES
Year 4	1998	2,254	139,556	14	NO
Year 5	1999	2,367	143,175	15	NO
Year 6	2000	2,598	148,159	16	YES
Year 7	2001	2,426	152,221	14	NO
Year 8	2002	2,465	161,267	14	NO
Year 9	2003	2,462	166,359	13	NO
Year 10	2004	2,495	170,784	13	NO
Year 11	0		-		NO
Year 12	0		-		NO
Year 13	0		-		NO
Year 14	0		-		NO
Year 15	0		-		NO
5 Year Baseline - Process Water Deduction Eligibility					
Year 1	2004	2,495	170,784	13	NO
Year 2	2005	2,446	179,523	12	NO
Year 3	2006	2,755	182,035	14	NO
Year 4	2007	2,506	184,369	12	NO
Year 5	2008	2,589	184,669	13	NO
2015 Compliance Year - Process Water Deduction Eligibility					
2015		2,126	200,466	9	NO

NOTES:

SB X7-7 Table 4-C.3: Process Water Deduction Eligibility

Criteria 3

Non-industrial use is equal to or less than 120 GPCD

Baseline Year *Fm SB X7-7 Table 3*		Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	Industrial Water Use	Non-industrial Water Use	Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
10 to 15 Year Baseline - Process Water Deduction Eligibility							
Year 1	1995	42,031		42,031	132,882	282	NO
Year 2	1996	45,325		45,325	135,001	300	NO
Year 3	1997	47,086		47,086	136,874	307	NO
Year 4	1998	41,777		41,777	139,556	267	NO
Year 5	1999	49,307		49,307	143,175	307	NO
Year 6	2000	50,532		50,532	148,159	304	NO
Year 7	2001	47,990		47,990	152,221	281	NO
Year 8	2002	52,035		52,035	161,267	288	NO
Year 9	2003	51,409		51,409	166,359	276	NO
Year 10	2004	54,386		54,386	170,784	284	NO
Year 11	0	-		-	-		NO
Year 12	0	-		-	-		NO
Year 13	0	-		-	-		NO
Year 14	0	-		-	-		NO
Year 15	0	-		-	-		NO
5 Year Baseline - Process Water Deduction Eligibility							
Year 1	2004	54,386		54,386	170,784	284	NO
Year 2	2005	55,523		55,523	179,523	276	NO
Year 3	2006	57,794		57,794	182,035	283	NO
Year 4	2007	60,848		60,848	184,369	295	NO
Year 5	2008	57,524		57,524	184,669	278	NO
2015 Compliance Year - Process Water Deduction Eligiblity							
2015		41,403		41,403	200,466	184	NO

NOTES:

SB X7-7 Table 4-C.4: Process Water Deduction Eligibility

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**
http://www.water.ca.gov/irwm/grants/resources_dac.cfm

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

☑ **2. 2010 Median Income**

California Median Household Income		Service Area Median Household Income	Percentage of Statewide Average	**Eligible for Exclusion? Y/N**
2015 Compliance Year - Process Water Deduction Eligibility				
2010	$60,883	$67,486	111%	NO

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	132,882	42,031	282
Year 2	1996	135,001	45,325	300
Year 3	1997	136,874	47,086	307
Year 4	1998	139,556	41,777	267
Year 5	1999	143,175	49,307	307
Year 6	2000	148,159	50,532	304
Year 7	2001	152,221	47,990	281
Year 8	2002	161,267	52,035	288
Year 9	2003	166,359	51,409	276
Year 10	2004	170,784	54,386	284
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**290**
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	2004	170,784	54,386	284
Year 2	2005	179,523	55,523	276
Year 3	2006	182,035	57,794	283
Year 4	2007	184,369	60,848	295
Year 5	2008	184,669	57,524	278
5 Year Average Baseline GPCD				**283**
2015 Compliance Year GPCD				
2015		200,466	41,403	**184**
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	290
5 Year Baseline GPCD	283
2015 Compliance Year GPCD	184
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**
290	**232**
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**
283	269	232	**232**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD except for suppliers at or below 100 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**
232	290	**261**
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?**
184	261	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	*From Methodology 8 (Optional)*	-	184	184	**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: Data from the Southern California Association of Governments was used to estimate the 2020 population.	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	198,979
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.*	
	46,021			-		-	**46,021**

*** 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	Inland Empire Utilities Agency
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
	14,344	-	14,344

[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: Excludes 1,038 AF used for non-potable demand.

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	Chino 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
	23,315		23,315

[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:

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	Cucamonga 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
	3,618		3,618

[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:

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	Cucamonga Canyon Surface Water
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
	931		931

[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:

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	Day/East Canyon Surface Water
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
	3,813		3,813

[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:

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**
	46,021		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**
		198,979	-	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**
	46,021		46,021	198,979	206	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	*Enter Name of Industrial Customer 1*				
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**
46,021	198,979	**206**
NOTES:		

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD (Enter "0" if Adjustment Not Used)			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
206	-	-	-	-	206	232	**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

CHINO BASIN JUDGMENT

Rec'd Jan 27, 1978 td

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FILED · West District
San Bernardino County Clerk

OCT 25 1989

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

MICROFILMED

CHINO BASIN MUNICIPAL WATER DISTRICT,

Plaintiff,

v.

CITY OF CHINO, et al.

Defendants.

No. 164327

RCN 51019

JUDGMENT

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SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT, Plaintiff, v. CITY OF CHINO, et al. Defendants.	No. 164327 JUDGMENT

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I. INTRODUCTION

1. Pleadings, Parties and Jurisdiction. The complaint herein was filed on January 2, 1975, seeking an adjudication of water rights, injunctive relief and the imposition of a physical solution. A first amended complaint was filed on July 16, 1976. The defaults of certain defendants have been entered, and certain other defendants dismissed. Other than defendants who have been dismissed or whose defaults have been entered, all defendants have appeared herein. By answers and order of this Court, the issues have been made those of a full inter se adjudication between the

parties. This Court has jurisdiction of the subject matter of this action and of the parties herein.

2. Stipulation For Judgment. Stipulation for entry of judgment has been filed by and on behalf of a majority of the parties, representing a majority of the quantitative rights herein adjudicated.

3. Trial; Findings and Conclusions. Trial was commenced on December 16, 1977, as to the non-stipulating parties, and findings of fact and conclusions of law have been entered disposing of the issues in the case.

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

(a) Active Parties. All parties other than those who have filed with Watermaster a written waiver of service of notices, pursuant to Paragraph 58.

(b) Annual or Year -- A fiscal year, July 1 through June 30, following, unless the context shall clearly indicate a contrary meaning.

(c) Appropriative Right -- The annual production right of a producer from the Chino Basin other than pursuant to an overlying right.

(d) Basin Water -- Ground water within Chino Basin which is part of the Safe Yield, Operating Safe Yield, or replenishment water in the Basin as a result of operations under the Physical Solution decreed herein. Said term does not include Stored Water.

(e) CBMWD -- Plaintiff Chino Basin Municipal Water District.

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(f) Chino Basin or Basin -- The ground water basin underlying the area shown as such on Exhibit "B" and within the boundaries described in Exhibit "K".

(g) Chino Basin Watershed -- The surface drainage area tributary to and overlying Chino Basin.

(h) Ground Water -- Water beneath the surface of the ground and within the zone of saturation, i.e., below the existing water table.

(i) Ground Water Basin -- An area underlain by one or more permeable formations capable of furnishing substantial water storage.

(j) Minimal Producer -- Any producer whose production does not exceed five acre-feet per year.

(k) MWD -- The Metropolitan Water District of Southern California.

(l) Operating Safe Yield -- The annual amount of ground water which Watermaster shall determine, pursuant to criteria specified in Exhibit "I", can be produced from Chino Basin by the Appropriative Pool parties free of replenishment obligation under the Physical Solution herein.

(m) Overdraft -- A condition wherein the total annual production from the Basin exceeds the Safe Yield thereof.

(n) Overlying Right -- The appurtenant right of an owner of lands overlying Chino Basin to produce water from the Basin for overlying beneficial use on such lands.

(o) Person. Any individual, partnership, association, corporation, governmental entity or agency, or other organization.

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(p) PVMWD -- Defendant Pomona Valley Municipal Water District.

(q) Produce or Produced -- To pump or extract ground water from Chino Basin.

(r) Producer -- Any person who produces water from Chino Basin.

(s) Production -- Annual quantity, stated in acre feet, of water produced.

(t) Public Hearing -- A hearing after notice to all parties and to any other person legally entitled to notice.

(u) Reclaimed Water -- Water which, as a result of processing of waste water, is suitable for a controlled use.

(v) Replenishment Water -- Supplemental water used to recharge the Basin pursuant to the Physical Solution, either directly by percolating the water into the Basin or indirectly by delivering the water for use in lieu of production and use of safe yield or Operating Safe Yield.

(w) Responsible Party -- The owner, co-owner, lessee or other person designated by multiple parties interested in a well as the person responsible for purposes of filing reports hereunder.

(x) Safe Yield -- The long-term average annual quantity of ground water (excluding replenishment or stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Basin under cultural conditions of a particular year without causing an undesirable result.

(y) SBVMWD -- San Bernardino Valley Municipal Water

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District.

(z) State Water -- Supplemental Water imported through the State Water Resources Development System, pursuant to Chapter 8, Division 6, Part 6 of the Water Code.

(aa) Stored Water -- Supplemental water held in storage, as a result of direct spreading, in lieu delivery, or otherwise, for subsequent withdrawal and use pursuant to agreement with Watermaster.

(bb) Supplemental Water -- Includes both water imported to Chino Basin from outside Chino Basin Watershed, and reclaimed water.

(cc) WMWD -- Defendant Western Municipal Water District of Riverside County.

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

"A" -- "Location Map of Chino Basin" showing boundaries of Chino Basin Municipal Water District, and other geographic and political features.

"B" -- "Hydrologic Map of Chino Basin" showing hydrologic features of Chino Basin.

"C" -- Table Showing Parties in Overlying (Agricultural) Pool.

"D" -- Table Showing Parties in Overlying (Non-agricultural Pool and Their Rights.

"E" -- Table Showing Appropriators and Their Rights.

"F" -- Overlying (Agricultural) Pool Pooling Plan.

"G" -- Overlying (Non-agricultural) Pool Pooling Plan.

"H" -- Appropriative Pool Pooling Plan.

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"I" -- Engineering Appendix.

"J" -- Map of In Lieu Area No. 1.

"K" -- Legal Description of Chino Basin.

II. DECLARATION OF RIGHTS

A. HYDROLOGY

6. Safe Yield. The Safe Yield of Chino Basin is 140,000 acre feet per year.

7. Overdraft and Prescriptive Circumstances. In each year for a period in excess of five years prior to filing of the First Amended Complaint herein, the Safe Yield of the Basin has been exceeded by the annual production therefrom, and Chino Basin is and has been for more than five years in a continuous state of overdraft. The production constituting said overdraft has been open, notorious, continuous, adverse, hostile and under claim of right. The circumstances of said overdraft have given notice to all parties of the adverse nature of such aggregate over-production.

B. WATER RIGHTS IN SAFE YIELD

8. Overlying Rights. The parties listed in Exhibits "C" and "D" are the owners or in possession of lands which overlie Chino Basin. As such, said parties have exercised overlying water rights in Chino Basin. All overlying rights owned or exercised by parties listed in Exhibits "C" and "D" have, in the aggregate, been limited by prescription except to the extent such rights have been preserved by self-help by said parties. Aggregate preserved overlying rights in the Safe Yield for agricultural pool use, including the rights of the State of California, total 82,800 acre feet per year. Overlying rights for non-agricultural pool use

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total 7,366 acre feet per year and are individually decreed for each affected party in Exhibit "D". No portion of the Safe Yield of Chino Basin exists to satisfy unexercised overlying rights, and such rights have all been lost by prescription. However, uses may be made of Basin Water on overlying lands which have no preserved overlying rights pursuant to the Physical Solution herein. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom.

9. Appropriative Rights. The parties listed in Exhibit "E" are the owners of appropriative rights, including rights by prescription, in the unadjusted amounts therein set forth, and by reason thereof are entitled under the Physical Solution to share in the remaining Safe Yield, after satisfaction of overlying rights and rights of the State of California, and in the Operating Safe Yield in Chino Basin, in the annual shares set forth in Exhibit "E".

(a) Loss of Priorities. By reason of the long continued overdraft in Chino Basin, and in light of the complexity of determining appropriative priorities and the need for conserving and making maximum beneficial use of the water resources of the State, each and all of the parties listed in Exhibit "E" are estopped and barred from asserting special priorities or preferences, inter se. All of said appropriative rights are accordingly deemed and considered of equal priority.

(b) Nature and Quantity. All rights listed in Exhibit "E" are appropriative and prescriptive in nature. By reason of the status of the parties, and the provisions of Section

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1007 of the Civil Code, said rights are immune from reduction or limitation by prescription.

10. Rights of the State of California. The State of California, by and through its Department of Corrections, Youth Authority and Department of Fish and Game, is a significant producer of ground water from and the State is the largest owner of land overlying Chino Basin. The precise nature and scope of the claims and rights of the State need not be, and are not, defined herein. The State, through said departments, has accepted the Physical Solution herein decreed, in the interests of implementing the mandate of Section 2 of Article X of the California Constitution. For all purposes of this Judgment, all future production by the State or its departments or agencies for overlying use on State-owned lands shall be considered as agricultural pool use.

C. RIGHTS TO AVAILABLE GROUND WATER STORAGE CAPACITY

11. Available Ground Water Storage Capacity. There exists in Chino Basin a substantial amount of available ground water storage capacity which is not utilized for storage or regulation of Basin Waters. Said reservoir capacity can appropriately be utilized for storage and conjunctive use of supplemental water with Basin Waters. It is essential that said reservoir capacity utilization for storage and conjunctive use of supplemental water be undertaken only under Watermaster control and regulation, in order to protect the integrity of both such Stored Water and Basin Water in storage and the Safe Yield of Chino Basin.

12. Utilization of Available Ground Water Capacity. Any person or public entity, whether a party to this action or not, may make reasonable beneficial use of the available ground water

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storage capacity of Chino Basin for storage of supplemental water; provided that no such use shall be made except pursuant to written agreement with Watermaster, as authorized by Paragraph 28. In the allocation of such storage capacity, the needs and requirements of lands overlying Chino Basin and the owners of rights in the Safe Yield or Operating Safe Yield of the Basin shall have priority and preference over storage for export.

III. INJUNCTION

13. Injunction Against Unauthorized Production of Basin Water. Each party in each of the respective pools is enjoined, as follows:

(a) Overlying (Agricultural) Pool. Each party in the Overlying (Agricultural) Pool, its officers, agents, employees, successors and assigns, is and they each are ENJOINED AND RESTRAINED from producing ground water from Chino Basin in any year hereafter in excess of such party's correlative share of the aggregate of 82,800 acre feet allocated to said Pool, except pursuant to the Physical Solution or a storage water agreement.

(b) Overlying (Non-Agricultural) Pool. Each party in the Overlying (Non-agricultural) Pool, its officers, agents, employees, successors and assigns, is and they each are ENJOINED AND RESTRAINED from producing ground water of Chino Basin in any year hereafter in excess of such party's decreed rights in the Safe Yield, except pursuant to the provisions of the Physical Solution or a storage water agreement.

(c) Appropriative Pool. Each party in the

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Appropriative Pool, its officers, agents, employees, successors and assigns, is and they are each ENJOINED AND RESTRAINED from producing ground water of Chino Basin in any year hereafter in excess of such party's decreed share of Operating Safe Yield, except pursuant to the provisions of the Physical Solution or a storage water agreement.

14. Injunction Against Unauthorized Storage or Withdrawal of Stored Water. Each party, its officers, agents, employees, successors and assigns is and they each are ENJOINED AND RESTRAINED from storing supplemental water in Chino Basin for withdrawal, or causing withdrawal of, water stored by that party, except pursuant to the terms of a written agreement with Watermaster and in accordance with Watermaster regulations. Any supplemental water stored or recharged in the Basin, except pursuant to such a Water-master agreement, shall be deemed abandoned and not classified as Stored Water. This paragraph has no application, as such, to supplemental water spread or provided in lieu by Watermaster pursuant to the Physical Solution.

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IV. CONTINUING JURISDICTION

15. Continuing Jurisdiction. Full jurisdiction, power and authority are retained and reserved to the Court as to all matters contained in this judgment, except:

(a) The redetermination of Safe Yield, as set forth in Paragraph 6, during the first ten (10) years of operation of the Physical Solution;

(b) The allocation of Safe Yield as between the several pools as set forth in Paragraph 44 of the Physical Solution;

(c) The determination of specific quantitative rights and shares in the declared Safe Yield or Operating Safe Yield herein declared in Exhibits "D" and "E"; and

(d) The amendment or modification of Paragraphs 7(a) and (b) of Exhibit "H", during the first ten (10) years of operation of the Physical Solution, and thereafter only upon affirmative recommendation of at least 67% of the voting power (determined pursuant to the formula described in Paragraph 3 of Exhibit "H"), but not less than one-third of the members of the Appropriative Pool Committee representatives of parties who produce water within CBMWD or WMWD; after said tenth year the formula set forth in said Paragraph 7(a) and 7(b) of Exhibit "H" for payment of the costs of replenishment water may be changed to 100% gross or net, or any percentage split thereof, but only in response to recommendation to the Court by affirmative vote of at least 67% of said voting power of the Appropriative Pool representatives of parties who produce ground water within CBMWD or WMWD, but not less than one-third of their number. In such event, the Court shall act in conformance with such recommendation unless there are compelling reasons to the contrary; and provided, further, that the fact that the allocation of Safe Yield or Operating Safe Yield shares may be rendered moot by a recommended change in the formula for replenishment assessments shall not be deemed to be such a "compelling reason."

Said continuing jurisdiction is provided for the purpose of enabling the Court, upon application of any party, the Watermaster, the Advisory Committee or any Pool Committee, by motion and, upon

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at least 30 days' notice thereof, and after hearing thereon, to make such further or supplemental orders or directions as may be necessary or appropriate for interpretation, enforcement or carrying out of this Judgment, and to modify, amend or amplify any of the provisions of this Judgment.

V. WATERMASTER

A. APPOINTMENT

16. Watermaster Appointment. CBMWD, acting by and through a majority of its board of directors, is hereby appointed Watermaster, to administer and enforce the provisions of this Judgment and any subsequent instructions or orders of the Court hereunder. The term of appointment of Watermaster shall be for five (5) years. The Court will by subsequent orders provide for successive terms or for a successor Watermaster. Watermaster may be changed at any time by subsequent order of the Court, on its own motion, or on the motion of any party after notice and hearing. Unless there are compelling reasons to the contrary, the Court shall act in conformance with a motion requesting the Watermaster be changed if such motion is supported by a majority of the voting power of the Advisory Committee.

B. POWERS AND DUTIES

17. Powers and Duties. Subject to the continuing supervision and control of the Court, Watermaster shall have and may exercise the express powers, and shall perform the duties, as provided in this Judgment or hereafter ordered or authorized by the Court in the exercise of the Court's continuing jurisdiction.

18. Rules and Regulations. Upon recommendation by the

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Advisory Committee, Watermaster shall make and adopt, after public hearing, appropriate rules and regulations for conduct of Watermaster affairs, including meeting schedules and procedures, and compensation of members of Watermaster at not to exceed $25 per member per meeting, or $300 per member per year, whichever is less, plus reasonable expenses related to activities within the Basin. Thereafter, Watermaster may amend said rules from time to time upon recommendation, or with approval of the Advisory Committee after hearing noticed to all active parties. A copy of said rules and regulations, and of any amendments thereof, shall be mailed to each active party.

19. Acquisition of Facilities. Watermaster may purchase, lease, acquire and hold all necessary facilities and equipment; provided, that it is not the intent of the Court that Watermaster acquire any interest in real property or substantial capital assets.

20. Employment of Experts and Agents. Watermaster may employ or retain such administrative, engineering, geologic, accounting, legal or other specialized personnel and consultants as may be deemed appropriate in the carrying out of its powers and shall require appropriate bonds from all officers and employees handling Watermaster funds. Watermaster shall maintain records for purposes of allocation of costs of such services as well as of all other expenses of Watermaster administration as between the several pools established by the Physical Solution.

21. Measuring Devices. Watermaster shall cause parties, pursuant to uniform rules, to install and maintain in good operating condition, at the cost of each party, such necessary measuring

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devices or meters as Watermaster may deem appropriate. Such measuring devices shall be inspected and tested as deemed necessary by Watermaster, and the cost thereof shall constitute an expense of Watermaster.

22. Assessments. Watermaster is empowered to levy and collect all assessments provided for in the pooling plans and Physical Solution.

23. Investment of Funds. Watermaster may hold and invest any and all Watermaster funds in investments authorized from time to time for public agencies of the State of California.

24. Borrowing. Watermaster may borrow from time to time amounts not exceeding the annual anticipated receipts of Watermaster during such year.

25. Contracts. Watermaster may enter into contracts for the performance of any powers herein granted; provided, however, that Watermaster may not contract with or purchase materials, supplies or services from CBMWD, except upon the prior recommendation and approval of the Advisory Committee and pursuant to written order of the Court.

26. Cooperation With Other Agencies. Subject to prior recommendation or approval of the Advisory Committee, Watermaster may act jointly or cooperate with agencies of the United States and the State of California or any political subdivisions, municipalities or districts or any person to the end that the purpose of the Physical Solution may be fully and economically carried out.

27. Studies. Watermaster may, with concurrence of the Advisory Committee or affected Pool Committee and in accordance with Paragraph 54(b), undertake relevant studies of hydrologic

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conditions, both quantitative and qualitative, and operating aspects of implementation of the management program for Chino Basin.

28. Ground Water Storage Agreements. Watermaster shall adopt, with the approval of the Advisory Committee, uniformly applicable rules and a standard form of agreement for storage of supplemental water, pursuant to criteria therefor set forth in Exhibit "I". Upon appropriate application by any person, Watermaster shall enter into such a storage agreement; provided that all such storage agreements shall first be approved by written order of the Court, and shall by their terms preclude operations which will have a substantial adverse impact on other producers.

29. Accounting for Stored Water. Watermaster shall calculate additions, extractions and losses and maintain an annual account of all Stored Water in Chino Basin, and any losses of water supplies or Safe Yield of Chino Basin resulting from such Stored Water.

30. Annual Administrative Budget. Watermaster shall submit to Advisory Committee an administrative budget and recommendation for each fiscal year on or before March 1. The Advisory Committee shall review and submit said budget and their recommendations to Watermaster on or before April 1, following. Watermaster shall hold a public hearing on said budget at its April quarterly meeting and adopt the annual administrative budget which shall include the administrative items for each pool committee. The administrative budget shall set forth budgeted items in sufficient detail as necessary to make a proper allocation of the expense among the several pools, together with Watermaster's proposed allocation. The budget shall contain such additional comparative information

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or explanation as the Advisory Committee may recommend from time to time. Expenditures within budgeted items may thereafter be made by Watermaster in the exercise of powers herein granted, as a matter of course. Any budget transfer in excess of 20% of a budget category during any budget year or modification of such administrative budget during any year shall be first submitted to the Advisory Committee for review and recommendation.

31. Review Procedures. All actions, decisions or rules of Watermaster shall be subject to review by the Court on its own motion or on timely motion by any party, the Watermaster (in the case of a mandated action), the Advisory Committee, or any Pool Committee, as follows:

(a) Effective Date of Watermaster Action. Any action, decision or rule of Watermaster shall be deemed to have occurred or been enacted on the date on which written notice thereof is mailed. Mailing of copies of approved Watermaster minutes to the active parties shall constitute such notice to all parties.

(b) Noticed Motion. Any party, the Watermaster (as to any mandated action), the Advisory Committee, or any Pool Committee may, by a regularly noticed motion, apply to the Court for review of any Watermaster's action, decision or rule. Notice of such motion shall be served personally or mailed to Watermaster and to all active parties. Unless otherwise ordered by the Court, such motion shall not operate to stay the effect of such Watermaster action, decision or rule.

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(c) Time for Motion. Notice of motion to review any Watermaster action, decision or rule shall be served and filed within ninety (90) days after such Watermaster action, decision or rule, except for budget actions, in which event said notice period shall be sixty (60) days.

(d) De Novo Nature of Proceedings. Upon the filing of any such motion, the Court shall require the moving party to notify the active parties, the Watermaster, the Advisory Committee and each Pool Committee, of a date for taking evidence and argument, and on the date so designated shall review de novo the question at issue. Watermaster's findings or decision, if any, may be received in evidence at said hearing, but shall not constitute presumptive or prima facie proof of any fact in issue.

(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 the Watermaster and all parties.

C. ADVISORY AND POOL COMMITTEES

32. Authorization. Watermaster is authorized and directed to cause committees of producer representatives to be organized to act as Pool Committees for each of the several pools created under the Physical Solution. Said Pool Committees shall, in turn, jointly form an Advisory Committee to assist Watermaster in performance of its functions under this judgment. Pool Committees shall be composed as specified in the respective pooling plans, and the Advisory Committee shall be composed of not to exceed ten (10) voting representatives from each pool, as designated by the

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respective Pool Committee. WMWD, PVMWD and SBVMWD shall each be entitled to one non-voting representative on said Advisory Committee.

33. Term and Vacancies. Members of any Pool Committee, shall serve for the term, and vacancies shall be filled, as specified in the respective pooling plan. Members of the Advisory Committee shall serve at the will of their respective Pool Committee.

34. Voting Power. The voting power on each Pool Committee shall be allocated as provided in the respective pooling plan. The voting power on the Advisory Committee shall be one hundred (100) votes allocated among the three pools in proportion to the total assessments paid to Watermaster during the preceding year; provided, that the minimum voting power of each pool shall be

(a) Overlying (Agricultural) Pool 20,

(b) Overlying (Non-agricultural) Pool 5, and

(c) Appropriative Pool 20.

In the event any pool is reduced to its said minimum vote, the remaining votes shall be allocated between the remaining pools on said basis of assessments paid to Watermaster by each such remaining pool during the preceding year. The method of exercise of each pool's voting power on the Advisory Committee shall be as determined by the respective pool committees.

35. Quorum. A majority of the voting power of the Advisory Committee or any Pool Committee shall constitute a quorum for the transaction of affairs of such Advisory or Pool Committee; provided, that at least one representative of each Pool Committee shall be required to constitute a quorum of the Advisory Committee. No Pool Committee representative may purposely absent himself or

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herself, without good cause, from an Advisory Committee meeting to deprive it of a quorum. Action by affirmative vote of a majority of the entire voting power of any Pool Committee or the Advisory Committee shall constitute action by such committee. Any action or recommendation of a Pool Committee or the Advisory Committee shall be transmitted to Watermaster in writing, together with a report of any dissenting vote or opinion.

36. Compensation. Pool or Advisory Committee members may receive compensation, to be established by the respective pooling plan, but not to exceed twenty-five dollars ($25.00) for each meeting of such Pool or Advisory Committee attended, and provided that no member of a Pool or Advisory Committee shall receive compensation of more than three hundred ($300.00) dollars for service on any such committee during any one year. All such compensation shall be a part of Watermaster administrative expense. No member of any Pool or Advisory Committee shall be employed by Watermaster or compensated by Watermaster for professional or other services rendered to such Pool or Advisory Committee or to Watermaster, other than the fee for attendance at meetings herein provided, plus reimbursement of reasonable expenses related to activities within the Basin.

37. Organization.

(a) Organizational Meeting. At its first meeting in each year, each Pool Committee and the Advisory Committee shall elect a chairperson and a vice chairperson from its membership. It shall also select a secretary, a treasurer and such assistant secretaries and treasurers as may be appropriate, any of whom may, but need not, be members of

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such Pool or Advisory Committee.

(b) Regular Meetings. All Pool Committees and the Advisory Committee shall hold regular meetings at a place and time to be specified in the rules to be adopted by each Pool and Advisory Committee. Notice of regular meetings of any Pool or Advisory Committee, and of any change in time or place thereof, shall be mailed to all active parties in said pool or pools.

(c) Special Meetings. Special meetings of any Pool or Advisory Committee may be called at any time by the Chairperson or by any three (3) members of such Pool or Advisory Committee by delivering notice personally or by mail to each member of such Pool or Advisory Committee and to each active party at least 24 hours before the time of each such meeting in the case of personal delivery, and 96 hours in the case of mail. The calling notice shall specify the time and place of the special meeting and the business to be transacted. No other business shall be considered at such meeting.

(d) Minutes. Minutes of all Pool Committee, Advisory Committee and Watermaster meetings shall be kept at Watermaster's offices. Copies thereof shall be mailed or otherwise furnished to all active parties in the pool or pools concerned. Said copies of minutes shall constitute notice of any Pool or Advisory Committee action therein reported, and shall be available for inspection by any party.

(e) Adjournments. Any meeting of any Pool or Advisory Committee may be adjourned to a time and place specified in the order of adjournment. Less than a quorum may so adjourn

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from time to time. A copy of the order or notice of adjournment shall be conspicuously posted forthwith on or near the door of the place where the meeting was held.

38. Powers and Functions. The powers and functions of the respective Pool Committees and the Advisory Committee shall be as follows:

(a) Pool Committees. Each Pool Committee shall have the power and responsibility for developing policy recommendations for administration of its particular pool, as created under the Physical Solution. All actions and recommendations of any Pool Committee which require Watermaster implementation shall first be noticed to the other two pools. If no objection is received in writing within thirty (30) days, such action or recommendation shall be transmitted directly to Watermaster for action. If any such objection is received, such action or recommendation shall be reported to the Advisory Committee before being transmitted to Watermaster.

(b) Advisory Committee. The Advisory Committee shall have the duty to study, and the power to recommend, review and act upon all discretionary determinations made or to be made hereunder by Watermaster.

[1] Committee Initiative. When any recommendation or advice of the Advisory Committee is received by Watermaster, action consistent therewith may be taken by Watermaster; provided, that any recommendation approved by 80 votes or more in the Advisory Committee shall constitute a mandate for action by Watermaster consistent therewith. If Watermaster is unwilling or unable to act

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pursuant to recommendation or advice from the Advisory Committee (other than such mandatory recommendations), Watermaster shall hold a public hearing, which shall be followed by written findings and decision. Thereafter, Watermaster may act in accordance with said decision, whether consistent with or contrary to said Advisory Committee recommendation. Such action shall be subject to review by the Court, as in the case of all other Watermaster determinations.

[2] Committee Review. In the event Watermaster proposes to take any discretionary action, other than approval or disapproval of a Pool Committee action or recommendation properly transmitted, or execute any agreement not theretofore within the scope of an Advisory Committee recommendation, notice of such intended action shall be served on the Advisory Committee and its members at least thirty (30) days before the Watermaster meeting at which such action is finally authorized.

(c) Review of Watermaster Actions. Watermaster (as to mandated action), the Advisory Committee or any Pool Committee shall be entitled to employ counsel and expert assistance in the event Watermaster or such Pool or Advisory Committee seeks Court review of any Watermaster action or failure to act. The cost of such counsel and expert assistance shall be Watermaster expense to be allocated to the affected pool or pools.

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VI. PHYSICAL SOLUTION

A. GENERAL

39. Purpose and Objective. Pursuant to the mandate of Section 2 of Article X of the California Constitution, the Court hereby adopts and orders the parties to comply with a Physical Solution. The purpose of these provisions is to establish a legal and practical means for making the maximum reasonable beneficial use of the waters of Chino Basin by providing the optimum economic, long-term, conjunctive utilization of surface waters, ground waters and supplemental water, to meet the requirements of water users having rights in or dependent upon Chino Basin.

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

41. Watermaster Control. Watermaster, with the advice of the Advisory and Pool Committees, is granted discretionary powers in order to develop an optimum basin management program for Chino Basin, including both water quantity and quality considerations. Withdrawals and supplemental water replenishment of Basin Water, and the full utilization of the water resources of Chino Basin, must be subject to procedures established by and administered through Watermaster with the advice and assistance of the Advisory and Pool Committees composed of the affected producers. Both the

quantity and quality of said water resources may thereby be preserved and the beneficial utilization of the Basin maximized.

42. General Pattern of Operations. It is contemplated that the rights herein decreed will be divided into three (3) operating pools for purposes of Watermaster administration. A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To the extent that pumping exceeds the share of the Safe Yield assigned to the Overlying Pools, or the Operating Safe Yield in the case of the Appropriative Pool, each pool will provide funds to enable Watermaster to replace such overproduction. The method of assessment in each pool shall be as set forth in the applicable pooling plan.

B. POOLING

43. Multiple Pools Established. There are hereby established three (3) pools for Watermaster administration of, and for the allocation of responsibility for, and payment of, costs of replenishment water and other aspects of this Physical Solution.

(a) Overlying (Agricultural) Pool. The first pool shall consist of the State of California and all overlying producers who produce water for other than industrial or commercial purposes. The initial members of the pool are listed in Exhibit "C".

(b) Overlying (Non-agricultural) Pool. The second pool shall consist of overlying producers who produce water for industrial or commercial purposes. The initial members of this pool are listed in Exhibit "D".

(c) Appropriative Pool. A third and separate pool shall

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consist of owners of appropriative rights. The initial members of the pool are listed in Exhibit "E".

Any party who changes the character of his use may, by subsequent order of the Court, be reassigned to the proper pool; but the allocation of Safe Yield under Paragraph 44 hereof shall not be changed. Any non-party producer or any person who may hereafter commence production of water from Chino Basin, and who may become a party to this physical solution by intervention, shall be assigned to the proper pool by the order of the Court authorizing such intervention.

44. Determination and Allocation of Rights to Safe Yield of Chino Basin. The declared Safe Yield of Chino Basin is hereby allocated as follows:

Pool	Allocation
Overlying (Agricultural) Pool	414,000 acre feet in any five (5) consecutive years.
Overlying (Non-agricultural) Pool.	7,366 acre feet per year.
Appropriative Pool	49,834 acre feet per year.

The foregoing acre foot allocations to the overlying pools are fixed. Any subsequent change in the Safe Yield shall be debited or credited to the Appropriative Pool. Basin Water available to the Appropriative Pool without replenishment obligation may vary from year to year as the Operating Safe Yield is determined by Watermaster pursuant to the criteria set forth in Exhibit "I".

45. Annual Replenishment. Watermaster shall levy and collect assessments in each year, pursuant to the respective pooling plans, in amounts sufficient to purchase replenishment water to replace production by any pool during the preceding year which exceeds that

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pool's allocated share of Safe Yield in the case of the overlying pools, or Operating Safe Yield in the case of the Appropriative Pool. It is anticipated that supplemental water for replenishment of Chino Basin may be available at different rates to the various pools to meet their replenishment obligations. If such is the case, each pool will be assessed only that amount necessary for the cost of replenishment water to that pool, at the rate available to the pool, to meet its replenishment obligation.

46. Initial Pooling Plans. The initial pooling plans, which are hereby adopted, are set forth in Exhibits "F", "G" and "H", respectively. Unless and until modified by amendment of the judgment pursuant to the Court's continuing jurisdiction, each such plan shall control operation of the subject pool.

C. REPORTS AND ACCOUNTING

47. Production Reports. Each party or responsible party shall file periodically with Watermaster, pursuant to Watermaster rules, a report on a form to be prescribed by Watermaster showing the total production of such party during the preceding reportage period, and such additional information as Watermaster may require, including any information specified by the affected Pool Committee.

48. Watermaster Reports and Accounting. Watermaster's annual report, which shall be filed on or before November 15 of each year and shall apply to the preceding year's operation, shall contain details as to operation of each of the pools and a certified audit of all assessments and expenditures pursuant to this Physical Solution and a review of Watermaster activities.

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D. REPLENISHMENT

49. Sources of Supplemental Water. Supplemental water may be obtained by Watermaster from any available source. Watermaster shall seek to obtain the best available quality of supplemental water at the most reasonable cost for recharge in the Basin. To the extent that costs of replenishment water may vary between pools, each pool shall be liable only for the costs attributable to its required replenishment. Available sources may include, but are not limited to:

(a) Reclaimed Water. There exist a series of agreements generally denominated the Regional Waste Water Agreements between CBMWD and owners of the major municipal sewer systems within the basin. Under those agreements, which are recognized hereby but shall be unaffected and unimpaired by this judgment, substantial quantities of reclaimed water may be made available for replenishment purposes. There are additional sources of reclaimed water which are, or may become, available to Watermaster for said purposes. Maximum beneficial use of reclaimed water shall be given high priority by Watermaster.

(b) State Water. State water constitutes a major available supply of supplemental water. In the case of State Water, Watermaster purchases shall comply with the water service provisions of the State's water service contracts. More specifically, Watermaster shall purchase State Water from MWD for replenishment of excess production within CBMWD, WMWD and PVMWD, and from SBVMWD to replenish excess production within SBVMWD's boundaries in Chino Basin, except to the

extent that MWD and SBVMWD give their consent as required by such State water service contracts.

(c) Local Import. There exist facilities and methods for importation of surface and ground water supplies from adjacent basins and watersheds.

(d) Colorado River Supplies. MWD has water supplies available from its Colorado River Aqueduct.

50. Methods of Replenishment. Watermaster may accomplish replenishment of overproduction from the Basin by any reasonable method, including:

(a) Spreading and percolation or Injection of water in existing or new facilities, subject to the provisions of Paragraphs 19, 25 and 26 hereof.

(b) In Lieu Procedures. Watermaster may make, or cause to be made, deliveries of water for direct surface use, in lieu of ground water production.

E. REVENUES

51. Production Assessment. Production assessments, on whatever basis, may be levied by Watermaster pursuant to the pooling plan adopted for the applicable pool.

52. Minimal Producers. Minimal Producers shall be exempted from payment of production assessments, upon filing of production reports as provided in Paragraph 47 of this Judgment, and payment of an annual five dollar ($5.00) administrative fee as specified by Watermaster rules.

53. Assessment Proceeds -- Purposes. Watermaster shall have the power to levy assessments against the parties (other than minimal pumpers) based upon production during the preceding period

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of assessable production, whether quarterly, semi-annually or annually, as may be determined most practical by Watermaster or the affected Pool Committee.

54. Administrative Expenses. The expenses of administration of this Physical Solution shall be categorized as either (a) general Watermaster administrative expense, or (b) special project expense.

(a) General Watermaster Administrative Expense shall include office rental, general personnel expense, supplies and office equipment, and related incidental expense and general overhead.

(b) Special Project Expense shall consist of special engineering, economic or other studies, litigation expense, meter testing or other major operating expenses. Each such project shall be assigned a Task Order number and shall be separately budgeted and accounted for.

General Watermaster administrative expense shall be allocated and assessed against the respective pools based upon allocations made by the Watermaster, who shall make such allocations based upon generally accepted cost accounting methods. Special Project Expense shall be allocated to a specific pool, or any portion thereof, only upon the basis of prior express assent and finding of benefit by the Pool Committee, or pursuant to written order of the Court.

55. Assessments -- Procedure. Assessments herein provided for shall be levied and collected as follows:

(a) Notice of Assessment. Watermaster shall give written notice of all applicable assessments to each party on

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or before ninety (90) days after the end of the production period to which such assessment is applicable.

(b) Payment. Each assessment shall be payable on or before thirty (30) days after notice, and shall be the obligation of the party or successor owning the water production facility at the time written notice of assessment is given, unless prior arrangement for payment by others has been made in writing and filed with Watermaster.

(c) Delinquency. Any delinquent assessment shall bear interest at 10% per annum (or such greater rate as shall equal the average current cost of borrowed funds to the Watermaster) from the due date thereof. Such delinquent assessment and interest may be collected in a show-cause proceeding herein instituted by the Watermaster, in which case the Court may allow Watermaster its reasonable costs of collection, including attorney's fees.

56. Accumulation of Replenishment Water Assessment Proceeds. In order to minimize fluctuation in assessment and to give Watermaster flexibility in purchase and spreading of replenishment water, Watermaster may make reasonable accumulations of replenishment water assessment proceeds. Interest earned on such retained funds shall be added to the account of the pool from which the funds were collected and shall be applied only to the purchase of replenishment water.

57. Effective Date. The effective date for accounting and operation under this Physical Solution shall be July 1, 1977, and the first production assessments hereunder shall be due after July 1, 1978. Watermaster shall, however, require installation of

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meters or measuring devices and establish operating procedures immediately, and the costs of such Watermaster activity (not including the cost of such meters and measuring devices) may be recovered in the first administrative assessment in 1978.

VII. MISCELLANEOUS PROVISIONS

58. 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 served. Said designation may be changed from time to time by filing a written notice of such change with the Watermaster. Any party desiring to be relieved of receiving notices of Watermaster or committee activity may file a waiver of notice on a form to be provided by Watermaster. Thereafter such party shall be removed from the Active Party list. Watermaster shall maintain at all times a current list of active parties 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, without cost, to any party, the Advisory Committee or any Pool Committee upon written request therefor.

59. Service of Documents. Delivery to or service upon any party or active party by the Watermaster, by any other party, or by the Court, of any item required to be served upon or delivered to such party or active party under or pursuant to the Judgment shall be made personally or by deposit in the United States mail, first

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class, postage prepaid, addressed to the designee and at the address in the latest designation filed by such party or active party.

60. Intervention After Judgment. Any non-party assignee of the adjudicated appropriative rights of any appropriator, or any other person newly proposing to produce water from Chino Basin, may become a party to this judgment upon filing a petition in intervention. Said intervention must be confirmed by order of this Court. Such intervenor shall thereafter be a party bound by this judgment and entitled to the rights and privileges accorded under the Physical Solution herein, through the pool to which the Court shall assign such intervenor.

61. Loss of Rights. Loss, whether by abandonment, forfeiture or otherwise, of any right herein adjudicated shall be accomplished only (1) by a written election by the owner of the right filed with Watermaster, or (2) by order of the Court upon noticed motion and after hearing.

62. Scope of Judgment. Nothing in this Judgment shall be deemed to preclude or limit any party in the assertion against a neighboring party of any cause of action now existing or hereafter arising based upon injury, damage or depletion of water supply available to such party, proximately caused by nearby pumping which constitutes an unreasonable interference with such complaining party's ability to extract ground water.

63. Judgment Binding on Successors. This Judgment and all provisions thereof are applicable to and binding upon not only the parties to this action, but also upon their respective heirs, executors, administrators, successors, assigns, lessees and

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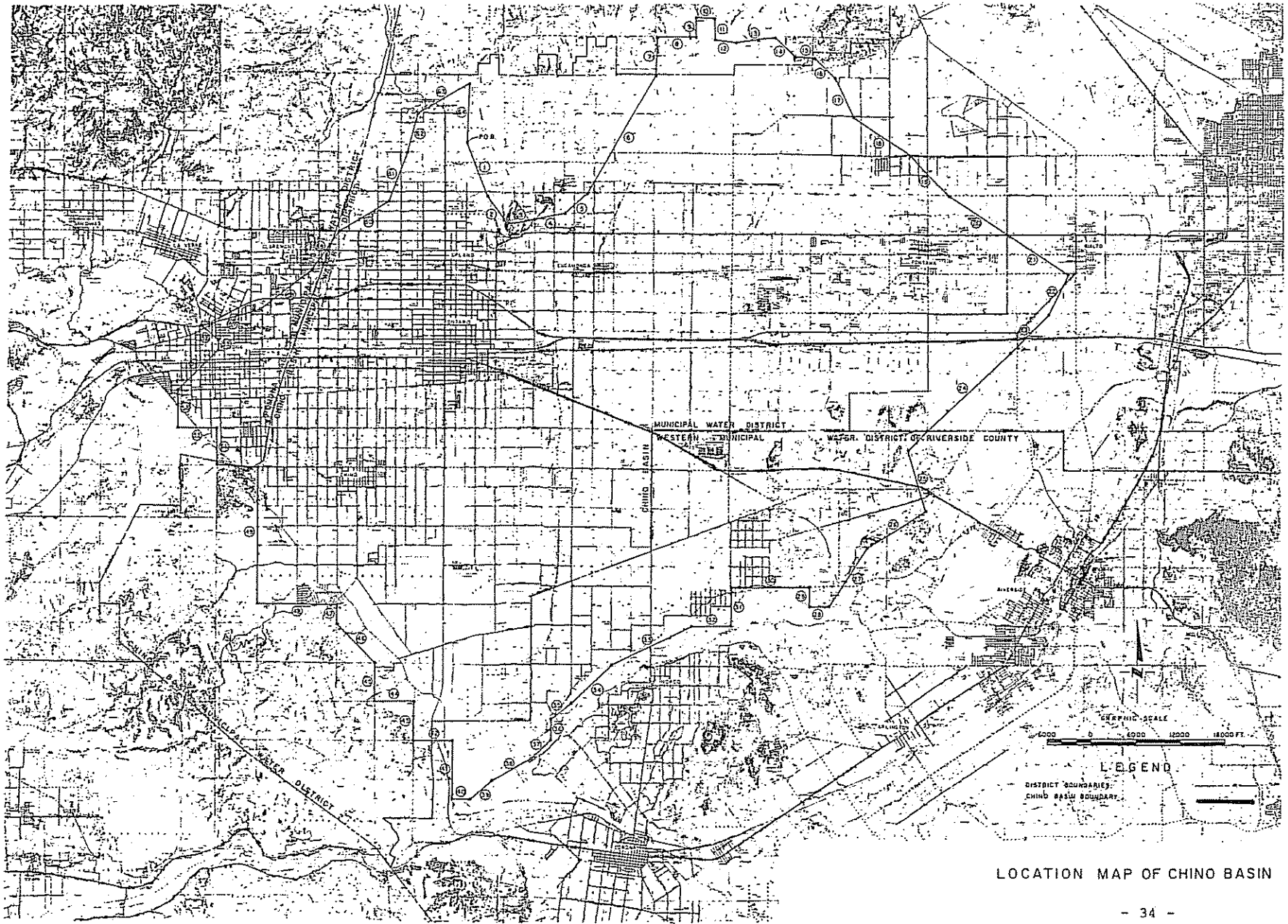
licensees and upon the agents, employees and attorneys in fact of all such persons.

64. Costs. No party shall recover any costs in this proceeding from any other party.

Dated: JAN 27 1978.

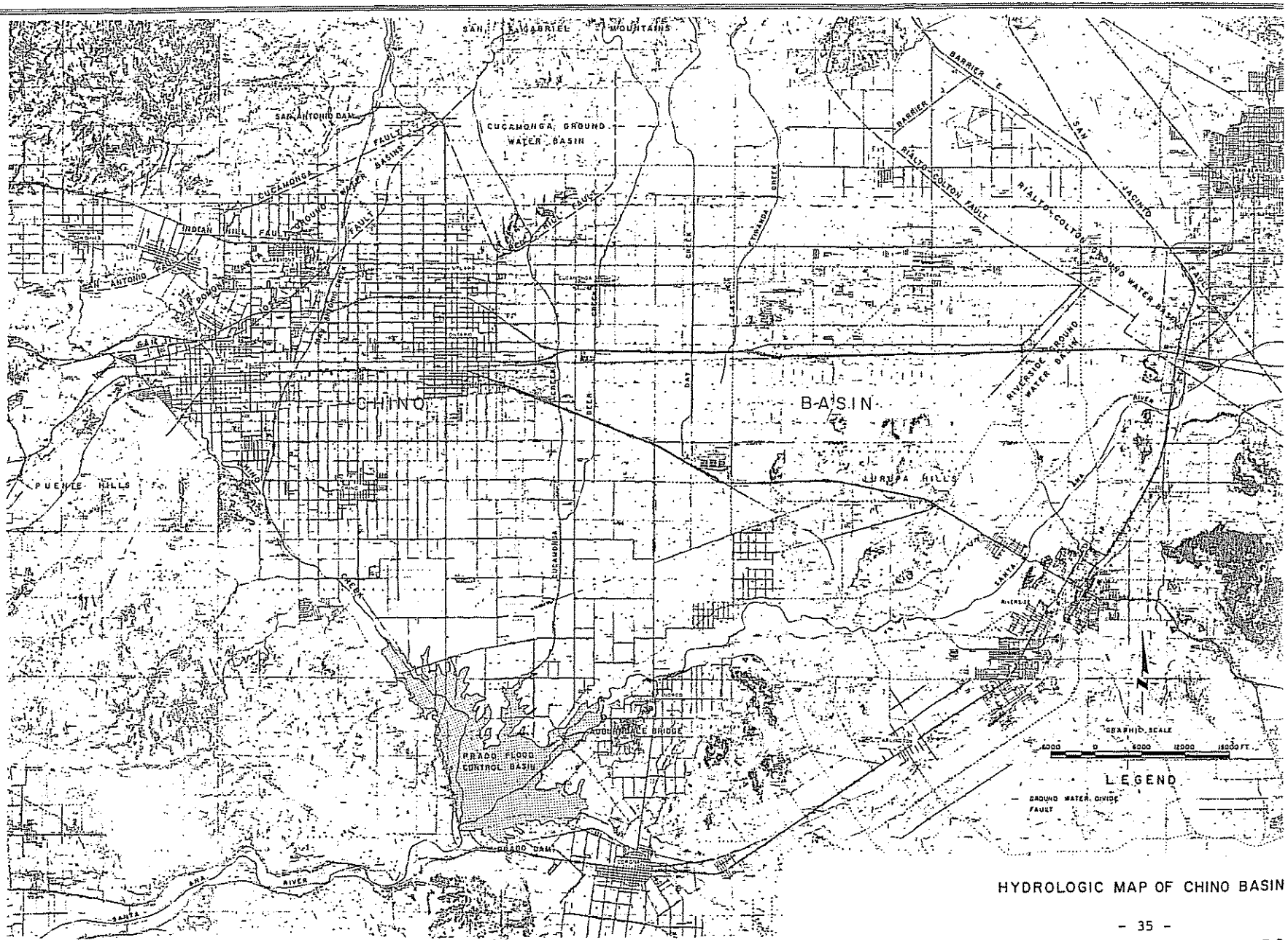
Judge

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LOCATION MAP OF CHINO BASIN

EXHIBIT A



HYDROLOGIC MAP OF CHINO BASIN

EXHIBIT B

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STIPULATING OVERLYING AGRICULTURAL PRODUCERS

STATE OF CALIFORNIA
COUNTY OF SAN BERNARDINO

Abacherli Dairy, Inc.
Abacherli, Frank
Abacherli, Shirley
Abbona, Anna
Abbona, James
Abbona, Jim
Abbona, Mary
Agliani, Amelia H.
Agman, Inc.
Aguerre, Louis B.
Ahmanson Trust Co.
Akiyama, Shizuye
Akiyama, Tomoo
Akkerman, Dave
Albers, J. N.
Albers, Nellie
Alewyn, Jake J.
Alewyn, Normalee
Alger, Mary D.
Alger, Raymond
Allen, Ben F.
Allen, Jane F.
Alta-Dena Dairy
Anderson Farms
Anguiano, Sarah L. S.
Anker, Gus
Aphessetche, Xavier
Arena Mutual Water Assn.
Armstrong Nurseries, Inc.
Arretche, Frank
Arretche, Jean Pierre
Arvidson, Clarence F.
Arvidson, Florence
Ashley, George W.
Ashley, Pearl E.
Atlas Farms
Atlas Ornamental Iron Works, Inc.
Aukeman, Carol
Aukeman, Lewis
Ayers, Kenneth C., aka
Kelley Ayers
Bachoc, Raymond
Baldwin, Edgar A.
Baldwin, Lester
Banbury, Carolyn
Bangma Dairy
Bangma, Arthur
Bangma, Ida
Bangma, Martin
Bangma, Sam
Barba, Anthony B.
Barba, Frank
Barcellos, Joseph
Barnhill, Maurine W.

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Barnhill, Paul	Boersma, Angie
Bartel, Dale	Boersma, Berdina
Bartel, Ursula	Boersma, Frank
Bartel, Willard	Boersma, Harry
Barthelemy, Henry	Boersma, Paul
Barthelemy, Roland	Boersma, Sam
Bassler, Donald V., M.D.	Boersma, William L.
Bates, Lowell R.	Bohlander & Holmes, Inc.
Bates, Mildred L.	Bokma, Peter
Beahm, James W.	Bollema, Jacob
Beahm, Joan M.	Boonstoo, Edward
Bekendam, Hank	Bootsma, Jim
Bekendam, Pete	Borba, Dolene
Bello, Eugene	Borba, Dolores
Bello, Olga	Borba, Emily
Beltman, Evelyn	Borba, George
Beltman, Tony	Borba, John
Bergquist Properties, Inc.	Borba, John & Sons
Bevacqua, Joel A.	Borba, John Jr.
Bevacqua, Marie B.	Borba, Joseph A.
Bidart, Bernard	Borba, Karen E.
Bidart, Michael J.	Borba, Karen M.
Binnell, Wesley	Borba, Pete, Estate of
Black, Patricia E.	Borba, Ricci
Black, Victor	Borba, Steve
Bodger, John & Sons Co.	Borba, Tom
Boer, Adrian	Bordisso, Alleck
Boersma and Wind Dairy	Borges, Angelica M.

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Borges, Bernadette
Borges, John O.
Borges, Linda L.
Borges, Manual Jr.
Borges, Tony
Bos, Aleid
Bos, Gerrit
Bos, John
Bos, John
Bos, Margaret
Bos, Mary
Bos, Mary Beth
Bos, Tony
Bosch, Henrietta
Bosch, Peter T.
Boschma, Betty
Boschma, Frank
Boschma, Greta
Boschma, Henry
Bosma, Dick
Bosma, Florence G.
Bosma, Gerrit
Bosma, Jacob J.
Bosma, Jeanette Thea
Bosman, Frank
Bosman, Nellie
Bosnyak, Goldie M.
Bosnyak, Martin
Bothof, Roger W.
Bouma, Cornie
Bouma, Emma
Bouma, Henry P.
Bouma, Martin
Bouma, Peter G. & Sons Dairy
Bouma, Ted
Bouman, Helen
Bouman, Sam
Bower, Mabel E.
Boys Republic
Breedyk, Arie
Breedyk, Jessie
Briano Brothers
Briano, Albert
Briano, Albert Trustee for
Briano, Albert Frank
Briano, Lena
Brink, Russell N.
Brinkerhoff, Margaret
Brinkerhoff, Robert L.
Britschgi, Florence
Britschgi, Magdalena Garetto
Britschgi, Walter P.
Brommer, Marvin
Brookside Enterprizes, dba
Brookside Vineyard Co.
Brothers Three Dairy

Brown, Eugene
Brun, Martha M.
Brun, Peter Robert
Buma, Duke
Buma, Martha
Bunse, Nancy
Bunse, Ronnie L.
Caballero, Bonnie L.
Caballero, Richard F.
Cable Airport Inc.
Cadlini, Donald
Cadlini, Jesse R.
Cadlini, Marie Edna
Cambio, Anna
Cambio, Charles, Estate of
Cambio, William V.
Cardoza, Florence
Cardoza, Olivi
Cardoza, Tony
Carnesi, Tom
Carver, Robt M., Trustee
Cauffman, John R.
Chacon Bros.
Chacon, Elvera P.
Chacon, Joe M.
Chacon, Robert M.
Chacon, Virginia L.
Chez, Joseph C.
Chino Corona Investment
Chino Water Co.
Christensen, Leslie
Christensen, Richard G.
Christian, Ada R.
Christian, Harold F.
Christy, Ella J.
Christy, Ronald S.
Cihigoyenetche, Jean
Cihigoyenetche, Leona
Cihigoyenetche, Martin
Clarke, Arthur B.
Clarke, Nancy L.
Clarke, Phyllis J.
Coelho, Isabel
Coelho, Joe A. Jr.
Collins, Howard E.
Collins, Judith F.
Collinsworth, Ester L.
Collinsworth, John E.
Collinsworth, Shelby
Cone Estate (05-2-00648/649)
Consolidated Freightways Corp.
of Delaware
Corona Farms Co.
Corra, Rose
Costa, Dimas S.
Costa, Laura

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Costa, Myrtle	De Boer, L. H.
Costamagna, Antonio	De Boer, Sidney
Costamagna, Joseph	De Bos, Andrew
Cousyn, Claus B.	De Graaf, Anna Mae
Cramer, Carole F.	De Graaf, Gerrit
Cramer, William R.	De Groot, Dick
Crossroads Auto Dismantlers, Inc.	De Groot, Dorothy
Crouse, Beatrice I.	De Groot, Ernest
Crouse, Roger	De Groot, Henrietta
Crowley, Juanita C.	De Groot, Jake
Crowley, Ralph	De Groot, Pete Jr.
Cucamonga Vintners	De Haan, Bernadena
D'Astici, Teresa	De Haan, Henry
Da Costa, Cecilia B.	De Hoog, Adriana
Da Costa, Joaquim F.	De Hoog, Joe
Daloisio, Norman	De Hoog, Martin
De Berard Bros.	De Hoog, Martin L.
De Berard, Arthur, Trustee	De Hoog, Mitch
De Berard, Charles	De Hoog, Tryntje
De Berard, Chas., Trustee	De Jager, Cobi
De Berard, Helan J.	De Jager, Edward D.
De Berard, Robert	De Jong Brothers Dairy
De Berard, Robert, Trustee	De Jong, Cornelis
De Bie, Adrian	De Jong, Cornelius
De Bie, Henry	De Jong, Grace
De Bie, Margaret M.	De Jong, Jake
De Bie, Marvin	De Jong, Lena
De Boer, Fred	De Leeuw, Alice

De Leeuw, Sam	Dirkse, Catherine
De Soete, Agnes	Dirkse, Charles C.
De Soete, Andre	Dixon, Charles E.
De Vries, Abraham	Dixon, Geraldine A.
De Vries, Case	Doesberg, Hendrica
De Vries, Dick	Doesburg, Theodorus P.
De Vries, Evelyn	Dolan, Marion
De Vries, Henry, Estate of	Dolan, Michael H.
De Vries, Hermina	Dominguez, Helen
De Vries, Jack H.	Dominguez, Manual
De Vries, Jane	Donkers, Henry A.
De Vries, Janice	Donkers, Nellie G.
De Vries, John	Dotta Bros.
De Vries, John J.	Douma Brothers Dairy
De Vries, Neil	Douma, Betty A.
De Vries, Ruth	Douma, Fred A.
De Vries, Theresa	Douma, Hendrika
De Wit, Gladys	Douma, Herman G.
De Wit, Peter S.	Douma, Narleen J.
De Wyn, Evert	Douma, Phillip M.
De Zoete, Hattie V.	Dow Chemical Co.
De Zoete, Leo A.	Dragt, Rheta
Decker, Hallie	Dragt, William
Decker, Henry A.	Driftwood Dairy Farm
Demmer, Ernest	Droogh, Case
Di Carlo, Marie	Duhalde, Marian
Di Carlo, Victor	Duhalde, Lauren
Di Tommaso, Frank	Duits, Henrietta

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Duits, John	Excelsior Farms
	F.D.I.C.
Dunlap, Edna Kraemer,	Fagundes, Frank M.
Estate of	Fagundes, Mary
Durrington, Glen	Fernandes, Joseph Jr.
Durrington, William F.	Fernandes, Velma C.
Dusi, John, Sr.	Ferraro, Ann
Dykstra, Dick	Ferreira, Frank J.
Dykstra, John	Ferreira, Joe C. Jr.
Dykstra, John & Sons	Ferreira, Narcie
Dykstra, Wilma	Filippi, J. Vintage Co.
Dyt, Cor	Filippi, Joseph
Dyt, Johanna	Filippi, Joseph A.
E and S Grape Growers	Filippi, Mary E.
Eaton, Thomas, Estate of	Fitzgerald, John R.
Echeverria, Juan	Flameling Dairy Inc.
Echeverria, Carlos	Flamingo Dairy
Echeverria, Pablo	Foss, Douglas E.
Eilers, E. Myrle	Foss, Gerald R.
Eilers, Henry W.	Foss, Russel
El Prado Golf Course	Fred & John Troost No. 1 Inc.
Ellsworth, Rex C.	Fred & Maynard Troost No. 2 Inc.
Engelsma, Jake	Freitas, Beatriz
Engelsma, Susan	Freitas, Tony T.
Escojeda, Henry	Gakle, Louis L.
Etiwanda Grape Products Co.	Galleano Winery, Inc.
Euclid Ave. Investment One	Galleano, Bernard D.
Euclid Ave. Investment Four	Galleano, D.
Euclid Ave. Three Investment	Galleano, Mary M.

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Garcia, Pete
Gardner, Leland V.
Gardner, Lola M.
Garrett, Leonard E.
Garrett, Patricia T.
Gastelluberry, Catherine
Gastelluberry, Jean
Gilstrap, Glen E.
Gilstrap, Marjorie J.
Godinho, John
Godinho, June
Gonsalves, Evelyn
Gonsalves, John
Gorzeman, Geraldine
Gorzeman, Henry A.
Gorzeman, Joe
Govea, Julia
Goyenetche, Albert
Grace, Caroline E.
Grace, David J.
Gravatt, Glenn W.
Gravatt, Sally Mae
Greydanus Dairy, Inc.
Greydanus, Rena
Griffin Development Co.
Haagsma, Dave
Haagsma, John
Hansen, Mary D.
Hansen, Raymond F.
Hanson, Ardeth W.
Harada, James T.
Harada, Violet A.
Haringa, Earl and Sons
Haringa, Herman
Haringa, Rudy
Haringa, William
Harper, Cecilia de Mille
Harrington, Winona
Harrison, Jacqueline A.
Hatanaka, Kenichi
Heida, Annie
Heida, Don
Heida, Jim
Heida, Sam
Helms, Addison D.
Helms, Irma A.
Hermans, Alma I.
Hermans, Harry
Hettinga, Arthur
Hettinga, Ida
Hettinga, Judy
Hettinga, Mary
Hettinga, Wilbur
Heublein, Inc., Grocery Products Group
Hibma, Catherine M.

Hibma, Sidney
Hicks, Kenneth I.
Hicks, Minnie M.
Higgins Brick Co.
Highstreet, Alfred V.
Highstreet, Evada V.
Hilarides, Bertha as Trustee
Hilarides, Frank
Hilarides, John as Trustee
Hindelang, Tillie
Hindelang, William
Hobbs, Bonnie C.
Hobbs, Charles W.
Hobbs, Hazel I.
Hobbs, Orlo M.
Hoekstra, Edward
Hoekstra, George
Hoekstra, Grace
Hoekstra, Louie
Hofer, Paul B.
Hofer, Phillip F.
Hofstra, Marie
Hogeboom, Jo Ann M.
Hogeboom, Maurice D.
Hogg, David V.
Hogg, Gene P.
Hogg, Warren G.
Hohberg, Edith J.
Hohberg, Harold C.
Hohberg, Harold W.
Holder, Arthur B.
Holder, Dorothy F.
Holmes, A. Lee
Holmes, Frances P.
Hoogeboom, Gertrude
Hoogeboom, Pete
Hoogendam, John
Hoogendam, Tena
Houssels, J. K. Thoroughbred Farm
Hunt Industries
Idsinga, Ann
Idsinga, William W.
Imbach Ranch, Inc.
Imbach, Kenneth E.
Imbach, Leonard K.
Imbach, Oscar K.
Imbach, Ruth M.
Indaburu, Jean
Indaburu, Marceline
Iseli, Kurt H.
Ito, Kow
J & B Dairy Inc.
Jaques, Johnny C. Jr.
Jaques, Mary
Jaques, Mary Lou

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Jay Em Bee Farms
Johnson Bro's Egg Ranches, Inc.
Johnston, Ellwood W.
Johnston, George F. Co.
Johnston, Judith H.
Jones, Leonard P.
Jongsma & Sons Dairy
Jongsma, Diana A.
Jongsma, Dorothy
Jongsma, George
Jongsma, Harold
Jongsma, Henry
Jongsma, John
Jongsma, Nadine
Jongsma, Tillie
Jordan, Marjorie G.
Jordan, Troy O.
Jorritsma, Dorothy
Juliano, Albert
Kamper, Cornelis
Kamstra, Wilbert
Kaplan, Lawrence J.
Kasbergen, Martha
Kasbergen, Neil
Kazian, Angelen Estate of
Kingsway Const. Corp.
Klapps Market
Kline, James K.
Knevelbaard, John
Knudsen, Ejnar
Knudsen, Karen M.
Knudsen, Kenneth
Knudson, Robert
Knudson, Darlene
Koel, Helen S.
Koetsier, Gerard
Koetsier, Gerrit J.
Koetsier, Jake
Koning, Fred W.
Koning, Gloria
Koning, J. W. Estate
Koning, James A.
Koning, Jane
Koning, Jane C.
Koning, Jennie
Koning, John
Koning, Victor A.
Kooi Holstein Corporation
Koolhaas, Kenneth E.
Koolhaas, Simon
Koolhaas, Sophie Grace
Koopal, Grace
Koopal, Silas
Koopman, Eka
Koopman, Gene T.
Koopman, Henry G.

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Koopman, Ted
Koopman, Tena
Koot, Nick
Koster, Aart
Koster, Frances
Koster, Henry B.
Koster, Nellie
Kroes, Jake R.
Kroeze, Bros
Kroeze, Calvin E.
Kroeze, John
Kroeze, Wesley
Kruckenberg, Naomi
Kruckenberg, Perry
L. D. S. Welfare Ranch
Labrucherie, Mary Jane
Labrucherie, Raymond F.
Lako, Samuel
Landman Corp.
Lanting, Broer
Lanting, Myer
Lass, Jack
Lass, Sandra L.
Lawrence, Cecelia, Estate of
Lawrence, Joe H., Estate of
Leal, Bradley W.
Leal, John C.
Leal, John Craig
Leck, Arthur A.
Leck, Evelyn M.
Lee, Harold E.
Lee, Helen J.
Lee, Henrietta C.
Lee, R. T. Construction Co.
Lekkerkerk, Adriana
Lekkerkerk, L. M.
Lekkerkerker, Nellie
Lekkerkerker, Walt
Lewis Homes of California
Livingston, Dorothy M.
Livingston, Rex E.
Lokey, Rosemary Kraemer
Lopes, Candida A.
Lopes, Antonio S.
Lopez, Joe D.
Lourenco, Carlos, Jr.
Lourenco, Carmelina P.
Lourenco, Jack C.
Lourenco, Manual H.
Lourenco, Mary
Lourenco, Mary
Luiten, Jack
Luiz, John M.
Luna, Christine I.
Luna, Ruben T.
Lusk, John D. and Son
a California corporation

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Lyon, Gregory E.
Lyon, Paula E.
M & W Co. #2
Madole, Betty M.
Madole, Larry B.
Marquez, Arthur
Marquine, Jean
Martin, Lelon O.
Martin, Leon O.
Martin, Maria D.
Martin, Tony J.
Martins, Frank
Mathias, Antonio
Mc Cune, Robert M.
Mc Masters, Gertrude
Mc Neill, J. A.
Mc Neill, May F.
Mees, Leon
Mello and Silva Dairy
Mello and Sousa Dairy
Mello, Emilia
Mello, Enos C.
Mello, Mercedes
Mendiondo, Catherine
Mendiondo, Dominique
Meth. Hosp. - Sacramento
Metzger, R. S.
Metzger, Winifred
Mickel, Louise
Miersma, Dorothy
Meirsma, Harry C.
Minaberry, Arnaud
Minaberry, Marie
Mistretta, Frank J.
Mocho and Plaa Inc.
Mocho, Jean
Mocho, Noeline
Modica, Josephine
Montes, Elizabeth
Montes, Joe
Moons, Beatrice
Moons, Jack
Moramarco, John A. Enterprises
Moreno, Louis W.
Moss, John R.
Motion Pictures Associates, Inc.
Moynier, Joe
Murphy, Frances V.
Murphy, Myrl L.
Murphy, Naomi
Nanne, Martin Estate of
Nederend, Betty
Nederend, Hans
Norfolk, James
Norfolk, Martha
Notrica, Louis

Nyberg, Lillian N.
Nyenhuis, Annie
Nyenhuis, Jim
Occidental Land Research
Okumura, Marion
Okumura, Yuiche
Oldengarm, Effie
Oldengarm, Egbert
Oldengarm, Henry
Oliviera, Manuel L.
Oliviera, Mary M.
Olson, Albert
Oltmans Construction Co.
Omlin, Anton
Omlin, Elsie L.
Ontario Christian School Assn.
Oord, John
Oostdam, Jacoba
Oostdam, Pete
Oosten, Agnes
Oosten, Anthonia
Oosten, Caroline
Oosten, John
Oosten, Marinus
Oosten, Ralph
Orange County Water District
Ormonde, Manuel
Ormonde, Pete, Jr.
Ormonde, Viva
Ortega, Adeline B.
Ortega, Bernard Dino
Osterkamp, Joseph S.
Osterkamp, Margaret A.
P I E Water Co.
Palmer, Eva E.
Palmer, Walter E.
Parente, Luis S.
Parente, Mary Borba
Parks, Jack B.
Parks, Laura M.
Patterson, Lawrence E. Estate of
Payne, Clyde H.
Payne, Margo
Pearson, Athelia K.
Pearson, William C.
Pearson, William G.
Pene, Robert
Perian, Miller
Perian, Ona E.
Petrissans, Deanna
Petrissans, George
Petrissans, Jean P.
Petrissans, Marie T.
Pickering, Dora M.
(Mrs. A. L. Pickering)
Pierce, John

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Pierce, Sadie
Pietszak, Sally
Pine, Joe
Pine, Virginia
Pires, Frank
Pires, Marie
Plaa, Jeanne
Plaa, Michel
Plantenga, Agnes
Plantenga, George
Poe, Arlo D.
Pomona Cemetery Assn.
Porte, Cecelia, Estate of
Porte, Garritt, Estate of
Portsmouth, Vera McCarty
Ramella, Mary M.
Ramirez, Concha
Rearick, Hildegard H.
Rearick, Richard R.
Reinalda, Clarence
Reitsma, Greta
Reitsma, Louis
Rice, Bernice
Rice, Charlie E.
Richards, Karin
(Mrs. Ronnie Richards)
Richards, Ronald L.
Ridder, Jennie Wassenaar
Righetti, A. T.
Riley, George A.
Riley, Helen C.
Robbins, Jack K.
Rocha, John M.
Rocha, Jose C.
Rodrigues, John
Rodrigues, Manuel
Rodrigues, Manuel, Jr.
Rodrigues, Mary L.
Rodriquez, Daniel
Rogers, Jack D.
Rohrer, John A.
Rohrer, Theresa D.
Rohrs, Elizabeth H.
Rossetti, M. S.
Roukema, Angeline
Roukema, Ed.
Roukema, Nancy
Roukema, Siebren
Ruderian, Max J.
Russell, Fred J.
Rusticus, Ann
Rusticus, Charles
Rynsburger, Arie
Rynsburger, Berdena, Trust
Rynsburger, Joan Adele
Rynsburger, Thomas

S. P. Annex, Inc.
Salisbury, Elinor J.
Sanchez, Edmundo
Sanchez, Margarita O.
Santana, Joe Sr.
Santana, Palmira
Satragni, John B. Jr.
Scaramella, George P.
Schaafsma Bros.
Schaafsma, Jennie
Schaafsma, Peter
Schaafsma, Tom
Schaap, Andy
Schaap, Ids
Schaap, Maria
Schacht, Sharon C.
Schakel, Audrey
Schakel, Fred
Schmid, Olga
Schmidt, Madeleine
Schoneveld, Evert
Schoneveld, Henrietta
Schoneveld, John
Schoneveld, John Allen
Schug, Donald E.
Schug, Shirley A.
Schuh, Bernatta M.
Schuh, Harold H.

Scott, Frances M.
Scott, Linda F.
Scott, Stanley A.
Scritsmier, Lester J.
Serl, Charles A.
Serl, Rosalie P.
Shady Grove Dairy, Inc.
Shamel, Burt A.
Shelby, Harold E.
Shelby, John A.
Shelby, Velma M.
Shelton, Alice A.
Sherwood, Robert W.
Sherwood, Sheila J.
Shue, Eva
Shue, Gilbert
Sieperda, Anne
Sieperda, James
Sigrist, Hans
Sigrist, Rita
Silveira, Arline L.
Silveira, Frank
Silveira, Jack
Silveira, Jack P. Jr.
Simas, Dolores
Simas, Joe
Singleton, Dean
Singleton, Elsie R.

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Sinnott, Jim	Staal, John
Sinnott, Mildred B.	Stahl, Zippora P.
Slegers, Dorothy	Stampfl, Berta
Slegers, Hubert J.	Stampfl, William
Slegers, Jake	Stanley, Robert E.
Slegers, Jim	Stark, Everett
Slegers, Lenwood M.	Stellingwerf, Andrew
Slegers, Martha	Stellingwerf, Henry
Slegers, Tesse J.	Stellingwerf, Jenette
Smith, Edward S.	Stellingwerf, Shana
Smith, Helen D.	Stellingwerf, Stan
Smith, James E.	Stelzer, Mike C.
Smith, Keith J.	Sterk, Henry
Smith, Lester W.	Stiefel, Winifred
Smith, Lois Maxine	Stiefel, Jack D.
Smith, Marjorie W.	Stigall, Richard L.
Soares, Eva	Stigall, Vita
Sogioka, Mitsuyoshi	Stockman's Inn
Sogioka, Yoshimato	Stouder, Charlotte A.
Sousa, Sam	Stouder, William C.
Southern Pacific Land Co.	Struikmans, Barbara
Southfield, Eddie	Struikmans, Gertie
Souza, Frank M.	Struikmans, Henry Jr.
Souza, Mary T.	Struikmans, Henry Sr.
Spickerman, Alberta	Struikmans, Nellie
Spickerman, Florence	Swager, Edward
Spickerman, Rudolph	Swager, Gerben
Spyksma, John	Swager, Johanna

Swager, Marion
Swierstra, Donald
Swierstra, Fanny
Sybrandy, Ida
Sybrandy, Simon
Sytsma, Albert
Sytsma, Edith
Sytsma, Jennie
Sytsma, Louie
Te Velde, Agnes
Te Velde, Bay
Te Velde, Bernard A.
Te Velde, Bonnie
Te Velde, Bonnie G.
Te Velde, George
Te Velde, George, Jr.
Te Velde, Harm
Te Velde, Harriet
Te Velde, Henry J.
Te Velde, Jay
Te Velde, Johanna
Te Velde, John H.
Te Velde, Ralph A.
Te Velde, Zwaantina, Trustee
Ter Maaten, Case
Ter Maaten, Cleone
Ter Maaten, Steve
Terpstra, Carol
Terpstra, Theodore G.
Teune, Tony
Teunissen, Bernard
Teunissen, Jane
Thomas, Ethel M.
Thommen, Alice
Thommen, Fritz
Tillema, Allie
Tillema, Harold
Tillema, Klaas D.
Timmons, William R.
Tollerup, Barbara
Tollerup, Harold
Trapani, Louis A.
Trimlett, Arlene R.
Trimlett, George E.
Tristant, Pierre
Tuinhout, Ale
Tuinhout, Harry
Tuinhout, Hilda
Tuls, Elizabeth
Tuls, Jack S.
Tuls, Jake
Union Oil Company of California
United Dairyman's Co-op.
Urquhart, James G.
Usle, Cathryn
Usle, Faustino

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V & Y Properties
Vaile, Beryl M.
Valley Hay Co.
Van Beek Dairy Inc.
Van Canneyt Dairy
Van Canneyt, Maurice
Van Canneyt, Wilmer
Van Dam, Bas
Van Dam, Isabelle
Van Dam, Nellie
Van Den Berg, Gertrude
Van Den Berg, Joyce
Van Den Berg, Marinus
Van Den Berg, Marvin
Van Der Linden, Ardith
Van Der Linden, John
Van Der Linden, Stanley
Van Der Veen, Kenneth
Van Diest, Anna T.
Van Diest, Cornelius
Van Diest, Ernest
Van Diest, Rena
Van Dyk, Bart
Van Dyk, Jeanette
Van Foeken, Martha
Van Foeken, William
Van Hofwegan, Steve
Van Hofwegen, Adrian A.
Van Hofwegen, Clara
Van Hofwegen, Jessie
Van Klaveren, A.
Van Klaveren, Arie
Van Klaveren, Wilhelmina
Van Klaveren, William
Van Leeuwen, Arie C.
Van Leeuwen, Arie C.
Van Leeuwen, Arlan
Van Leeuwen, Clara G.
Van Leeuwen, Cornelia L.
Van Leeuwen, Harriet
Van Leeuwen, Jack
Van Leeuwen, John
Van Leeuwen, Letie
Van Leeuwen, Margie
Van Leeuwen, Paul
Van Leeuwen, William A.
Van Ravenswaay, Donald
Van Ryn Dairy
Van Ryn, Dick
Van Surksum, Anthonetta
Van Surksum, John
Van Veen, John
Van Vliet, Effie
Van Vliet, Hendrika
Van Vliet, Hugo
Van Vliet, Klaas

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Vande Witte, George	Vander Laan, Katie
Vanden Berge, Gertie	Vander Laan, Martin Jr.
Vanden Berge, Gertie	Vander Laan, Tillie
Vanden Berge, Jack	Vander Leest, Anna
Vanden Berge, Jake	Vander Leest, Ann
Vanden Brink, Stanley	Vander Meer, Alice
Vander Dussen, Agnes	Vander Meer, Dick
Vander Dussen, Cor	Vander Poel, Hank
Vander Dussen, Cornelius	Vander Poel, Pete
Vander Dussen, Edward	Vander Pol, Irene
Vander Dussen, Geraldine Marie	Vander Pol, Margie
Vander Dussen, James	Vander Pol, Marines
Vander Dussen, John	Vander Pol, William P.
Vander Dussen, Nelvina	Vander Schaaf, Earl
Vander Dussen, Rene	Vander Schaaf, Elizabeth
Vander Dussen, Sybrand Jr.	Vander Schaaf, Henrietta
Vander Dussen, Sybrand Sr.	Vander Schaaf, John
Vander Dussen Trustees	Vander Schaaf, Ted
Vander Eyk, Case Jr.	Vander Stelt, Catherine
Vander Eyk, Case Sr.	Vander Stelt, Clarence
Vander Feer, Peter	Vander Tuig, Arlene
Vander Feer, Rieka	Vander Tuig, Sylvester
Vander Laan, Ann	Vander Veen, Joe A.
Vander Laan, Ben	Vandervlag, Robert
Vander Laan, Bill	Vander Zwan, Peter
Vander Laan, Corrie	Vanderford, Betty W.
Vander Laan, Henry	Vanderford, Claud R.
Vander Laan, James	Vanderham, Adrian

Vanderham, Cornelius	Vestal, J. Howard
Vanderham, Cornelius P.	Visser, Gerrit
Vanderham, Cory	Visser, Grace
Vanderham, E. Jane	Visser, Henry
Vanderham, Marian	Visser, Jess
Vanderham, Martin	Visser, Louie
Vanderham, Pete C.	Visser, Neil
Vanderham, Wilma	Visser, Sam
Vasquez, Eleanor	Visser, Stanley
Veenendaal, Evert	Visser, Tony D.
Veenendaal, John H.	Visser, Walter G.
Veiga, Dominick Sr.	Von Der Ahe, Fredric T.
Verbree, Jack	Von Euw, George
Verbree, Tillie	Von Euw, Marjorie
Verger, Bert	Von Lusk, a limited partnership
Verger, Betty	Voortman, Anna Marie
Verhoeven, Leona	Voortman, Edward
Verhoeven, Martin	Voortman, Edwin J.
Verhoeven, Wesley	Voortman, Gertrude Dena
Vermeer, Dick	Wagner, Richard H.
Vermeer, Jantina	Walker, Carole R.
Vernola Ranch	Walker, Donald E.
Vernola, Anthonietta	Walker, Wallace W.
Vernola, Anthony	Wardle, Donald M.
Vernola, Frank	Warner, Dillon B.
Vernola, Mary Ann	Warner, Minnie
Vernola, Pat F.	Wassenaar, Peter W.
Vestal, Frances Lorraine	Waters, Michael

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Weeda, Adriana
Weeda, Daniel
Weeks, O. L.
Weeks, Verona E.
Weidman, Maurice
Weidman, Virginia
Weiland, Adaline I.
Weiland, Peter J.
Wesselink, Jules
West, Katharine R.
West, Russel
West, Sharon Ann
Western Horse Property
Westra, Alice
Westra, Henry
Westra, Hilda
Westra, Jake J.
Weststeyn, Freida
Weststeyn, Pete
Whitehurst, Louis G.
Whitehurst, Pearl L.
Whitmore, David L.
Whitmore, Mary A.
Whitney, Adolph M.
Wiersema, Harm
Wiersema, Harry
Wiersma, Ellen H.
Wiersma, Gladys J.
Wiersma, Jake
Wiersma, Otto
Wiersma, Pete
Winchell, Verne H., Trustee
Wind, Frank
Wind, Fred
Wind, Hilda
Wind, Johanna
Woo, Frank
Woo, Sem Gee
Wybenga, Clarence
Wybenga, Gus
Wybenga, Gus K.
Wybenga, Sylvia
Wynja, Andy
Wynja, Iona F.
Yellis, Mildred
Yellis, Thomas E.
Ykema-Harmsen Dairy
Ykema, Floris
Ykema, Harriet
Yokley, Betty Jo
Yokley, Darrell A.
Zak, Zan
Zivelonghi, George
Zivelonghi, Margaret
Zwaagstra, Jake
Zwaagstra, Jessie M.
Zwart, Case

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NON-PRODUCER WATER DISTRICTS

Chino Basin Municipal Water District

Chino Basin Water Conservation District

Pomona Valley Municipal Water District

Western Municipal Water District of Riverside County

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DEFAULTING OVERLYING AGRICULTURAL PRODUCERS

Cheryl L. Bain	Roy W. Lantis
Warren Bain	Sharon I. Lantis
John M. Barcelona	Frank Lorenz
Letty Bassler	Dagney H. MacDonald
John Brazil	Frank E. Martin
John S. Briano	Ruth C. Martin
Lupe Briano	Connie S. Mello
Paul A. Briano	Naldiro J. Mello
Tillie Briano	Felice Miller
Arnie B. Carlson	Ted Miller
John Henry Fikse	Masao Nerio
Phyllis S. Fikse	Tom K. Nerio
Lewellyn Flory	Toyo Nerio
Mary I. Flory	Yuriko Nerio
L. H. Glazer	Harold L. Rees
Dorothy Goodman	Alden G. Rose
Sidney D. Goodman	Claude Rouleau, Jr.
Frank Grossi	Patricia M. Rouleau
Harada Brothers	Schultz Enterprises
Ellen Hettinga	Albert Shaw
Hein Hettinga	Lila Shaw
Dick Hofstra, Jr.	Cathy M. Stewart
Benjamin M. Hughey	Marvin C. Stewart
Frieda L. Hughey	Betty Ann Stone
Guillaume Indart	John B. Stone
Ellwood B. Johnston, Trustee	Vantoll Cattle Co., Inc.
Perry Kruckenberg, Jr.	Catherene Verburg

Martin Verburg

Donna Vincent

Larry Vincent

Cliff Wolfe & Associates

Ada M. Woll

Zarubica Co.

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EXHIBIT "D"

OVERLYING NON-AGRICULTURAL RIGHTS

Party	Total Overlying Non-Agricultural Rights (Acre Feet)	Share of Safe Yield (Acre Feet)
Ameron Steel Producers, Inc.	125	97.858
County of San Bernardino	171	133.870
Conrock Company	406	317.844
Kaiser Steel Corporation	3,743	2,930.274
Red Star Fertilizer	20	15.657
Southern California Edison Co.	1,255	982.499
Space Center, Mira Loma	133	104.121
Southern Service Co., dba Blue Seal Linen	24	18.789
Sunkist, Orange Products Division	2,393	1,873.402
Carlsberg Mobile Home Properties, Ltd. '73	593	464.240
Union Carbide Corporation	546	427.446
Quaker Chemical Co.	0	0
Totals	9,409	7,366.000

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EXHIBIT "E"
APPROPRIATIVE RIGHTS

Party	Appropriative Right (Acre Feet)	Share of Initial Operating Safe Yield (Acre Feet)	Share of Operating Safe Yield (Percent)
City of Chino	5,271.7	3,670.067	6.693
City of Norco	289.5	201.545	0.368
City of Ontario	16,337.4	11,373.816	20.742
City of Pomona	16,110.5	11,215.852	20.454
City of Upland	4,097.2	2,852.401	5.202
Cucamonga County Water District	4,431.0	3,084.786	5.626
Jurupa Community Services District	1,104.1	768.655	1.402
Monte Vista County Water District	5,958.7	4,148.344	7.565
West San Bernardino County Water District	925.5	644.317	1.175
Etiwanda Water Company	768.0	534.668	0.975
Felspar Gardens Mutual Water Company	68.3	47.549	0.087
Fontana Union Water Co.	9,188.3	6,396.736	11.666
Marygold Mutual Water Co.	941.3	655.317	1.195
Mira Loma Water Co.	1,116.0	776.940	1.417
Monta Vista Irr. Co.	972.1	676.759	1.234
Mutual Water Company of Glen Avon Heights	672.2	467.974	0.853
Park Water Company	236.1	164.369	0.300
Pomona Valley Water Co.	3,106.3	2,162.553	3.944
San Antonio Water Co.	2,164.5	1,506.888	2.748
Santa Ana River Water Company	1,869.3	1,301.374	2.373
Southern California Water Company	1,774.5	1,235.376	2.253
West End Consolidated Water Company	1,361.3	947.714	1.728
TOTAL	78,763.8	54,834.000	100.000

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EXHIBIT "F"
OVERLYING (AGRICULTURAL) POOL
POOLING PLAN

1. Membership in Pool. The State of California and all producers listed in Exhibit "C" shall be the initial members of this pool, which shall include all producers of water for overlying uses other than industrial or commercial purposes.

2. Pool Meetings. The members of the pool shall meet annually, in person or by proxy, at a place and time to be designated by Watermaster for purposes of electing members of the Pool Committee and conducting any other business of the pool. Special meetings of the membership of the pool may be called and held as provided in the rules of the pool.

3. Voting. All voting at meetings of pool members shall be on the basis of one vote for each 100 acre feet or any portion thereof of production from Chino Basin during the preceding year, as shown by the records of Watermaster.

4. Pool Committee. The Pool Committee for this pool shall consist of not less than nine (9) representatives selected at large by members of the pool. The exact number of members of the Pool Committee in any year shall be as determined by majority vote of the voting power of members of the pool in attendance at the annual pool meeting. Each member of the Pool Committee shall have one vote and shall serve for a two-year term. The members first elected shall classify themselves by lot so that approximately one-half serve an initial one-year term. Vacancies during any term shall be filled by a majority of the remaining members of the Pool Committee.

5. Advisory Committee Representatives. The number of

representatives of the Pool Committee on the Advisory Committee shall be as provided in the rules of the pool from time to time but not exceeding ten (10). The voting power of the pool on the Advisory Committee shall be apportioned and exercised as determined from time to time by the Pool Committee.

6. Replenishment Obligation. The pool shall provide funds for replenishment of any production by persons other than members of the Overlying (Non-agricultural) Pool or Appropriator Pool, in excess of the pool's share of Safe Yield. During the first five (5) years of operations of the Physical Solution, reasonable efforts shall be made by the Pool Committee to equalize annual assessments.

7. Assessments. All assessments in this pool (whether for replenishment water cost or for pool administration or the allocated share of Watermaster administration) shall be in an amount uniformly applicable to all production in the pool during the preceding year or calendar quarter. Provided, however, that the Agricultural Pool Committee, may recommend to the Court modification of the method of assessing pool members, inter se, if the same is necessary to attain legitimate basin management objectives, including water conservation and avoidance of undesirable socio-economic consequences. Any such modification shall be initiated and ratified by one of the following methods:

(a) Excess Production. In the event total pool production exceeds 100,000 acre feet in any year, the Pool Committee shall call and hold a meeting, after notice to all pool members, to consider remedial modification of the assessment formula.

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(b) Producer Petition. At any time after the fifth full year of operation under the Physical Solution, a petition by ten percent (10%) of the voting power or membership of the Pool shall compel the holding of a noticed meeting to consider revision of said formula of assessment for replenishment water.

In either event, a majority action of the voting power in attendance at such pool members' meeting shall be binding on the Pool Committee.

8. Rules. The Pool Committee shall adopt rules for conducting meetings and affairs of the committee and for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "G"
OVERLYING (NON-AGRICULTURAL) POOL
POOLING PLAN

1. Membership in Pool. The initial members of the pool, together with the decreed share of the Safe Yield of each, are listed in Exhibit "D". Said pool includes producers of water for overlying industrial or commercial (non-agricultural) purposes, or such producers within the Pool who may hereafter take water pursuant to Paragraph 8 hereof.

2. Pool Committee. The Pool Committee for this pool shall consist of one representative designated by each member of the pool. Voting on the committee shall be on the basis of one vote for each member, unless a volume vote is demanded, in which case votes shall be allocated as follows:

The volume voting power on the Pool Committee shall be 1,484 votes. Of these, 742 votes shall be allocated on the basis of one vote for each ten (10) acre feet or fraction thereof of decreed shares in Safe Yield. (See Exhibit "D".) The remaining 742 votes shall be allocated proportionally on the basis of assessments paid to Watermaster during the preceding year.*

3. Advisory Committee Representatives. At least three (3) members of the Pool Committee shall be designated by said committee to serve on the Advisory Committee. The exact number of such representatives at any time shall be as determined by the Pool Committee. The voting power of the pool shall be exercised in the

*Or production assessments paid under Water Code Section 72140 et seq., as to years prior to the second year of operation under the Physical Solution hereunder.

Advisory Committee as a unit, based upon the vote of a majority of said representatives.

4. Replenishment Obligation. The pool shall provide funds for replenishment of any production in excess of the pool's share of Safe Yield in the preceding year.

5. Assessment. Each member of this pool shall pay an assessment equal to the cost of replenishment water times the number of acre feet of production by such producer during the preceding year in excess of (a) his decreed share of the Safe Yield, plus (b) any carry-over credit under Paragraph 7 hereof. In addition, the cost of the allocated share of Watermaster administration expense shall be recovered on an equal assessment against each acre foot of production in the pool during such preceding fiscal year or calendar quarter; and in the case of Pool members who take substitute ground water as set forth in Paragraph 8 hereof, such producer shall be liable for its share of administration assessment, as if the water so taken were produced, up to the limit of its decreed share of Safe Yield.

6. Assignment. Rights herein decreed are appurtenant to the land and are only assignable with the land for overlying use thereon; provided, however, that any appropriator who may, directly or indirectly, undertake to provide water service to such overlying lands may, by an appropriate agency agreement on a form approved by Watermaster, exercise said overlying right to the extent, but only to the extent necessary to provide water service to said overlying lands.

7. Carry-over. Any member of the pool who produces less than its assigned water share of Safe Yield may carry such unexercised

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right forward for exercise in subsequent years. The first water produced during any such subsequent year shall be deemed to be an exercise of such carry-over right. In the event the aggregate carry-over by any pool member exceeds its share of Safe Yield, such member shall, as a condition of preserving such surplus carry-over, execute a storage agreement with Watermaster.

8. Substitute Supplies. To the extent that any Pool member, at the request of Watermaster and with the consent of the Advisory Committee, takes substitute surface water in lieu of producing ground water otherwise subject to production as an allocated share of Safe Yield, said party shall nonetheless remain a member of this Pool.

9. Rules. The Pool Committee shall adopt rules for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "H"
APPROPRIATIVE POOL
POOLING PLAN

1. Qualification for Pool. Any city, district or other public entity and public utility -- either regulated under Public Utilities Commission jurisdiction, or exempt therefrom as a non-profit mutual water company (other than those assigned to the Overlying [Agricultural] Pool) -- shall be a member of this pool. All initial members of the pool are listed in Exhibit "E", together with their respective appropriative rights and acre foot allocation and percentage shares of the initial and subsequent Operating Safe Yield.

2. Pool Committee. The Pool Committee shall consist of one (1) representative appointed by each member of the Pool.

3. Voting. The total voting power on the Pool Committee shall be 1,000 votes. Of these, 500 votes shall be allocated in proportion to decreed percentage shares in Operating Safe Yield. The remaining 500 votes shall be allocated proportionally on the basis of assessments paid to Watermaster during the preceding year.* Routine business of the Pool Committee may be conducted on the basis of one vote per member, but upon demand of any member a weighted vote shall be taken. Affirmative action of the Committee shall require a majority of the voting power of members in attendance, provided that it includes concurrence by at least one-third of its total members.

4. Advisory Committee Representatives. Ten (10) members of

*Or production assessments paid under Water Code Section 72140 et seq., as to years prior to the second year of operation under the Physical Solution hereunder.

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the Pool Committee shall be designated to represent this pool on the Advisory Committee. Each major appropriator, i.e., the owner of an adjudicated appropriative right in excess of 3,000 acre feet, shall be entitled to one representative. The remaining members representing the Appropriative Pool on the Advisory Committee shall be elected at large by the remaining members of the pool. The voting power of the Appropriative Pool on the Advisory Committee shall be apportioned between the major appropriator representatives in proportion to their respective voting power in the Pool Committee. The remaining two representatives shall exercise equally the voting power proportional to the Pool Committee voting power of all remaining appropriators; provided, however, that if any representative fails to attend an Advisory Committee meeting, the voting power of that representative shall be allocated among the representatives of the Appropriator Pool in attendance in the same proportion as their own respective voting powers.

5. Replenishment Obligation. The pool shall provide funds for purchase of replenishment water to replace any production by the pool in excess of Operating Safe Yield during the preceding year.

6. Administrative Assessment. Costs of administration of this pool and its share of general Watermaster expense shall be recovered by a uniform assessment applicable to all production during the preceding year.

7. Replenishment Assessment. The cost of replenishment water required to replace production from Chino Basin in excess of Operating Safe Yield in the preceding year shall be allocated and recovered as follows:

(a) For production, other than for increased export, within CBMWD or WMWD:

(1) Gross Assessment. 15% of such replenishment water costs shall be recovered by a uniform assessment against all production of each appropriator producing in said area during the preceding year.

(2) Net Assessment. The remaining 85% of said costs shall be recovered by a uniform assessment on each acre foot of production from said area by each such appropriator in excess of his allocated share of Operating Safe Yield during said preceding year.

(b) For production which is exported for use outside Chino Basin in excess of maximum export in any year through 1976, such increased export production shall be assessed against the exporting appropriator in an amount sufficient to purchase replenishment water from CBMWD or WMWD in the amount of such excess.

(c) For production within SBVMWD or PVMWD:

By an assessment on all production in excess of an appropriator's share of Operating Safe Yield in an amount sufficient to purchase replenishment water through SBVMWD or MWD in the amount of such excess.

8. Socio-Economic Impact Review. The parties have conducted certain preliminary socio-economic impact studies. Further and more detailed socio-economic impact studies of the assessment formula and its possible modification shall be undertaken for the Appropriator Pool by Watermaster no later than ten (10) years from the effective date of this Physical Solution, or whenever total

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production by this pool has increased by 30% or more over the decreed appropriative rights, whichever is first.

9. Facilities Equity Assessment. Watermaster may, upon recommendation of the Pool Committee, institute proceedings for levy and collection of a Facilities Equity Assessment for the purposes and in accordance with the procedures which follow:

(a) Implementing Circumstances. There exist several sources of supplemental water available to Chino Basin, each of which has a differential cost and quantity available. The optimum management of the entire Chino Basin water resource favors the maximum use of the lowest cost supplemental water to balance the supplies of the Basin, in accordance with the Physical Solution. The varying sources of supplemental water include importations from MWD and SBVMWD, importation of surface and ground water supplies from other basins in the immediate vicinity of Chino Basin, and utilization of reclaimed water. In order to fully utilize any of such alternate sources of supply, it will be essential for particular appropriators having access to one or more of such supplies to have invested, or in the future to invest, directly or indirectly, substantial funds in facilities to obtain and deliver such water to an appropriate point of use. To the extent that the use of less expensive alternate sources of supplemental water can be maximized by the inducement of a Facilities Equity Assessment, as herein provided, it is to the long-term benefit of the entire basin that such assessment be authorized and levied by Watermaster.

(b) Study and Report. At the request of the Pool

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Committee, Watermaster shall undertake a survey study of the utilization of alternate supplemental supplies by members of the Appropriative Pool which would not otherwise be utilized and shall prepare a report setting forth the amount of such alternative supplies being currently utilized, the amount of such supplies which could be generated by activity within the pool, and the level of cost required to increase such uses and to optimize the total supplies available to the basin. Said report shall contain an analysis and recommendation for the levy of a necessary Facilities Equity Assessment to accomplish said purpose.

(c) Hearing. If the said report by Watermaster contains a recommendation for imposition of a Facilities Equity Assessment, and the Pool Committee so requests, Watermaster shall notice and hold a hearing not less than 60 days after distribution of a copy of said report to each member of the pool, together with a notice of the hearing date. At such hearing, evidence shall be taken with regard to the necessity and propriety of the levy of a Facilities Equity Assessment and full findings and decision shall be issued by Watermaster.

(d) Operation of Assessment. If Watermaster determines that it is appropriate that a Facilities Equity Assessment be levied in a particular year, the amount of additional supplemental supplies which should be generated by such assessment shall be estimated. The cost of obtaining such supplies, taking into consideration the investment in necessary facilities shall then be determined and spread equitably among the producers within the pool in a manner so that those

producers not providing such additional lower cost supplemental water, and to whom a financial benefit will result, may bear a proportionate share of said costs, not exceeding said benefit; provided that any producer furnishing such supplemental water shall not thereby have its average cost of water in such year reduced below such producer's average cost of pumping from the Basin. In so doing, Watermaster shall establish a percentage of the total production by each party which may be produced without imposition of a Facilities Equity Assessment. Any member of the pool producing more water than said percentage shall pay such Facilities Equity Assessment on any such excess production. Watermaster is authorized to transmit and pay the proceeds of such Facilities Equity Assessment to those producers who take less than their share of Basin water by reason of furnishing a higher percentage of their requirements through use of supplemental water.

10. Unallocated Safe Yield Water. To the extent that, in any five years, any portion of the share of Safe Yield allocated to the Overlying (Agricultural) Pool is not produced, such water shall be available for reallocation to members of the Appropriative Pool, as follows:

(a) Priorities. Such allocation shall be made in the following sequence:

(1) to supplement, in the particular year, water available from Operating Safe Yield to compensate for any reduction in the Safe Yield by reason of recalculation thereof after the tenth year of operation hereunder.

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(2) pursuant to conversion claims as defined in Subparagraph (b) hereof.

(3) as a supplement to Operating Safe Yield, without regard to reductions in Safe Yield.

(b) Conversion Claims. The following procedures may be utilized by any appropriator:

(1) Record of Land Use Conversion. Any appropriator who undertakes, directly or indirectly, during any year, to permanently provide water service to lands which during the immediate preceding five (5) consecutive years was devoted to irrigated agriculture may report such change in land use or water service to Watermaster. Watermaster shall thereupon verify such change in water service and shall maintain a record and account for each appropriator of the total acreage involved and the average annual water use during said five-year period.

(2) Establishment of Allocation Percentage. In any year in which unallocated Safe Yield water from the Overlying (Agricultural) Pool is available for such conversion claims, Watermaster shall establish allocable percentages for each appropriator based upon the total of such converted acreage recorded to each such appropriator's account.

(3) Allocation and Notice. Watermaster shall thereafter apply the allocated percentage to the total unallocated Safe Yield water available for special allocation to derive the amount thereof allocable to

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each appropriator; provided that in no event shall the allocation to any appropriator as a result of such conversion claim exceed 50% of the average annual amount of water actually applied to the areas converted by such appropriator prior to such conversion. Any excess water by reason of such limitation on any appropriator's right shall be added to Operating Safe Yield. Notice of such special allocation shall be given to each appropriator and shall be treated for purposes of this Physical Solution as an addition to such appropriator's share of the Operating Safe Yield for the particular year only.

(4) Administrative Costs. Any costs of Watermaster attributable to administration of such special allocations and conversion claims shall be assessed against appropriators participating in such reporting.

11. In Lieu Procedures. There are, or may develop, certain areas within Chino Basin where good management practices dictate that recharge of the basin be accomplished, to the extent practical, by taking surface supplies of supplemental water in lieu of ground water otherwise subject to production as an allocated share of Operating Safe Yield.

(a) Method of Operation. Any appropriator producing water within such designated in lieu area who is willing to abstain for any reason from producing any portion of such producer's share of Operating Safe Yield in any year may offer such unpumped water to Watermaster. In such event, Watermaster shall purchase said water in place, in lieu of spreading replenishment water, which is otherwise required to

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make up for over production. The purchase price for in lieu water shall be the lesser of:

(1) Watermaster's current cost of replenishment water, whether or not replenishment water is currently then obtainable, plus the cost of spreading; or

(2) The cost of supplemental surface supplies to the appropriator, less

a. said appropriator's average cost of ground water production, and

b. the applicable production assessment were the water produced.

Where supplemental surface supplies consist of MWD or SBVMWD supplies, the cost of treated, filtered State water from such source shall be deemed the cost of supplemental surface supplies to the appropriator for purposes of such calculation.

In any given year in which payments may be made pursuant to a Facilities Equity Assessment, as to any given quantity of water the party will be entitled to payment under this section or pursuant to the Facilities Equity Assessment, as the party elects, but not under both.

(b) Designation of In Lieu Areas. The first in lieu area is designated as the "In Lieu Area No. 1" and consists of an area wherein nitrate levels in the ground water generally exceed 45 mg/l, and is shown on Exhibit "J" hereto. Other in lieu areas may be designated by subsequent order of Watermaster upon recommendation or approval by Advisory Committee. Said in lieu areas may be enlarged, reduced or

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eliminated by subsequent orders; provided, however, that designation of In Lieu Areas shall be for a minimum fixed term sufficient to justify necessary capital investment. In Lieu Area No. 1 may be enlarged, reduced or eliminated in the same manner, except that any reduction of its original size or elimination thereof shall require the prior order of Court.

12. Carry-over. Any appropriator who produces less than his assigned share of Operating Safe Yield may carry such unexercised right forward for exercise in subsequent years. The first water produced during any such subsequent year shall be deemed to be an exercise of such carry-over right. In the event the aggregate carry-over by any appropriator exceeds its share of Operating Safe Yield, such appropriator shall, as a condition of preserving such surplus carry-over, execute a storage agreement with Watermaster. Such appropriator shall have the option to pay the gross assessment applicable to such carry-over in the year in which it accrued.

13. Assignment, Transfer and Lease. Appropriative rights, and corresponding shares of Operating Safe Yield, may be assigned or may be leased or licensed to another appropriator for exercise in a given year. Any transfer, lease or license shall be ineffective until written notice thereof is furnished to and approved as to form by Watermaster, in compliance with applicable Watermaster rules. Watermaster shall not approve transfer, lease or license of a right for exercise in an area or under conditions where such production would be contrary to sound basin management or detrimental to the rights or operations of other producers.

14. Rules. The Pool Committee shall adopt rules for

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administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

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EXHIBIT "I"

ENGINEERING APPENDIX

1. Basin Management Parameters. In the process of implementing the physical solution for Chino Basin, Watermaster shall consider the following parameters:

(a) Pumping Patterns. Chino Basin is a common supply for all persons and agencies utilizing its waters. It is an objective in management of the Basin's waters that no producer be deprived of access to said waters by reason of unreasonable pumping patterns, nor by regional or localized recharge of replenishment water, insofar as such result may be practically avoided.

(b) Water Quality. Maintenance and improvement of water quality is a prime consideration and function of management decisions by Watermaster.

(c) Economic Considerations. Financial feasibility, ecnomic impact and the cost and optimum utilization of the Basin's resources and the physical facilities of the parties are objectives and concerns equal in importance to water quantity and quality parameters.

2. Operating Safe Yield. Operating Safe Yield in any year shall consist of the Appropriative Pool's share of Safe Yield of the Basin, plus any controlled overdraft of the Basin which Watermaster may authorize. In adopting the Operating Safe Yield for any year, Watermaster shall be limited as follows:

(a) Accumulated Overdraft. During the operation of this Judgment and Physical Solution, the overdraft accumulated from and after the effective date of the Physical

Solution and resulting from an excess of Operating Safe Yield over Safe Yield shall not exceed 200,000 acre feet.

(b) Quantitative Limits. In no event shall Operating Safe Yield in any year be less than the Appropriative Pool's share of Safe Yield, nor shall it exceed such share of Safe Yield by more than 10,000 acre feet. The initial Operating Safe Yield is hereby set at 54,834 acre feet per year. Operating Safe Yield shall not be changed upon less than five (5) years' notice by Watermaster.

Nothing contained in this paragraph shall be deemed to authorize, directly or indirectly, any modification of the allocation of shares in Safe Yield to the overlying pools, as set forth in Paragraph 44 of the Judgment.

3. Ground Water Storage Agreements. Any agreements authorized by Watermaster for storage of supplemental water in the available ground water storage capacity of Chino Basin shall include, but not be limited to:

(a) The quantities and term of the storage right.

(b) A statement of the priority or relation of said right, as against overlying or Safe Yield uses, and other storage rights.

(c) The procedure for establishing delivery rates, schedules and procedures which may include

[1] spreading or injection, or

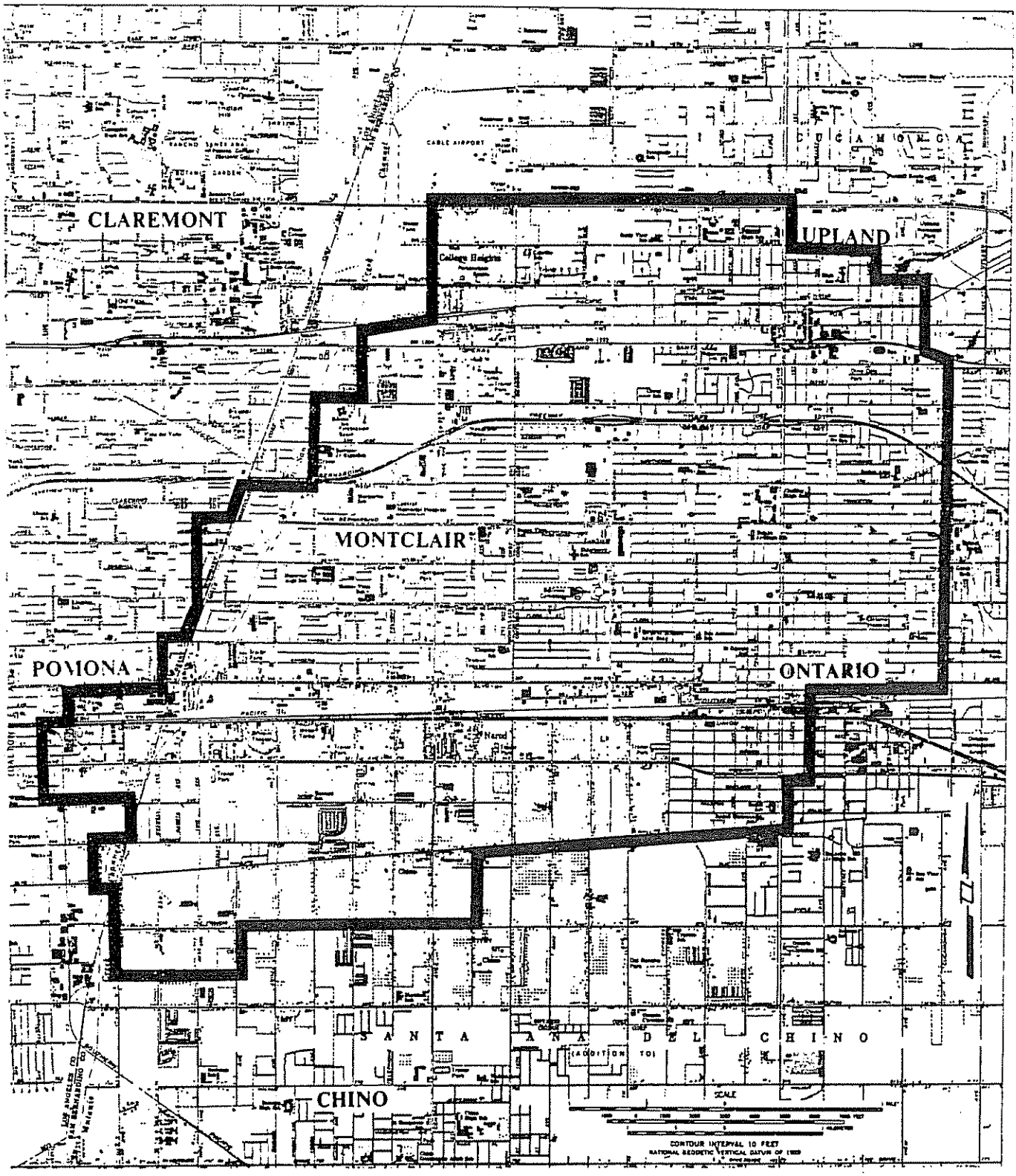
[2] in lieu deliveries of supplemental water for direct use.

(d) The procedures for calculation of losses and annual accounting for water in storage by Watermaster.

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(e) The procedures for establishment and administration of withdrawal schedules, locations and methods.

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CHINO BASIN

IN LIEU AREA NO. 1

EXHIBIT "J"

LEGAL DESCRIPTION

OF CHINO BASIN

Preamble

All of the townships and ranges referred to in the following legal description are the San Bernardino Base and Meridian. Certain designated sections are implied as the System of Government Surveys may be extended where not established. Said sections are identified as follows:

Section 20, T1N, R8W is extended across Rancho Cucamonga;

Section 36, T1N, R8W is extended across the City of Upland;

Sections 2, 3, and 4, T1S, R7W are extended across Rancho Cucamonga;

Section 10, T1S, R8W is extended across the City of Claremont;

Sections 19, 20, 21, 30, 31 and 32, T1S, R8W are extended across the City of Pomona;

Sections 4, 5, and 28, T2S, R8W are extended across Rancho Santa Ana Del Chino;

Sections 15 and 16, T3S, R7W are extended across Rancho La Sierra; and

Sections 17 and 20, T3S, R7W are extended across Rancho El Rincon.

Description

Chino Basin is included within portions of the Counties of San Bernardino, Riverside and Los Angeles, State of California, bounded by a continuous line described as follows:

BEGINNING at the Southwest corner of Lot 241 as shown on Map of Ontario Colony Lands, recorded in Map Book 11, page 6, Office of the County Recorder of San Bernardino County, said corner being the Point of Beginning;

1. Thence Southeasterly to the Southeast corner

of Lot 419 of said Ontario Colony Lands;

2. Thence Southeasterly to a point 1300 feet North of the South line and 1300 feet East of the West line of Section 4, T1S, R7W;

3. Thence Easterly to a point on the East line of Section 4, 1800 feet North of the Southeast corner of said Section 4;

4. Thence Easterly to the Southeast corner of the Southwest quarter of the Northeast quarter of Section 3, T1S, R7W;

5. Thence Northeasterly to a point on the North line of Section 2, T1S, R7W, 1400 feet East of the West line of said Section 2;

6. Thence Northeasterly to the Southwest corner of Section 18, T1N, R6W;

7. Thence Northerly to the Northwest corner of said Section 18;

8. Thence Easterly to the Northeast corner of said Section 18;

9. Thence Northerly to the Northwest corner of the Southwest quarter of Section 8, T1N, R6W;

10. Thence Easterly to the Northeast corner of said Southwest quarter of said Section 8;

11. Thence Southerly to the Southeast corner of said Southwest quarter of said Section 8;

12. Thence Easterly to the Northeast corner of Section 17, T1N, R6W;

13. Thence Easterly to the Northeast corner of Section 16, T1N, R6W;

14. Thence Southeasterly to the Northwest corner of the Southeast quarter of Section 15, T1N, R6W;

15. Thence Easterly to the Northeast corner of said Southeast quarter of said Section 15;

16. Thence Southeasterly to the Northwest corner of the Northeast quarter of Section 23, T1N, R6W;

17. Thence Southeasterly to the Northwest corner

of Section 25, T1N, R6W;

18. Thence Southeasterly to the Northwest corner of the Northeast quarter of Section 31, T1N, R5W;

19. Thence Southeasterly to the Northeast corner of the Northwest quarter of Section 5, T1S, R5W;

20. Thence Southeasterly to the Southeast corner of Section 4, T1S, R5W;

21. Thence Southeasterly to the Southeast corner of the Southwest quarter of Section 11, T1S, R5W;

22. Thence Southwesterly to the Southwest corner of Section 14, T1S, R5W;

23. Thence Southwest to the Southwest corner of Section 22, T1S, R5W;

24. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 6, T2S, R5W;

25. Thence Southeasterly to the Northeast corner of Section 18 T2S, R5W;

26. Thence Southwesterly to the Southwest corner of the Southeast quarter of Section 13, T2S, R6W;

27. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 26, T2S, R6W;

28. Thence Westerly to the Southwest corner of the Northwest quarter of said Section 26;

29. Thence Northerly to the Northwest corner of said Section 26;

30. Thence Westerly to the Southwest corner of Section 21, T2S, R6w:

31. Thence Southerly to the Southeast corner of Section 29, T2S, R6W;

32. Thence Westerly to the Southeast corner of Section 30, T2S, R6W;

33. Thence Southwesterly to the Southwest corner of Section 36, T 2 S, R 7 W;

34. Thence Southwesterly to the Southeast corner

of Section 3, T3S, R7W;

35. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 10, T3S, R7W;

36. Thence Southerly to the Northeast corner of the Northwest quarter of Section 15, T3S, R7W;

37. Thence Southwesterly to the Southeast corner of the Northeast quarter of Section 16, T3S, R7W;

38. Thence Southwesterly to the Southwest corner of said Section 16;

39. Thence Southwesterly to the Southwest corner of the Northeast quarter of Section 20, T3S, R7W;

40. Thence Westerly to the Southwest corner of the Northwest quarter of said Section 20;

41. Thence Northerly to the Northwest corner of Section 17, T3S, R7W;

42. Thence Westerly to the Southwest corner of Section 7, T3S, R7W;

43. Thence Northerly to the Southwest corner of Section 6, T3S, R7W;

44. Thence Westerly to the Southwest corner of Section 1, T3S, R8W;

45. Thence Northerly to the Southeast corner of Section 35, T2S, R8W;

46. Thence Northwesterly to the Northwest corner of said Section 35;

47. Thence Northerly to the Southeast corner of Lot 33, as shown on Map of Tract 3193, recorded in Map Book 43, pages 46 and 47, Office of the County Recorder of San Bernardino County;

48. Thence Westerly to the Northwest corner of the Southwest quarter of Section 28, T2S, R8W;

49. Thence Northerly to the Southwest corner of Section 4, T2S, R8W;

50. Thence Westerly to the Southwest corner of Section 5, T2S, R8W;

51. Thence Northerly to the Southwest corner of Section 32, T1S, R8W;

52. Thence Westerly to the Southwest corner of Section 31, T1S, R8W;

53. Thence Northerly to the Southwest corner of Section 30, T1S, R8W;

54. Thence Northeasterly to the Southwest corner of Section 20, T1S, R8W;

55. Thence Northerly to the Northwest corner of the Southwest quarter of the Southwest quarter of said Section 20;

56. Thence Northwesterly to the Northeast corner of the Southeast quarter of the Southeast quarter of the Northwest quarter of Section 19, T1S, R8W;

57. Thence Easterly to the Northwest corner of Section 21, T1S, R8W;

58. Thence Northeasterly to the Southeast corner of the Southwest quarter of the Southwest quarter of Section 10, T1S, R8W;

59. Thence Northeasterly to the Southwest corner of Section 2, T1S, R8W;

60. Thence Northeasterly to the Southeast corner of the Northwest quarter of the Northwest quarter of Section 1, T1S, R8W;

61. Thence Northerly to the Northeast corner of the Northwest quarter of the Northeast quarter of Section 36, T1N, R8W;

62. Thence Northerly to the Southeast corner of Section 24, T1N, R8W;

63. Thence Northeasterly to the Southeast corner of the Northwest quarter of the Northwest quarter of Section 20, T1N, R7W; and

64. Thence Southerly to the Point of Beginning.

Sections Included

Said perimeter description includes all or portions of the following Townships, Ranges and Sections of San Bernardino Base and Meridian:

T1N, R5W - Sections: 30, 31 and 32

T1N, R6W - Sections: 8, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36

T1N, R7W - Sections: 19, 20, 24, 25, 26, 29, 30, 31, 32, 35 and 36

T1N, R8W - Sections: 25 and 36

T1S, R5W - Sections: 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 31 and 32.

T1S, R6W - Sections: 1 through 36, inclusive

T1S, R7W - Sections: 1 through 36, inclusive

T1S, R8W - Sections: 1, 2, 10, 11, 12, 13, 14, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36

T2S, R5W - Sections: 6, 7 and 18

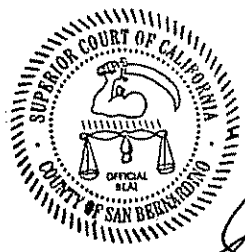
T2S, R6W - Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 29, 30 and 31

T2S, R7W - Sections: 1 through 36, inclusive

T2S, R8W - Sections: 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 35 and 36

T3S, R7W - Sections: 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17 and 20

T3S, R8W - Section: 1.



THE DOCUMENT TO WHICH THIS CERTIFICATION IS ATTACHED IS A FULL, TRUE AND CORRECT COPY OF THE ORIGINAL ON FILE AND OF RECORD IN MY OFFICE.

ATTEST OCT 2 9 2002

Clerk of the Superior Court of the State of California, in and for the County of San Bernardino

By _____ Deputy

Terry Wittenborn

92 pages

APPENDIX J

MARCH 2009 COURT ORDER

FILED
SUPERIOR COURT OF CALIFORNIA
COUNTY OF SAN BERNARDINO
SAN BERNARDINO CIVIL DIVISION
MAR 15 2019
BY ACHLEE LAVLESS, DEPUTY

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF SAN BERNARDINO

CHINO BASIN MUNICIPAL WATER DISTRICT,

Plaintiff,

v.

CITY OF CHINO et al.,

Defendant.

Case No. RCV RS51010

Assigned for All Purposes to the Honorable Stanford E. Reichert

~~[PROPOSED]~~ **FINDINGS AND ORDER REGARDING AMENDMENTS TO RESTATED JUDGMENT, PEACE AGREEMENT, PEACE II AGREEMENT, AND RE-OPERATION SCHEDULE**

The Court having read, reviewed, and considered all pleadings, declarations, and exhibits presented for the March 15, 2019 hearing, and the arguments of counsel, if any, the Court finds as follows:

(1) Watermaster is in substantial compliance with the approved Recharge Master Plan as required by Restated Judgment Exhibit "I", paragraph 2(b)(6), and the amended schedule set forth in Exhibit "B" to Watermaster's Resolution 2019-03 providing the quantities of Re-Operation Water that may be accessed by the Parties will not cause material physical injury to the Basin.

(2) The signatories to the Peace Agreement and the Peace II Agreement have been notified of Watermaster's Motion Regarding Amendments to Restated Judgment, Peace Agreement, Peace II agreement, and Re-Operation Schedule and have consented to the proposed

amendments to the Peace Agreement and Peace II Agreement set forth in Watermaster's Resolution 2019-03;

(3) The proposed amendments to the Court Approved Management Agreements are implementable by Watermaster provided that it can proceed to redetermine Safe Yield on a timely basis as provided on pages 15-18 of this Court's April 28, 2017 Order.

SUBJECT TO THE CONTINUING JURISDICTION OF THE COURT, the Court hereby makes the following Orders:

(1) Watermaster's adoption of its Resolution 2019-03 is approved and Watermaster shall proceed in accordance with the Resolution and the documents attached thereto;

(2) Watermaster shall proceed to redetermine Safe Yield as set forth on pages 15-18 of the Court's April 28, 2017 Order;

(3) The amendment to Paragraph 10 of Exhibit "H" to the Restated Judgment as shown in Attachment A hereto is approved;

(4) The amended schedule for access to Re-Operation water shown in Attachment B hereto is approved;

(5) The amendments to Paragraphs 6, 9, and 10 of Exhibit "G" to the Restated Judgment as shown in Attachment C hereto are approved; and

(6) Watermaster shall implement the Restated Judgment and continue to comply with all commitments made in the Court Approved Management Agreements, as amended by this Order.

IT IS SO ORDERED.

Dated: 3-15-19

STANFORD E. REICHERT
JUDGE OF THE SUPERIOR COURT

18540473

ATTACHMENT A
[PROPOSED] ORDER

Exhibit A

Proposed Changes to Appropriative Pool Pooling Plan and CAMA

1. **Appropriative Pool Pooling Plan.** The introductory sentence to Exhibit H, ¶10 of the Judgment is amended to read as follows:

> 10. Unallocated Safe Yield Water. To the extent that, in any ***year*** ~~five years~~, any portion of the share of Safe Yield allocated to the Overlying (Agricultural) Pool is not produced, such water shall be available for reallocation to members of the Appropriative Pool, as follows:

2. **Early Transfer**

A. Section 1.1(o) of the Peace Agreement is amended to read as follows:

> (o) "Early Transfer" means the reallocation of Safe Yield not Produced by the Agricultural Pool to the Appropriative Pool on an annual basis ***after the allocations in subdivisions (a)(1) and (a)(2) of*** ~~rather than according to the five year increment described in~~ Paragraph 10 of Exhibit "H" of the Judgment;

B. Section 5.3(g) of the Peace Agreement is amended to read as follows:

> (g) Watermaster shall approve an "Early Transfer" of water to the Appropriative Pool ~~in an amount not less than 32,800 acre-feet per year~~ that is the ~~expected approximate~~ quantity of water not Produced by the Agricultural Pool ***on an annual basis*** ~~The quantity of water subject to Early Transfer under this paragraph shall be the greater of (i) 32,800 acre-feet of (ii) 32,800 acre-feet plus the actual quantity of water not Produced by the Agricultural Pool for that Fiscal Year~~ that is remaining after all the land use conversions are satisfied pursuant to 5.3(***hi***) below.
>
> (i) The Early Transfer water shall be annually allocated among the members of the Appropriative Pool in accordance with their pro-rata share of the initial Safe Yield.
>
> (ii) The Transfer shall not limit the Production right of the Agricultural Pool under the Judgment to Produce up to 82,800 acre-feet of water in any year or 414,000 acre-feet in any five years as provided in the Judgment.
>
> (iii) The combined Production of all parties to the Judgment shall not cause a Replenishment assessment on the members of the Agricultural Pool. The Agricultural Pool shall be responsible for any Replenishment obligation created by the Agricultural Pool Producing more than 414,000 acre-feet in any five-year period.
>
> (iv) The parties to the Judgment and Watermaster shall Produce water in accordance with the Operating Safe Yield and shall procure sufficient quantities of Replenishment Water to satisfy over-Production requirements, whatever they may be, and avoid Material Physical Injury to any party to the Judgment or the Basin;

(v) Nothing herein shall be construed as modifying the procedures or voting rights within or by the members of the Agricultural Pool.

3. **Conversion Claims.** Subparagraph (b)(3)(i) of Exhibit H, ¶ 10 of the Judgment is amended to read as follows:

(i) For the term of the Peace Agreement ***and any extension thereof***, in any year in which sufficient unallocated Safe Yield from the Overlying (Agricultural) Pool is available for such conversion claims, Watermaster shall allocate to each appropriator with a conversion claim 2.0 acre-feet of unallocated Safe Yield water for each converted acre for which conversion has been approved and recorded by the Watermaster.

4. **Controlled Overdraft.** Pursuant to section 7.2(e)(ii) of the Peace II Agreement, 175,000 acre-feet of controlled overdraft (Re-Operation water) will be allocated to Desalter replenishment over a 17-year period, beginning in 2013-14 and ending in 2029-30, according to the schedule attached as Exhibit A.

5. **New Yield.** Section 7.1 of the Peace II Agreement, entitled "New Yield Attributable to Desalters," is deleted. It is replaced by new section 6.2(b)(ii) as set forth in section 6 below.

6. **Desalter Replenishment.** Section 6.2(b) of the Peace II Agreement is amended to read as follows:

(b) To the extent available credits are insufficient to fully offset the quantity of groundwater production attributable to the Desalters, Watermaster will use water or revenue obtained by levying the following assessments among the members of the Overlying (Non-Agricultural) Pool and the Appropriative Pool to meet any remaining replenishment obligation as follows.

(i) A Special OBMP Assessment against the Overlying (Non-Agricultural) Pool as more specifically authorized and described in amendment to Exhibit "G" paragraph ~~8(c)~~ **5(c)** to the Judgment will be dedicated by Watermaster to further off-set replenishment of the Desalters. However, to the extent there is no remaining replenishment obligation attributable to the Desalters in any year after applying the off-sets set forth in 6.2(a), the OBMP Special Assessment levied by Watermaster will be distributed as provided in section 9.2 below. The Special OBMP Assessment will be assessed pro-rata on each member's share of Safe Yield.~~, followed by~~

(ii) The members of the Appropriative Pool will contribute a total of 10,000 afy toward Desalter replenishment, allocated among Appropriative Pool members as follows:

(1) ***85% of the total (8,500 afy) will be allocated according to the Operating Safe Yield percentage of each Appropriative Pool member; and***

(2) ***15% of the total (1,500 afy) will be allocated according to each land use conversion agency's percentage of the total land use conversion claims, based on the actual land use conversion allocations of the year.***

The annual desalter replenishment obligation contribution of each Appropriative Pool member will be calculated using the following formula:

> ***Desalter replenishment obligation contribution = (8,500 * % Appropriator's share of total initial 49,834 afy Operating Safe Yield) + (1,500 * % Appropriator's proportional share of that year's total conversion claims)***

A sample calculation of the desalter replenishment obligation contribution for each Appropriative Pool member is shown on Exhibit __ to this Peace II Agreement, as amended.

(iii) ~~(ii)~~ A Replenishment Assessment against the Appropriative Pool ***for any remaining Desalter replenishment obligation after applying both 6(b)(i) and 6(b)(ii), allocated pro-rata to each Appropriative Pool member according to the combined total of the member's share of Operating Safe Yield and the member's Adjusted Physical Production, as defined below.*** ~~pro-rata based on each Producer's combined total share of Operating Safe Yield and the previous year's actual production.~~ Desalter Production is excluded from this calculation. ***A sample calculation of the allocation of the remaining desalter obligation is shown in Exhibit __ to this Peace II Agreement.*** ~~However, if there is a material reduction in the net cost of Desalter product water to the purchasers of product water, Watermaster may re-evaluate whether to continue the exclusion of Desalter Production but only after giving due regard to the contractual commitment of the parties.~~

(iv) Adjusted Physical Production is the Appropriative Pool member's total combined physical production (i.e., all groundwater pumped or produced by the Appropriative Pool member's groundwater wells in the Chino Basin, including water transferred from the Non-Agricultural Pool under Exhibit G, ¶9 of the Judgment), with the following adjustments:

> *(1) In the case of assignments among Appropriative Pool members, or between Appropriative Pool members and Non-Agricultural Pool members under Exhibit G, ¶6 of the Judgment, resulting in pumping or production by one party to the Judgment for use by another party to the Judgment, the production for purposes of Adjusted Physical Production shall be assigned to the party making beneficial use of the water, not the actual producer.*
>
> *(2) Production offset credits pursuant to voluntary agreements under section 5.3(i) of the Peace Agreement are calculated at 50% of the total voluntary agreement credit in the determination of Adjusted Physical Production for an Appropriative Pool member participating in a voluntary agreement for that year. In the determination of Adjusted Physical Production, the voluntary agreement credit is subtracted from physical production. Reduction of the voluntary agreement credit from 100% to 50% is applicable only to the calculation of the Adjusted Physical Production hereunder; but in all other applications, the voluntary agreement credit shall remain unchanged (i.e. remain at 100%).*

(3) Production associated with approved storage and recovery programs (e.g., Dry Year Yield recovery program with MWD) is not counted in Adjusted Physical Production, except for in-lieu participation in such programs: in-lieu put quantities shall be added to physical production, and in-lieu take quantities shall be subtracted from physical production.

(4) Metered pump-to-waste Production that is determined by Watermaster to be subsequently recharged to the groundwater basin is deducted from physical production; unmetered pump-to-waste production that is determined by Watermaster not to be subsequently recharged to the groundwater basin is added to physical production.

(5) The Appropriative Pool may approve, by unanimous vote, the inclusion of other items in the determination of Adjusted Physical Production, with the exception of Non-Agricultural Pool water assigned or transferred under Exhibit G, ¶6 or ¶10 of the Judgment.

(v) Any member of the Non-Agricultural Pool that is also a member of the Appropriative Pool may elect to transfer (a) some or all of the annual share of Operating Safe Yield of the transferor in and for the year in which the transfer occurs (except that such transfer shall exclude any dedication to the Watermaster required by section 6.2(b)(1)), and (b) any quantity of water held in storage by the transferor (including without limitation carryover and excess carryover) to any member of the Appropriative Pool, in either case at any price that the transferor and transferee may deem appropriate and for the purpose of satisfying the transferee's desalter replenishment obligation. The transferee's desalter replenishment obligation shall be credited by the number of acre-feet so transferred.

(vi) ~~(iii)~~ The quantification of any Party's share of Operating Safe Yield does not include *either* land use conversions *or Early Transfers*.

7. **Allocation of Non-Agricultural Pool OBMP Special Assessment.** The introductory sentence of section 9.2(a) of the Peace II Agreement is amended to read as follows:

a. For a period of ten years from the effective date of the Peace II Measures, any water (or financial equivalent) that may be contributed from the Overlying (Non-Agricultural) Pool in accordance with paragraph ~~8(c)~~ *5(c)* of Exhibit G to the Judgment (as amended) will be apportioned among the members of the Appropriative Pool in each year as follows:

Attachment: Peace Agreement, Section 7.2 (e)(ii)
Schedule for Use of Re-Operation Water**, and
Calculation of Remaining Desalter Replenishment Obligation (DRO)
Production from 2017-18 through 2029-30 is estimated

Production Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Peace I Desalter Production	29,227.997	29,541.300	27,008.810	26,275.588	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000
Peace II Desalter Production	14.555	448.690	1,154.052	1,527.215	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000
Appropriative Pool DRO Contribution	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)
Re-Operation Water**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**
Non-Agricultural Pool Assessment	0.000	0.000	0.000	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
Remaining DRO	6,742.552	7,489.990	5,662.862	4,567.803	16,765.000	16,765.000	16,765.000	16,765.000	16,765.000

Production Year	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Peace I Desalter Production	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000
Peace II Desalter Production	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000
Appropriative Pool "DRO Contribution	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)
Re-Operation Water**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**
Non-Agricultural Pool Assessment	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
Remaining DRO	16,765.000	16,765.000	16,765.000	24,265.000	24,265.000	24,265.000	24,265.000	24,265.000

Attachment: Peace II Agreement, Section 6.2(b)(ii)

Allocation of Appropriative Pool Desalter Replenishment Obligation (DRO) Contributions (by agency)

Production Year 2013-14 Desalter Replenishment Obligation (DRO) Contribution: 10,000.000 AF

Appropriative Pool Party	Production Year 2013/14 Common Data (Headings from Approved 2014/2015 Assessment Package)			Methodology for 85/15 split between shares of Operating Safe Yield and % of Land Use Conversions		
	a	b	c = %b	d = (DRO Contrib*.85)*a	e = (DRO Contrib*.15)*c	f = d + e
	Percent of Operating Safe Yield (Column 2A)	Land Use Conversions (Page 12A)*	Percent of Land Use Conversions	85% DRO Contribution Based on Percent of Operating Safe Yield	15% DRO Contribution Based on Percent of Land Use Conversions	Desalter Replenishment Obligation Contribution
Arrowhead Mtn Spring Water Co	0.000%	0.000	0.000%	0.000	0.000	0.000
Chino Hills, City of	3.851%	1,133.906	4.334%	327.335	65.013	392.348
Chino, City of	7.357%	7,623.064	29.138%	625.345	437.074	1,062.419
Cucamonga Valley Water District	6.601%	598.364	2.287%	561.085	34.308	595.393
Fontana Union Water Company	11.657%	0.000	0.000%	990.845	0.000	990.845
Fontana Water Company	0.002%	834.000	3.188%	0.170	47.818	47.988
Fontana, City of	0.000%	0.000	0.000%	0.000	0.000	0.000
Golden State Water Company	0.750%	0.000	0.000%	63.750	0.000	63.750
Jurupa Community Services District	3.759%	13,876.196	53.040%	319.515	795.602	1,115.117
Marygold Mutual Water Company	1.195%	0.000	0.000%	101.575	0.000	101.575
Monte Vista Irrigation Company	1.234%	0.000	0.000%	104.890	0.000	104.890
Monte Vista Water District	8.797%	55.075	0.211%	747.745	3.158	750.903
Niagara Bottling, LLC	0.000%	0.000	0.000%	0.000	0.000	0.000
Nicholson Trust	0.007%	0.000	0.000%	0.595	0.000	0.595
Norco, City of	0.368%	0.000	0.000%	31.280	0.000	31.280
Ontario, City of	20.742%	2,041.095	7.802%	1,763.070	117.028	1,880.098
Pomona, City of	20.454%	0.000	0.000%	1,738.590	0.000	1,738.590
San Antonio Water Company	2.748%	0.000	0.000%	233.580	0.000	233.580
San Bernardino, County of (Shooting Park)	0.000%	0.000	0.000%	0.000	0.000	0.000
Santa Ana River Water Company	2.373%	0.000	0.000%	201.705	0.000	201.705
Upland, City of	5.202%	0.000	0.000%	442.170	0.000	442.170
West End Consolidated Water Co	1.728%	0.000	0.000%	146.880	0.000	146.880
West Valley Water District	1.175%	0.000	0.000%	99.875	0.000	99.875
	100.000%	**26,161.700**	**100.000%**	**8,500.000**	**1,500.000**	**10,000.000**

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Attachment: Peace II Agreement, Section 6.2 (b)(iii)

Allocation of Appropriative Pool Remaining Desalter Replenishment Obligation (RDRO)

Production Year 2013-14:	acre-feet
CDA Production - Peace I Allocation	29,227.997
CDA Production - Peace II Allocation	14.555
Total Desalter Replenishment Obligation (Total DRO):	29,242.552
Desalter Replenishment Obligation Contribution (DROC)	(10,000.000)
Re-Operation Water	(12,500.000)
RDRO	6,742.552

Appropriative Pool Party	Operating Safe Yield	Production Year 2013/14 Common Data (From Approved 2014/2015 Assessment Package - Appendix A)					Methodology for Calculation of Adjusted Physical Production (APP)	Methodology for Calculation of "RDRO"
	a	b	c	d	e	f	APP = [b+(c*50%)+d+e+f]	Individual Party RDRO = ((a+APP)/(Total a + Total APP)) * RDRO
	Assessment Paackage Page 2A: Column 2D	Physical Production	Voluntary Agreements (w/Ag)	Assignments (w/Non-Ag)	Storage and Recovery Programs	Other Adjustments	*Note: APP for City of Chino does not include "Other Adjustments" for this period	
Arrowhead Mtn Spring Water Co	0.000	379.111	0.000	0.000	0.000	0.000	379.111	15.905
Chino Hills, City of	2,111.422	2,150.925	(286.221)	0.000	0.000	5,359.300	7,367.115	397.669
Chino, City of	4,033.857	6,725.430	(6,686.440)	(104.278)	0.000	65.288	3,277.932	306.764
Cucamonga Valley Water District	3,619.454	16,121.550	0.000	0.000	0.000	0.000	16,121.550	828.227
Fontana Union Water Company	6,391.736	0.000	0.000	0.000	0.000	0.000	0.000	268.163
Fontana Water Company	1.000	15,377.579	0.000	0.000	0.000	0.000	15,377.579	645.203
Fontana, City of	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Golden State Water Company	411.476	736.362	0.000	0.000	0.000	0.000	736.362	48.157
Jurupa Community Services District	2,061.118	18,406.630	0.000	(379.499)	0.000	(8.784)	18,018.347	842.427
Marygold Mutual Water Company	655.317	1,314.734	0.000	0.000	0.000	0.000	1,314.734	82.653
Monte Vista Irrigation Company	676.759	0.000	0.000	0.000	0.000	0.000	0.000	28.393
Monte Vista Water District	4,823.954	12,521.892	(151.480)	0.000	0.000	(5,371.667)	7,074.485	499.195
Niagara Bottling, LLC	0.000	1,342.588	0.000	0.000	0.000	0.000	1,342.588	56.328
Nicholson Trust	4.000	0.000	0.000	0.000	0.000	0.000	0.000	0.168
Norco, City of	201.545	0.000	0.000	0.000	0.000	0.000	0.000	8.456
Ontario, City of	11,373.816	21,980.342	(4,428.101)	(1,855.196)	0.000	0.000	17,911.096	1,228.639
Pomona, City of	11,215.852	12,909.293	0.000	0.000	0.000	0.000	12,909.293	1,012.163
San Antonio Water Company	1,506.888	1,159.242	0.000	0.000	0.000	0.000	1,159.242	111.857
San Bernardino, County of (Shooting Park)	0.000	16.390	0.000	0.000	0.000	0.000	16.390	0.688
Santa Ana River Water Company	1,301.374	0.000	0.000	0.000	0.000	48.515	48.515	56.634
Upland, City of	2,852.401	2,822.046	0.000	0.000	0.000	0.000	2,822.046	238.070
West End Consolidated Water Co	947.714	0.000	0.000	0.000	0.000	0.000	0.000	39.761
West Valley Water District	644.317	0.000	0.000	0.000	0.000	0.000	0.000	27.032
	54,834.000	113,964.114	(11,552.242)	(2,338.973)	0.000	92.652	105,876.384	6,742.552

ATTACHMENT B
[PROPOSED] ORDER

EXHIBIT B

Attachment: Peace Agreement, Section 7.2 (e)(ii)
Schedule for Use of Re-Operation Water**, and
Calculation of Remaining Desalter Replenishment Obligation (DRO)
Production from 2017-18 through 2029-30 is estimated

Production Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Peace I Desalter Production	29,227.997	29,541.300	27,008.810	26,275.588	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000
Peace II Desalter Production	14.555	448.690	1,154.052	1,527.215	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000
Appropriative Pool DRO Contribution	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)
Re-Operation Water**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**
Non-Agricultural Pool Assessment	0.000	0.000	0.000	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
Remaining DRO	6,742.552	7,489.990	5,662.862	4,567.803	16,765.000	16,765.000	16,765.000	16,765.000	16,765.000

Production Year	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Peace I Desalter Production	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000	30,000.000
Peace II Desalter Production	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000	10,000.000
Appropriative Pool "DRO Contribution	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)	(10,000.000)
Re-Operation Water**	**(12,500.000)**	**(12,500.000)**	**(12,500.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**	**(5,000.000)**
Non-Agricultural Pool Assessment	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
Remaining DRO	16,765.000	16,765.000	16,765.000	24,265.000	24,265.000	24,265.000	24,265.000	24,265.000

ATTACHMENT C
[PROPOSED] ORDER

EXHIBIT A

PROPOSED AMENDMENT TO THE NON-AGRICULTURAL POOL POOLING PLAN

1. Section 6 of Exhibit G to the Judgment (the NAP Pooling Plan) is hereby amended and restated as follows:

6. Assignment. Rights herein decreed are appurtenant to that land and are only assignable with the land for overlying use thereon; provided, however (a) that any appropriator who may, directly or indirectly, undertake to provide water service to such overlying lands may, by an appropriate agency agreement on a form approved by Watermaster, exercise said overlying right to the extent, but only to the extent necessary to provide water service to said overlying lands, and (b) the members of the pool shall have the right to Transfer or lease their quantified production rights within the pool or to Watermaster in conformance with the procedures described in the Peace Agreement between the parties therein, dated June 29, 2000 for the term of the Peace Agreement. Any production pursuant to any such agency agreement (1) shall not constitute production in the Appropriative Pool for the purpose of calculating any assessments imposed on members of the Appropriative Pool, including without limitation replenishment assessments; and (2) shall constitute production in the Non-Agricultural Pool by the assignor for the purpose of calculating any assessments imposed on members of the Non-Agricultural Pool, with the continuing dedications by members of the Non-Agricultural Pool of 10% of their annual share of Operating Safe Yield to desalter replenishment pursuant to Section 5(c) being the sole and exclusive method by which such members shall be required to contribute at any time to desalter production or desalter replenishment.

2. Section 9 of Exhibit G to the Judgment (the NAP Pooling Plan) is hereby amended and restated as follows:

9. Physical Solution Transfers. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom except that for the term of the Peace Agreement the members of the Overlying (Non-Agricultural) Pool shall have the discretionary right to Transfer or lease their quantified Production rights and carry-over water held in storage accounts in quantities that each member may from time to time individually determine as Transfers in furtherance of the Physical Solution: (i) within the Overlying (Non-Agricultural) Pool; (ii) to Watermaster in conformance with the procedures described in the Peace Agreement between the Parties therein, dated June 29, 2000; (iii) in conformance with the procedures described in Paragraph I of the Purchase and Sale Agreement for the Purchase of Water by Watermaster from Overlying (Non-Agricultural Pool dated June 30, 2007; or (iv) to Watermaster and thence to members of the Appropriative Pool in accordance with the following guidelines and those procedures Watermaster may further provide in Watermaster's Rules and Regulations:

(a) By December 31 of each year, the members of the Overlying (Non-Agricultural) Pool shall notify Watermaster of the amount of water each member

shall make available in their individual discretion for purchase by the Appropriators. The Pool Committee of the Overlying (Non-Agricultural) Pool may, by affirmative action of its members from time to time, establish a price for such water or a method pursuant to which such price will be established. By January 31 of each year, Watermaster shall provide a Notice of Availability of each Appropriator's pro-rata share of such water;

(b) Except as they may be limited by paragraph 9(e) below, each member of the Appropriative Pool will have, in their discretion, a right to purchase its pro-rata share of the supply made available from the Overlying (Non-Agricultural) Pool at the price at which the water is being offered. Each Appropriative Pool member's pro-rata share of the available supply will be based on each Producer's combined total share of Operating Safe Yield and the previous year's actual Production by each party;

(c) If any member of the Appropriative Pool fails to irrevocably commit to their allocated share by March 1 of each year, its share of the Overlying (Non-Agricultural) Pool water will be made available to all other members of the Appropriative Pool according to the same proportions as described in 9(b) above and at the price at which the water is being offered. Each member of the Appropriative Pool shall complete its payment for its share of water made available by June 30 of each year.

(d) Commensurate with the cumulative commitments by members of the Appropriative Pool pursuant to (b) and (c) above, Watermaster will purchase the surplus water made available by the Overlying (Non-Agricultural) Pool water on behalf of the members of the Appropriative Pool on an annual basis at the price at which the water is being offered and each member of the Appropriative Pool shall complete its payment for its determined share of water made available by June 30 of each year.

(e) Any surplus water cumulatively made available by all members of the Overlying (Non-Agricultural) Pool that is not purchased by Watermaster after completion of the process set forth herein will be pro-rated among the members of the Pool in proportion to the total quantity offered for transfer in accordance with this provision and may be retained by the Overlying (Non-Agricultural) Pool member without prejudice to the rights of the members of the Pool to make further beneficial us or transfer of the available surplus.

(f) Each Appropriator shall only be eligible to purchase their pro-rata share under this procedure if the party is: (i) current on all their assessments; and (ii) in compliance with the OBMP.

(g) The right of any member of the Overlying (Non-Agricultural) Pool to transfer water in accordance with this Paragraph 9(a)-(c) in any year is dependent upon Watermaster making a finding that the member of the Overlying (Non-Agricultural) Pool is using recycled water where it is both physically available and appropriate for the designated end use in lieu of pumping groundwater.

(h) Nothing herein shall be construed to affect or limit the rights of any Party to offer or accept an assignment as authorized by the Judgment Exhibit "G" paragraph 6 above, or to affect the rights of any Party under a valid assignment.

3. A new Section 10 of Exhibit G to the Judgment (the NAP Pooling Plan) is inserted as follows:

10. Elective Transfers for Desalter Replenishment. Any member of the Non-Agricultural Pool (including without limitation any member of the Non-Agricultural Pool that is also a member of the Appropriative Pool) may elect to transfer (a) some or all of the annual share of Operating Safe Yield of the transferor in and for the year in which the transfer occurs (except that such transfer shall exclude any dedication to Watermaster required by Section 5(c) hereof), and (b) any quantity of water held in storage by the transferor (including without limitation carryover and excess carryover) to any member of the Appropriative Pool, in either case at any price that the transferor and transferee may deem appropriate and for the purpose of satisfying the transferee's desalter replenishment obligation. Any such transfer shall be effective upon delivery by the transferor or transferee to Watermaster staff of written notice of such transfer in the form attached hereto as Form A. The transferee's desalter replenishment obligation shall be credited by the number of acre feet so transferred.

4. Existing Section 10 of Exhibit G to the Judgment (the NAP Pooling Plan) is renumbered as Section 11 as follows:

11. Rules. The Pool Committee shall adopt rules for administering its program and in amplification of the provisions, but not inconsistent with, this pooling plan.

FORM A

NOTICE OF ELECTIVE TRANSFER FOR DESALTER REPLENISHMENT

QUANTITY:

_____ Acre-Feet of Annual Share of Operating Safe Yield for Current Year

_____ Acre-Feet of Carryover

_____ Acre-Feet of Excess Carryover

Transferor and Transferee hereby provide written notice to Watermaster staff of a transfer by the Transferor, in its capacity as a member of the Non-Agricultural Pool, to Transferee, in its capacity as a member of the Appropriative Pool, of water in the quantity and of the type set forth above pursuant to Section 10 of Exhibit G to the Judgment.

TRANSFEROR NAME:	TRANSFEREE NAME:
_____	_____
By: _____	By: _____
Name: _____	Name: _____
Its: _____	Its: _____
Dated: _____	Dated: _____

3.15.19

IT IS SO ORDERED

Judge STANFORD E. REICHERT

APPENDIX K

2007 PEACE II AGREEMENT

PEACE II AGREEMENT:
PARTY SUPPORT FOR WATERMASTER'S OBMP IMPLEMENTATION PLAN, – SETTLEMENT AND RELEASE OF CLAIMS REGARDING FUTURE DESALTERS

WHEREAS, paragraph 41 of the Judgment entered in *Chino Basin Municipal Water District v. City of Chino* (San Bernardino Superior Court Case No. 51010) grants Watermaster, with the advice of the Advisory and Pool Committees, "discretionary powers in order to implement an Optimum Basin Management Program ("OBMP") for the Chino Basin";

WHEREAS, the Parties to the Judgment executed an agreement resolving their differences and pledging their support for Watermaster actions in accordance with specific terms in June of 2000 ("Peace Agreement");

WHEREAS, Watermaster approved Resolution 00-05, and thereby adopted the goals and objectives of the OBMP, the OBMP Implementation Plan and committed to act in accordance with the terms of the Peace Agreement;

WHEREAS, pursuant to Article IV, paragraph 4.2, each of the parties to the Peace Agreement agreed not to oppose Watermaster's adoption and implementation of the OBMP Implementation Plan attached as Exhibit "B" to the Peace Agreement;

WHEREAS, the Peace Agreement, the OBMP Implementation Plan and the Chino Basin Watermaster Rules and Regulations contemplate further actions by Watermaster in furtherance of its responsibilities under paragraph 41 of the Judgment and in accordance with the Peace Agreement and the OBMP Implementation Plan;

WHEREAS, the Parties to the Peace Agreement made certain commitments regarding the funding, design, construction and operation of Future Desalters;

WHEREAS, after receiving input from its stakeholders in the form of the Stakeholder's Non-Binding Term Sheet, Watermaster has proposed to adopt Resolution 07-05 attached as Exhibit "1" hereto to further implement the OBMP through a suite of measures commonly referred to and herein defined as "Peace II Measures", including but not limited to the 2007 Supplement to the OBMP, the Second Amendment to the Peace Agreement, amendments to Watermater's Rules and Regulations, the purchase and sale of water within the Overlying (Non-Agricultural) Pool and certain Judgment amendments; and

NOW, THEREFORE, in consideration of the mutual promises specified herein and by conditioning their performance under this Agreement upon the conditions precedent set forth in Article III herein, the Watermaster Approval, and Court Order, and for other good and valuable consideration, the Parties agree as follows:

ARTICLE I
DEFINITIONS AND RULES OF CONSTRUCTION

1.1 Definitions.

(a) "Desalters" means Desalters and Future Desalters collectively, as defined in the Peace Agreement.

(b) "Hydraulic Control" means the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimus quantities. The Chino North Management Zone is defined in the 2004 Basin Plan amendment (RWQCB resolution R8-2004-001) attached hereto as Exhibit "B."

(c) "Leave Behind" means a contribution to the Basin from water held in storage within the Basin under a Storage and Recovery Agreement that may be established by Watermaster from time to time that may reflect any or all of the following: (i) actual losses; (ii) equitable considerations associated with Watermaster's management of storage agreements; and (iii) protection of the long-term health of the Basin against the cumulative impacts of simultaneous recovery of groundwater under all storage agreements.

(d) Re-Operation" means the controlled overdraft of the Basin by the managed withdrawal of groundwater Production for the Desalters and the potential increase in the cumulative un-replenished Production from 200,000 authorized by paragraph 3 of the Engineering Appendix Exhibit I to the Judgment, to 600,000 acre feet for the express purpose of securing and maintaining Hydraulic Control as a component of the Physical Solution.

(e) Unless otherwise expressly provided herein, all definitions set forth in the Peace Agreement and the Judgment are applicable to the terms as they are used herein.

1.2 Rules of Construction.

(a) Unless the context clearly requires otherwise:

(i) The plural and singular forms include the other;

(ii) "Shall," "will," "must," and "agrees" are each mandatory;

(iii) "May" is permissive;

(iv) "Or" is not exclusive;

(v) "Includes" and "including" are not limiting; and

(vi) "Between" includes the ends of the identified range.

(b) Headings at the beginning of Articles, paragraphs and subparagraphs of this Agreement are solely for the convenience of the Parties, are not a part of this Agreement and shall not be used in construing it.

(c) The masculine gender shall include the feminine and neuter genders and vice versa.

(d) The word "person" shall include individual, partnership, corporation, limited liability company, business trust, joint stock company, trust, unincorporated association, joint venture, governmental authority, water district and other entity of whatever nature.

(e) Reference to any agreement (including this Agreement), document, or instrument means such agreement, document, instrument as amended or modified and in effect from time to time in accordance with the terms thereof and, if applicable, the terms thereof.

(f) Except as specifically provided herein, reference to any law, statute or ordinance, regulation or the like means such law as amended, modified, codified or reenacted, in whole or in part and in effect from time to time, including any rules and regulations promulgated thereunder.

ARTICLE II
COMPLIANCE WITH CEQA

2.1 Project Description. The proposed project description regarding the design, permitting, construction and operation of Future Desalter, securing Hydraulic Control through Basin Re-Operation is set forth in Attachment "A" to Watermaster Resolution 07-05 attached hereto as Exhibit "1."

2.2 Acknowledgment of IEUA as the Lead Agency for CEQA Review. IEUA has been properly designated as the "Lead Agency" for the purposes of completing environmental assessment and review of the proposed project.

2.3 Commitments are Consistent with CEQA. The Parties agree and acknowledge that no commitment will be made to carry out any "project" under the amendments to the OBMP and within the meaning of CEQA unless and until the environmental review and assessment that may be required by CEQA for that defined "project" have been completed.

2.4 Reservation of Discretion. Execution of this Agreement is not intended to commit any Party to undertake a project without compliance with CEQA or to commit the Parties individually or collectively to any specific course of action, which would result in the present approval of a future project.

2.5 No Prejudice by Comment or Failure to Comment. Nothing contained in environmental review of the Project, or a Party's failure to object or comment thereon, shall limit any

Party's right to allege that "Material Physical Injury" will result or has resulted from the implementation of the OBMP or its amendment.

ARTICLE III
CONDITIONS PRECEDENT

3.1 Performance Under Articles IV-XII is Subject to Satisfaction of the Conditions Precedent. Each Party's obligations under this Agreement are subject to the satisfaction of the following conditions precedent on or before the dates specified below, unless satisfaction or a specified condition or conditions is waived in writing by all other Parties:

(a) Watermaster approval of Resolution 07-05 in a form attached hereto as Exhibit "1," including the following Attachments thereto

(i) the amendments to the Chino Basin Watermaster Rules and Regulations set forth in Attachment "F" thereto.

(ii) the 2007 Supplement to the OBMP Implementation Plan set forth in Attachment "D" thereto.

(iii) the amendments to the Judgment set forth in Attachments "H, I, and J" thereto.

(iv) the Second Amendment to the Peace Agreement set forth in Attachment "L" thereto.

(v) the Purchase and Sale Agreement for the Purchase of Water by Watermaster From the Overlying (Non-Agricultural) Pool as set forth in Attachment G thereto.

(b) The execution of the proposed Second Amendment to the Peace Agreement by all Parties to the Peace Agreement .

(c) Court approval of the proposed Judgment Amendments and a further order of the Court directing Watermaster to proceed in accordance with the terms of the Peace II Measures as embodied in Resolution 07-05.

ARTICLE IV
MUTUAL ACKNOWLEDGEMENT AND COVENANTS

4.1 Acknowledgment of Peace II Measures. The collective actions of Watermaster set forth in Watermaster Resolution 07-05 and the Attachments thereto (Peace II Measures) constitute further actions by Watermaster in implementing the OBMP in accordance with the grant and limitations on its discretionary authority set forth under paragraph 41 of the Judgment

4.2 Non-Opposition. No Party to this Agreement shall oppose Watermaster's adoption of Resolution 07-05 and implementation of the Peace II measures as embodied therein

including the Judgment Amendments, Amendments to the Peace Agreement, the 2007 Supplement to the OBMP Implementation Plan and Amendments to the Chino Basin Watermaster's Rules and Regulations or to Watermaster's execution of memoranda of agreement that are not materially inconsistent with the terms contained therein. Notwithstanding this covenant, no party shall be limited in their right of participation in all functions of Watermaster as they are provided in the Judgment or to preclude a Party to the Judgment from seeking judicial review of Watermaster determinations pursuant to the Judgment or as otherwise provided in this Agreement.

4.3 Consent to Amendments. Each Party expressly consents to the Judgment amendments and modifications set forth in Watermaster's Resolution 07-05.

4.4 Non-Agricultural Pool Intervention. The Parties acknowledge and agree that any Party to the Judgment shall have the right to purchase Non-Agricultural overlying property within the Basin and appurtenant water rights and to intervene in the Non-Agricultural Pool.

ARTICLE V
FUTURE DESALTERS

5.1 Purpose. Watermaster plans to coordinate and the Parties to the Judgment plan to arrange for the physical capacity and potable water use of water from the Desalters. Desalters in existence on the effective date of this Agreement will be supplemented to provide the required capacity to cumulatively produce approximately 40,000 acre-feet per year of groundwater from the Desalters by 2012.

5.2 2007 Supplement to the OBMP Implementation Plan. The OBMP Implementation Plan will be supplemented as set forth in the 2007 Supplement to the OBMP Implementation Plan to reflect that Western Municipal Water District ("WMWD"), acting independently or in its complete discretion with the City of Ontario ("Ontario") or the Jurupa Community Services District ("Jurupa") or both, will exercise good faith and reasonable best efforts to arrange for the design, planning, and construction of Future Desalters in accordance with the 2007 Supplement to the OBMP Implementation Plan, to obtain Hydraulic Control, further Re-Operation and support the Future Desalters.

5.3 Implementation. WMWD, acting independently or in its complete discretion with Ontario, Jurupa, or both, will exercise good faith and reasonable best efforts to arrange for the design, planning, and construction of Future Desalters in accordance with the 2007 Supplement to the OBMP Implementation Plan, to account for Hydraulic Control, Re-Operation and Future Desalters.

(a) WMWD, acting independently or in its complete discretion with Ontario or Jurupa or both, will exercise good faith and reasonable best efforts to proceed in accordance with the timeline for the completion of design, permitting, finance and construction as attached hereto as Exhibit "2"

(b) WMWD, acting independently or in its complete discretion with the City of Ontario or the Jurupa Community Services District or both, will provide quarterly progress reports to Watermaster and the Court.

5.4 Project Description. The Future Desalters will add up to 9 mgd to existing Desalters. This will include production capacity from new groundwater wells that will be located in the Southerly end of the Basin, as depicted in Exhibit "3" attached hereto and incorporated herein by this reference. The final design and construction of Future Desalters *may* depend on the terms and conditions that may be freely arrived at by fair bargaining among WMWD and the Chino Basin Desalter Authority ("CDA") or whether it is required to build stand-alone facilities or both. There are material yield benefits to the Parties to the Judgment that are achieved by obtaining Hydraulic Control through Basin Re-Operation. The extent of these benefits is somewhat dependent upon the final location of new production facilities within the southerly end of the Basin. Accordingly, Watermaster will ensure that the location of Future Desalter groundwater production facilities will achieve both Hydraulic Control and maximize yield enhancement by their location emphasizing groundwater production from the Southerly end of the Basin.

5.5 Implementing Agreements. Within twenty-four (24) months of the effective date, WMWD, acting independently or in its complete discretion with the City of Ontario or the Jurupa Community Services District or both, will exercise good faith and reasonable best efforts to complete final binding agreement(s) regarding Future Desalters that includes the following key terms:

(a) Arrangements for WMWD's purchase of product water from CDA;

(b) Arrangements with CDA, Jurupa and other Chino Basin parties for the common use of existing facilities, if any;

(c) Arrangement with the owners of the SARI line;

(d) Arrangements with the Appropriative Pool regarding the apportionment of any groundwater produced as controlled overdraft in accordance with the Physical Solution between Desalters I, Desalters II on the one hand and the Future Desalters on the other hand;

(e) WMWD's payment to Watermaster to reimburse Parties to the Judgment for their historical contributions towards the OBMP, if any;

(f) The schedule for approvals and project completion.

5.6 Reservation of Discretion. Nothing herein shall be construed as committing WMWD, or any members of CDA to take any specific action(s) to accommodate the needs or requests of the other, Watermaster, or any Party to the Judgment, whatever the request may be.

5.7 Condition Subsequent. WMWD's obligation to execute a binding purchase agreement with CDA or to independently develop the Future Desalters is subject to the express condition subsequent that the total price per acre-foot of water delivered must not be projected to exceed the sum of the following: (i) the full MWD Tier II Rate; (ii) the MWD Treatment Surcharge calculated in terms of an annual average acre-foot charge; and (iii) $150 (in 2006 dollars) per acre-foot of water delivered to account for water supply reliability.

(a) The full acre-foot cost to Western for Capital and O&M (assuming the priority allocation of controlled overdraft), includes:

(i) the delivery of the desalted water to its Mockingbird Reservoir or directly to the City of Norco,

(ii) any applicable ongoing Watermaster assessments, payments to CDA and JCSD and for SARI utilization.

(b) Provided that if third-party funding, grants and a MWD subsidy under the Local Resources Program or otherwise should reduce Western's costs to an amount which is $75 (in 2006 dollars) below the cap described in paragraph 5.5, Western will transmit an amount equal to fifty (50) percent of the amount less than the computed price cap less $75 (in 2006 dollars) to Watermaster.

(c) Western may elect to exercise its right of withdrawal under this paragraph 5.7 within 120 days following the later of: (1) completion of preliminary design; or (2) the certification of whatever CEQA document is prepared for the project, but not later than sixty (60) days thereafter and in no event after a binding water purchase agreement has been executed.

5.8 Limitations. The operation of the Future Desalters will be subject to the following limitations:

(a) Well Location. New groundwater production facilities for the Future Desalters will be located in the southern end of the Basin to achieve the dual purpose of obtaining Hydraulic Control and increasing Basin yield.

(i) New wells will be constructed in the shallow aquifer system among Desalter I wells No. 1 through 4 and west of Desalter I.

(ii) So long as these wells produce at least one-half of the Future Desalter groundwater, the Future Desalters shall be entitled to first priority for the allocation of the 400,000 acre-feet of controlled overdraft authorized by the Judgment Amendments to Exhibit I.

(b) Export. The export of groundwater from the Basin must be minimized. WMWD will present a plan for export minimization to the Watermaster for review and approval prior to operation of the Future Desalters.

(i) Watermaster will account for water imported and exported by WMWD.

(ii) Watermaster will prepare an initial reconciliation of WMWD's imports and exports at the end of the first ten (10) years of operation and every year thereafter to determine whether a "net export" occurred.

(iii) WMWD will pay an assessment, if any, on all "net exports" in accordance with Judgment Exhibit "H," paragraph 7(b) after the initial reconciliation is completed at the end of the first ten (10) years of operation.

ARTICLE VI
GROUNDWATER PRODUCTION BY AND REPLENISHMENT FOR DESALTERS

6.1 Acknowledgment. The Parties acknowledge that the hierarchy for providing Replenishment Water for the Desalters is set forth in Article VII, paragraph 7.5 of the Peace Agreement, and that this section controls the sources of water that will be offered to offset Desalter Production.

6.2 Peace II Desalter Production Offsets. To facilitate Hydraulic Control through Basin Re-Operation, in accordance with the 2007 Supplement to the OBMP Implementation Plan and the amended Exhibits G and I to the Judgment, additional sources of water will be made available for purposes of Desalter Production and thereby some or all of a Replenishment obligation. With these available sources, the Replenishment obligation attributable to Desalter production in any year will be determined by Watermaster as follows:

(a) Watermaster will calculate the total Desalter Production for the preceding year and then apply a credit against the total quantity from:

(i) the Kaiser account (Peace Agreement Section 7.5(a).);

(ii) dedication of water from the Overlying (Non-Agricultural) Pool Storage Account or from any contribution arising from an annual authorized Physical Solution Transfer in accordance with amended Exhibit G to the Judgment;

(iii) New Yield (other than Stormwater (Peace Agreement Section 7.5(b));

(iv) any declared losses from storage in excess of actual losses enforced as a "Leave Behind";

(v) Safe Yield that may be contributed by the parties (Peace Agreement Section 7.5(c));

(vi) any Production of groundwater attributable to the controlled overdraft authorized pursuant to amended Exhibit I to the Judgment.

(b) To the extent available credits are insufficient to fully offset the quantity of groundwater production attributable to the Desalters, Watermaster will use water or revenue obtained by levying the following assessments among the members of the Overlying (Non-Agricultural) Pool and the Appropriative Pool to meet any remaining replenishment obligation as follows.

(i) A Special OBMP Assessment against the Overlying (Non-Agricultural) Pool as more specifically authorized and described in amendment to Exhibit "G" paragraph 8(c) to the Judgment will be dedicated by Watermaster to further off-set replenishment of the Desalters. However, to the extent there is no remaining replenishment obligation attributable to the Desalters in any year after applying the off-sets set forth in 6.2(a), the OBMP Special Assessment levied by Watermaster will be distributed as provided in Section 9.2 below. The Special OBMP Assessment will be assessed pro-rata on each member's share of Safe Yield, followed by

(ii) A Replenishment Assessment against the Appropriative Pool, pro-rata based on each Producer's combined total share of Operating Safe Yield and the previous year's actual production. Desalter Production is excluded from this calculation. However, if there is a material reduction in the net cost of Desalter product water to the purchasers of product water, Watermaster may re-evaluate whether to continue the exclusion of Desalter Production but only after giving due regard to the contractual commitment of the parties.

(iii) The quantification of any Party's share of Operating Safe Yield does not include the result of any land use conversions.

(c) The rights and obligations of the parties, whatever they may be, regarding Replenishment Assessments attributable to all Desalters and Future Desalters in any renewal term of the Peace Agreement are expressly reserved and not altered by this Agreement.

ARTICLE VII
YIELD ACCOUNTING

7.1 New Yield Attributable to Desalters. Watermaster will make an annual finding as to the quantity of New Yield that is made available by Basin Re-Operation including that portion that is specifically attributable to the Existing and Future Desalters. Any subsequent recalculation of New Yield as Safe Yield by Watermaster will not change the priorities set forth above for offsetting Desalter production as set forth in Article VII, Section 7.5 of the Peace Agreement. For the initial term of the Peace Agreement, neither Watermaster nor the Parties will request that Safe Yield be recalculated in a manner that incorporates New Yield *attributable to the Desalters* into the determination of Safe Yield so that this source of supply will be available for Desalter Production rather than for use by individual parties to the Judgment.

7.2 Apportionment of Controlled Overdraft. Within twelve (12) months of the court approval and no later than December 1, 2008, with facilitation by Watermaster, WMWD and the Appropriative Pool will establish by mutual agreement the portion of the 400,000 acre-feet of the controlled overdraft authorized by the amendment to Exhibit "I" to the Judgment that will be allocated among the Desalters and pursuant to a proposed schedule.

(a) To the extent the groundwater wells for the Future Desalters pump at least fifty (50) percent groundwater from the southern end of the Basin as set forth in Exhibit "3" the *Future Desalters* will be entitled to first priority to the controlled overdraft authorized by the amendment to Exhibit "I" to the Judgment.

(b) WMWD and the Appropriative Pool will exercise good faith and reasonable best efforts to arrive at a fair apportionment. Relevant considerations in establishing the apportionment include, but are not limited to: (i) the nexus between the proposed expansion and achieving Hydraulic Control;(ii) the nexus between the project and obtaining increased yield; (iii) the identified capital costs; (iv) operating and maintenance expenses; and (iv) the availability of third-party funding.

(c) The parties will present any proposed agreement regarding apportionment to Watermaster. Watermaster will provide due regard to any agreement between WMWD and the Appropriative Pool and approve it so long as the proposal phases the Re-Operation over a reasonable period of time to secure the physical condition of Hydraulic Control and will achieve the identified yield benefits while at the same time avoiding Material Physical Injury or an inefficient use of basin resources.

(d) If WMWD and the Appropriative Pool do not reach agreement on apportionment of controlled overdraft to Future Desalters, then no later than August 31, 2009, the members of the Appropriative Pool will submit a plan to Watermaster that achieves the identified goals of increasing the physical capacity of the Desalters and potable water use of approximately 40,000 acre-feet of groundwater production from the Desalters from the Basin no later than 2012. The Appropriative Pool proposal must demonstrate how it has provided first priority to the Future Desalters if the conditions of paragraph 7.2(a) are met.

(e) Watermaster will have discretion to apportion the controlled overdraft under a schedule that reflects the needs of the parties and the need for economic certainty and the factors set forth in Paragraph 7.2(a) above. Watermaster may exercise its discretion to establish a schedule for Basin Re-Operation that best meets the needs of the Parties to the Judgment and the physical conditions of the Basin, including but not limited to such methods as "ramping up," "ramping down," or "straight-lining."

(i) An initial schedule will be approved by Watermaster and submitted to the Court concurrent with Watermaster Resolution 07-05.

(ii) Watermaster may approve and request Court approval of revisions to the initial schedule if Watermaster's approval and request are supported by a technical report demonstrating the continued need for access to controlled overdraft, subject to the limitations set forth in amended Exhibit "I" to the Judgment and the justification for the amendment.

7.3 Suspension. An evaluation of Watermaster's achievement of Basin outflow conditions, achievement of Hydraulic Control and compliance with Regional Board orders will be completed annually by Watermaster. Re-Operation and Watermaster's apportionment of controlled overdraft will not be suspended in the event that Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been produced so long as: (i) Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures to avoid Material Physical Injury and that equitably distributes the cost of any mitigation attributable to the identified contingencies, and (ii) Watermaster is in substantial compliance with a Court approved Recharge Master Plan as set forth in Paragraph 8.1 below.

7.4 Storage: Uniform Losses. The Parties acknowledge that Watermaster has assessed a two (2)-percent loss on all groundwater presently held in storage to reflect the current hydrologic condition. As provided in the Peace Agreement, Watermaster will continue to maintain a minimum 2 (two) percent loss until substantial evidence exists to warrant the imposition of another loss factor. However, the Parties further acknowledge and agree that losses have been substantially reduced through the OBMP Implementation Plan and the operation of Desalters I and II and that once Hydraulic Control is achieved outflow and losses from the Basin will have been limited to de minimis quantities. Therefore, Watermaster may establish uniform losses for all water held in storage based on whether the Party has substantially contributed to Watermaster reducing losses and ultimately securing and maintaining Hydraulic Control.

(a) Pre-Implementation of the Peace Agreement. The uniform annual loss (leave behind) of six (6) percent will be applied to all storage accounts to address actual losses, management and equitable considerations arising from the implementation of the Peace Agreement, the OBMP Implementation Plan, the 2007 Supplement to the OBMP Implementation Plan, including but not limited to the Desalters and Hydraulic Control unless the Party holding the storage account: (i) has previously contributed to the implementation of the OBMP as a Party to the Judgment, is in compliance with their continuing covenants under the Peace Agreement or in lieu thereof they have paid or delivered to Watermaster "financial equivalent" consideration to offset the cost of past performance prior to the implementation of the OBMP and (ii) promised continued future compliance with Watermaster Rules and Regulations. In the event that a Party satisfies 7.4(a)(i) and7.4(a)(ii) they will be assessed a minimum loss of two (2) percent against all water held in storage to reflect actual estimated losses. Watermaster's evaluation of the sufficiency of any consideration or financial equivalency may take into account the fact that one or more Parties to the Judgment are not similarly situated.

(b) Post-Hydraulic Control. Following Watermaster's determination that it has achieved Hydraulic Control and for so long as Watermaster continues to sustain losses from the Basin to the Santa Ana River at a de minimis level (less than one (1) percent), any Party to the Judgment (agency, entity or person) may qualify for the Post-Hydraulic Control uniform loss percentage of less than 1 percent if they meet the criteria of 7.4(a)(i) and 7.4(a)(ii) above.

7.5 Allocation of Losses. Any losses from storage assessed as a Leave Behind in excess of actual losses ("dedication quantity") will be dedicated by Watermaster towards groundwater Production by the Desalters to thereby avoid a Desalter replenishment obligation that may then exist *in the year* of recovery. Any dedication quantity which is not required to offset Desalter Production in the year in which the loss is assessed, will be made available to the members of the Appropriative Pool. The dedication quantity will be pro-rated among the members of the Appropriative Pool in accordance with each Producer's combined total share of Operating Safe Yield and the previous year's actual production. However, before any member of the Appropriative Pool may receive a distribution of any dedication quantity, they must be in full compliance with the 2007 Supplement to the OBMP Implementation Plan and current in all applicable Watermaster assessments.

ARTICLE VIII
RECHARGE

8.1 Update to the Recharge Master Plan. Watermaster will update and obtain Court approval of its update to the Recharge Master Plan to address how the Basin will be contemporaneously managed to secure and maintain Hydraulic Control and subsequently operated at a new equilibrium at the conclusion of the period of Re-Operation. The Recharge Master Plan will be jointly approved by IEUA and Watermaster and shall contain recharge estimations and summaries of the projected water supply availability as well as the physical means to accomplish the recharge projections. Specifically, the Plan will reflect an appropriate schedule for planning, design, and physical improvements as may be required to provide reasonable assurance that following the full beneficial use of the groundwater withdrawn in accordance with the Basin Re-Operation and authorized controlled overdraft, that sufficient Replenishment capability exists to meet the reasonable projections of Desalter Replenishment obligations. With the concurrence of IEUA and Watermaster, the Recharge Master Plan will be updated and amended as frequently as necessary with Court approval and not less than every five (5) years. Costs incurred in the design, permitting, operation and maintenance of recharge improvements will be apportioned in accordance with the following principles.

a. Operations and Maintenance. All future operations and maintenance costs attributable to all recharge facilities utilized for recharge of recycled water in whole or in part unfunded from third party sources, will be paid by the Inland Empire Utilities Agency ("IEUA") and Watermaster. The contribution by IEUA will be determined annually on the basis of the relative proportion of recycled water recharged bears to the total recharge from all sources in the prior year. For example, if 35 percent of total recharge in a single year is from recycled water, then IEUA will bear 35 percent of the operations and maintenance costs. All remaining unfunded costs attributable to the facilities used by Watermaster will be paid by Watermaster.

i. IEUA reserves discretion as to how it assesses its share of costs.

ii. Watermaster will apportion its costs among the members of the stakeholders in accordance with Production, excluding Desalter Production.

iii. The operations and maintenance costs of water recharged by aquifer storage and recovery will not be considered in the calculation other than by express agreement.

b. Capital. Mutually approved capital improvements for recharge basins that do or can receive recycled water constructed pursuant to the Court approved Recharge Master Plan, if any, will be financed through the use of third party grants and contributions if available, with any unfunded balance being apportioned 50 percent each to IEUA and Watermaster. The Watermaster contribution shall be allocated according to shares of Operating Safe Yield. All remaining unfunded costs attributable to the facilities used by Watermaster will be paid by Watermaster.

8.2 Coordination. The members of the Appropriative Pool will coordinate the development of their respective Urban Water Management Plans and Water Supply Master Plans with Watermaster as follows.

(a) Each Appropriator that prepares an Urban Water Management Plan and Water Supply Plans will provide Watermaster with copies of their existing and proposed plans.

(b) Watermaster will use the Plans in evaluating the adequacy of the Recharge Master Plan and other OBMP Implementation Plan program elements.

(c) Each Appropriator will provide Watermaster with a draft in advance of adopting any proposed changes to their Urban Water Management Plans and in advance of adopting any material changes to their Water Supply Master Plans respectively in accordance with the customary notification routinely provided to other third parties to offer Watermaster a reasonable opportunity to provide informal input and informal comment on the proposed changes.

(d) Any party that experiences the loss or the imminent threatened loss of a material water supply source will provide reasonable notice to Watermaster of the condition and the expected impact, if any, on the projected groundwater use.

8.3 Continuing Covenant. To ameliorate any long-term risks attributable to reliance upon un-replenished groundwater production by the Desalters, the annual availability of any portion of the 400,000 acre-feet set aside as controlled overdraft as a component of the Physical Solution, is expressly subject to Watermaster making an annual finding about whether it is in substantial compliance with the revised Watermaster Recharge Master Plan pursuant to Paragraphs 7.3 and 8.1 above.

8.4 Acknowledgment re 6,500 Acre-Foot Supplemental Recharge. The Parties make the following acknowledgments regarding the 6,500 Acre-Foot Supplemental Recharge:

(a) A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To promote the goal of equal access to groundwater within all areas and sub-areas of the Chino Basin, Watermaster has committed to use its best efforts to direct recharge relative to production in each area and sub-area of the Basin and to achieve long-term balance between total recharge and discharge. The Parties acknowledge that to assist Watermaster in providing for recharge, the Peace Agreement sets forth a requirement for Appropriative Pool purchase of 6,500 acre-feet per year of Supplemental Water for recharge in Management Zone 1 (MZ1). The purchases have been credited as an addition to Appropriative Pool storage accounts. The water recharged under this program has not been accounted for as Replenishment water.

(b) Watermaster was required to evaluate the continuance of this requirement in 2005 by taking into account provisions of the Judgment, Peace Agreement and OBMP, among all other relevant factors. It has been determined that other obligations in the Judgment and Peace Agreement, including the requirement of hydrologic balance and projected replenishment obligations, will provide for sufficient wet-water recharge to make the separate commitment of Appropriative Pool purchase of 6,500 acre-feet unnecessary. Therefore, because the recharge target as described in the Peace Agreement has been achieved, further purchases under the program will cease and Watermaster will proceed with operations in accordance with the provisions of paragraphs (c), (d) and (e) below.

(c) The parties acknowledge that, regardless of Replenishment obligations, Watermaster will independently determine whether to require wet-water recharge within MZ1 to maintain hydrologic balance and to provide equal access to groundwater in accordance with the provisions of this Section 8.4 and in a manner consistent with the Peace Agreement, OBMP and the Long Term Plan for Subsidence.". Watermaster will conduct its recharge in a manner to provide hydrologic balance within, and will emphasize recharge in MZ1. Accordingly, the Parties acknowledge and agree that each year Watermaster shall continue to be guided in the exercise of its discretion concerning recharge by the principles of hydrologic balance.

(d) Consistent with its overall obligations to manage the Chino Basin to ensure hydrologic balance within each management zone, for the duration of the Peace Agreement (until June of 2030), Watermaster will ensure that a minimum of 6,500 acre-feet of wet water recharge occurs within MZ1 on an annual basis. However, to the extent that water is unavailable for recharge or there is no replenishment obligation in any year, the obligation to recharge 6,500 acre-feet will accrue and be satisfied in subsequent years.

(1) Watermaster will implement this measure in a coordinated manner so as to

facilitate compliance with other agreements among the parties, including but not limited to the Dry-Year Yield Agreements.

(2) In preparation of the Recharge Master Plan, Watermaster will consider whether existing groundwater production facilities owned or controlled by producers within MZ1 may be used in connection with an aquifer storage and recovery ("ASR") project so as to further enhance recharge in specific locations and to otherwise meet the objectives of the Recharge Master Plan.

(e) Five years from the effective date of the Peace II Measures, Watermaster will cause an evaluation of the minimum recharge quantity for MZ1. After consideration of the information developed in accordance with the studies conducted pursuant to paragraph 3 below, the observed experiences in complying with the Dry Year Yield Agreements as well as any other pertinent information, Watermaster may increase the minimum requirement for MZ1 to quantities greater than 6,500 acre-feet per year. In no circumstance will the commitment to recharge 6,500 acre-feet be reduced for the duration of the Peace Agreement.

ARTICLE IX

9.1 Basin Management Assistance. Three Valleys Municipal Water District ("TVMWD") shall assist in the management of the Basin through a financial contribution of $300,000 to study the feasibility of developing a water supply program within Management Zone 1 of the Basin or in connection with the evaluation of Future Desalters. The study will emphasize assisting Watermaster in meeting its OBMP Implementation Plan objectives of concurrently securing Hydraulic Control through Re-Operation while attaining Management Zone 1 subsidence management goals. Further, TVMWD has expressed an interest in participating in future projects in the Basin that benefit TVMWD. If TVMWD wishes to construct or participate in such future projects, TVMWD shall negotiate with Watermaster in good faith concerning a possible "buy-in" payment.

9.2 Allocation of Non-Agricultural Pool OBMP Special Assessment

a. For a period of ten years from the effective date of the Peace II Measures, any water (or financial equivalent) that may be contributed from the Overlying (Non-Agricultural) Pool in accordance with paragraph 8(c) of Exhibit G to the Judgment (as amended) will be apportioned among the members of the Appropriative Pool in each year as follows:

(i)	City of Ontario.	80 af
(ii)	City of Upland	161 af
(iii)	Monte Vista Water District	213 af
(iv)	City of Pomona	220 af
(v)	Marygold Mutual Water Co	16 af
(vi)	West Valley Water District	15 af

(vii)	Santa Ana River Water Co.	31 af

b. In the eleventh year from the effective date of the Peace II Measures and in each year thereafter in which water may be available from the Overlying (Non-Agricultural) Pool in excess of identified Desalter replenishment obligations as determined in accordance with Section 6.2 above, any excess water (or financial equivalent) will be distributed pro rata among the members of the Appropriative Pool based upon each Producer's combined total share of Operating Safe Yield and the previous year's actual production.

ARTICLE X
SETTLEMENT AND RELEASE

10.1 Settlement. By its execution of this Agreement, the Parties mutually and irrevocably, fully settle their respective claims, rights and obligations, whatever they may be, regarding the design, funding, construction and operation of Future Desalters as set forth in and arising from Article VII of the Peace Agreement.

10.2 Satisfaction of Peace Agreement Obligation Regarding Future Desalters. The Parties' individual and collective responsibilities arising from the Part VII of the Peace Agreement and the OBMP Implementation Plan regarding the planning, design, permitting, construction and operation of Future Desalters, whatever they may be, are unaffected by this Agreement. However, upon the completion of a 10,000 AFY (9 mgd) expansion of groundwater production and desalting from Desalter II as provided for herein, the Parties will be deemed to have satisfied all individual and collective pre-existing obligations arising from the Peace Agreement and the OBMP Implementation Plan, whatever they may be, with regard to Future Desalters as described in Part VII of the Peace Agreement and the OBMP Implementation Plan.

10.3 Satisfaction of Pomona Credit. In recognition of the ongoing benefits received by TVMWD through the City of Pomona's anion exchange project, as its sole and exclusive responsibility, TVMWD will make an annual payment to Watermaster in an amount equal to the credit due the City of Pomona under Peace Agreement Paragraph 5.4(b) ("the Pomona Credit").

(a) Within ninety (90) days of each five-year period following the Effective Date of this Agreement, in its sole discretion TVMWD shall make an election whether to continue or terminate its responsibilities under this paragraph. TVMWD shall provide written notice of such election to Watermaster.

(b) Watermaster will provide an annual invoice to TVMWD for the amount of the Pomona Credit.

(c) Further, in any renewal term of the Peace Agreement, TVMWD will continue to make an equivalent financial contribution which TVMWD consents to

Watermaster's use for the benefit of MZ1, subject to the same conditions set forth above with respect to TVMWD's payment of the "Pomona Credit".

(d) In the event TVMWD elects to terminate is obligation under this Paragraph, the Peace Agreement and the responsibility for satisfying the Pomona Credit will remain unchanged and unaffected, other than as it will be deemed satisfied for each five-year period that TVMWD has actually made the specified payment.

10.4 Release. Upon WMWD's completion of a 10,000 AFY (9 mgd) expansion of groundwater production and desalting in a manner consistent with the parameters set forth in this Agreement, each Party, for itself, its successors, assigns, and any and all persons taking by or through it, hereby releases WMWD and IEUA from any and all obligations arising from WMWD's and IEUA's responsibility for securing funding, designing, and constructing Future Desalters as set forth in or arising exclusively from Article VII of the Peace Agreement and the Program Elements 3, 6, and 7, OBMP Implementation Plan only, and each Party knowingly and voluntarily waives all rights and benefits which are provided by the terms and provisions of section 1542 of the Civil Code of the State of California, or any comparable statute or law which may exist under the laws of the State of California, in or arising from WMWD's and IEUA's responsibility for securing funding, designing, and constructing Future Desalters as set forth in or arising exclusively from Article VII of the Peace Agreement and the OBMP Implementation Plan only. The Parties hereby acknowledge that this waiver is an essential and material term of this release. The Parties, and each of them, acknowledge that Civil Code section 1542 provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR.

Each Party understands and acknowledges that the significance and consequence of this waiver of Civil Code section 1542 is the waiver of any presently unknown claims as described above, and that if any Party should eventually suffer additional damages arising out of the respective claim that Party will not be able to make any claim for those additional damages. Further, all Parties to this Agreement acknowledge that they consciously intend these consequences even as to claims for such damages that may exist as of the date of this Agreement but which are not known to exist and which, if known, would materially affect the Parties' respective decision to execute this Agreement, regardless of whether the lack of knowledge is the result of ignorance, oversight, error, negligence, or any other cause.

10.5 Assessments. In view of the substantial investments previously made and contemplated by Watermaster and the parties over the term of the Peace Agreement and in particular to implement the OBMP, the parties desire substantial certainty regarding Watermaster's principles of cost allocation. The principles set forth in the Peace Agreement and the

Peace II Measures including those stated herein, constitute a fair and reasonable allocation of responsibility among the stakeholders. Accordingly, other than in the event of an emergency condition requiring prompt action by Watermaster or to correct a manifest injustice arising from conditions not presently prevailing in the Basin and unknown to Watermaster and the parties and then only to the extent Watermaster retains discretion, Watermaster will maintain the principles of cost allocation for apportioning costs and assessments as provided in the Judgment and now implemented through the Peace Agreement and the Peace II Measures for the balance of the initial Term of the Peace Agreement. For the balance of the initial Term of the Peace Agreement, the parties to the Peace II Agreement will waive any objections to the Watermaster's principles of cost allocation other than as to issues regarding whether Watermaster has: (i) properly followed appropriate procedures; (ii) correctly computed assessments and charges; and (iii) properly reported .

10.6 Reservation of Rights. Nothing herein shall be construed as precluding any party to the Judgment from seeking judicial review of any Watermaster action on the grounds that Watermaster has failed to act in accordance with the Peace Agreement as amended, this Agreement, the Amended Judgment, the OBMP Implementation Plan as amended and applicable law.

ARTICLE XI
TERM

11.1 Commencement. This Agreement will become effective upon the satisfaction of all conditions precedent and shall expire on the Termination Date.

11.2 Termination. This Agreement is coterminous with the initial term of the Peace Agreement and will expire of its own terms and terminate on the date of the Initial Term of the Peace Agreement.

ARTICLE XIII
GENERAL PROVISIONS

12.1 Construction of this Agreement. Each Party, with the assistance of competent legal counsel, has participated in the drafting of this Agreement and any ambiguity should not be construed for or against any Party on account of such drafting.

12.2 Awareness of Contents/Legal Effect. The Parties expressly declare and represent that they have read the Agreement and that they have consulted with their respective counsel regarding the meaning of the terms and conditions contained herein. The parties further expressly declare and represent that they fully understand the content and effect of this Agreement and they approve and accept the terms and conditions contained herein, and that this Agreement is executed freely and voluntarily.

12.3 Counterparts. This Agreement may be executed in counterparts. This Agreement shall become operative as soon as one counterpart hereof has been executed by each Party. The counterparts so executed shall constitute on Agreement notwithstanding that the signatures of all Parties do not appear on the same page.

IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: Party: _____

By _____

October 25, 2007

ARTICLE XI
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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: April 24, 2008 Party: Non-Agricultural Pool

By _____

ARTICLE XI
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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: 12/11/07

Party: CITY OF UPLAND

By _____
ROBB QUINCEY
CITY MANAGER

October 25, 2007

ARTICLE XI
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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated:

Party:

By

19
SB 447967 v1:008350.0001

ARTICLE XI
TERM

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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated:

Party: San Antonio Water Company

By Tom Thomas
Tom Thomas
President

Ken Willis
Secretary

October 25, 2007

ARTICLE XI
TERM

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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated:

Party: Cucamonga Valley Water District

By

19
SB 447967 v1:008350.0001

ARTICLE XI
TERM

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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated:

Party: WESTERN MWD

By

October 25, 2007

ARTICLE XI
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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: December 7, 2007

Party: FONTANA UNION WATER COMPANY

By

Robert A DeLoach, President

19
SB 447967 v1:008350.0001

ARTICLE XI
TERM

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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: 12/12/07

Party: WEST END CONSOLIDATED WATER C

By Tom R. Thomas
TOM R. THOMAS

October 25, 2007

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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: Dec. 19, 2007

Party: Ag Pool - Watermaster

By Robert Glaab

19
SB 447967 v1:008350.0001

October 25, 2007

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IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated:

Party: CITY OF CHINO

By

ATEST:

DATED: 2-21-08

Lenna J. Tanner
Lenna J. Tanner, City Clerk

Exhibit 1

WATERMASTER RESOLUTION
NO. 07-05

RESOLUTION OF THE CHINO BASIN WATERMASTER REGARDING THE PEACE II AGREEMENT AND THE OBMP IMPLEMENTATION PLAN

WHEREAS, the Judgment in the Chino Basin Adjudication, *Chino Municipal Water District v. City of Chino, et al.,* San Bernardino Superior Court No. 51010, created the Watermaster and directed it to perform the duties as provided in the Judgment or ordered or authorized by the court in the exercise of the Court's continuing jurisdiction;

WHEREAS, Watermaster has the express powers and duties as provided in the Judgment or as "hereafter" ordered or authorized by the Court in the exercise of the Court's continuing jurisdiction" subject to the limitations stated elsewhere in the Judgment;

WHEREAS, Watermaster, with the advice of the Advisory and Pool Committees has discretionary powers to develop an OBMP for Chino Basin, pursuant to Paragraph 41 of the Judgment;

WHEREAS, in June of 2000, the Parties to the Judgment executed the Peace Agreement providing for the implementation of the OBMP and Watermaster adopted Resolution 00-05 whereby it agreed to act in accordance with the Peace Agreement;

WHEREAS, the Court ordered Watermaster to proceed in accordance with the Peace Agreement and the OBMP Implementation, Exhibit "B" thereto;

WHEREAS, Watermaster adopted and the Court approved Chino Basin Watermaster Rules and Regulations in June of 2001;

WHEREAS, the Peace Agreement, the OBMP Implementation Plan and the Chino Basin Watermaster Rules and Regulations reserved Watermaster's discretionary powers in accordance with Paragraph 41 of the Judgment, with the advice from the Advisory and Pool Committees, and contemplated further implementing actions by Watermaster;

WHEREAS, the Judgment requires that Watermaster in implementing the Physical Solution, and the OBMP have flexibility to consider and where appropriate make adjustments after taking into consideration technological, economic, social and institutional factors in maximizing the efficient use of the waters of the Basin.

WHEREAS, the Parties to the Judgment provided input into the creation of a "Stakeholder Non-Binding Term Sheet" that articulated methods to maximize beneficial use of the Basin ("Peace II measures") was distributed to and considered by each of the Pools, the Advisory Committee and the Watermaster Board and subsequently transmitted to the Court;

WHEREAS, Watermaster will continue to require that to the extent any of the Peace II Implementing Measures constitute "projects" within the meaning of the California Environmental Quality Act ("CEQA"), compliance with CEQA will be required as a pre-condition of Watermaster's issuance of any final, binding approvals; and

WHEREAS, the actions articulated in the "Stakeholder Non-Binding Term Sheet" and contemplated herein to maximize the beneficial use of the groundwater and the Basin benefit the Basin and the Parties to the Judgment.

NOW, THEREFORE, IT IS HEREBY RESOLVED AND DETERMINED THAT:

1. Watermaster caused the completion of a preliminary engineering, hydrogeologic, and technical evaluation of the physical impacts to the Basin and to the Parties to the Judgment that may result from implementation of the Peace II measures. The preliminary evaluation was conducted by Mark Wildermuth of Wildermuth Environmental.

2. The Assistant to the Special Referee, Joe Scalmanini of Luhdorff & Scalmanini Consulting Engineers, transmitted his technical review in March of 2007 ("Report"). In relevant part, the Report states:

> "For planning level analysis, the existing model is a useful and applicable tool to simulate approximate basin response to management actions that involve the quantities and distribution of pumping and recharge in the basin. For example, for the most notable of its applications to date, which has been to conduct a planning level analysis of intended future hydraulic control, the model can be confidently utilized to examine whether groundwater conditions (levels) will form in such a way that hydraulic control will be achieved as result of basin re-operation and, if not, what other changes in basin operation are logically needed to achieve it." (Report at p. 37)

3. Watermaster caused the preparation of a specific project description set forth in Attachment "A" hereto for the purpose of conducting a more refined engineering, hydrogeologic and technical evaluation of the physical impacts to the Basin and to the Parties to the Judgment that may result from implementation of the Peace II measures.

4. Watermaster caused the completion of a macro socioeconomic analysis by Dr. David Sunding, a PhD in economics and professor at the University of California Berkeley set forth in Attachment "B" hereto. The macro analysis provided an evaluation of the macro costs and benefits to the parties as a whole that may be attributable to the Peace II measures.

5. Watermaster caused an update of the previously completed socioeconomic analysis conducted pursuant to the Judgment. The analysis was completed by Dr. Sunding, and it considered the positive and negative impacts of implementing the OBMP, the Peace Agreement, and the Peace II measures, including Watermaster assessments. The analysis also addressed the potential distribution of costs and benefits among the parties that were initiated

with the approval of the Peace Agreement. The study was completed in final draft form on September 13, 2007 and is set forth in Attachment "C" hereto. Each of the Parties to the Judgment has had the opportunity to comment on earlier drafts of the report and on the final draft of the report and to consider the analyses contained therein prior to Watermaster's approval of this Resolution 07-05.

9. Watermaster has caused the preparation of the 2007 Supplement to the Optimum Basin Management Program ("OBMP") addressing Watermaster's efforts to, among other things; pursue Hydraulic Control through Basin Re-Operation as set forth in Attachment "D" hereto.

10. Watermaster has prepared a summary of the cumulative total of groundwater production and desalting from all authorized Desalters and other activities authorized by the 2007 Supplement to the OBMP Implementation Plan as amended as provided in the Peace Agreement in a schedule that: (i) identifies the total quantity of groundwater that will be produced through the proposed Basin Re-Operation to obtain Hydraulic Control, and (ii) characterizes and accounts for all water that is projected to be produced by the Desalters for the initial Term of the Peace Agreement (by 2030) as dedicated water, New Yield, controlled overdraft pursuant to the Physical Solution or subject to Replenishment . This schedule is set forth in Attachment "E" hereto. Watermaster will modify its projections from time to time, as may be prudent under the circumstances.

11. More than fifteen months have passed since the Non-Binding Term Sheet was initially published by Watermaster in its current form and transmitted to the Court for its consideration and more than six months have passed following Watermaster's declaration that any party interested in participating in the development and construction of Future Desalters should identify their interest in making a proposal and no party has stepped forward and made a responsive proposal in lieu of the Western Municipal Water District proposal.

12. The Peace II measures collectively consist of:

(a) Watermaster's election to exercise its reserved discretion as provided in the Judgment, the Peace Agreement and the OBMP Implementation Plan, to amend the Watermaster Rules and Regulations as more fully set forth in Attachment "F" attached hereto and incorporated herein by this reference;

(b) Watermaster's execution and Court approval of the proposed Purchase and Sale Agreement with the Non-Agricultural (Overlying) Pool as more fully set forth in Attachment "G" attached hereto and incorporated herein by this reference;

(c) Watermaster's and the Court's approval of the proposed amendments to the Judgment as more fully set forth in Attachment "H", Attachment "I" and Attachment "J" attached hereto and incorporated herein by this reference;

(d) Watermaster's approval of and further agreement to act in accordance with the Peace II Agreement, including the provisions related to Future Desalters, as more fully set forth in Attachment "K" attached hereto, upon a further order of the

Court directing Watermaster to proceed in accordance with its terms;

(e) Watermaster's and the Court's approval of the 2007 Supplement to the OBMP Implementation Plan as they are more fully set forth in Attachment "D" attached hereto and incorporated herein by this reference; and

(f) Execution of the proposed Second Amendment to the Peace Agreement as more fully set forth in Attachment "L" attached hereto and incorporated herein by this reference, approval by Watermaster and a further order of the Court directing Watermaster to proceed in accordance with its terms.

13. The Overlying (Non-Agricultural), the Overlying (Agricultural) Pool, and the Appropriative Pool have approved the Peace II measures and recommended Watermaster's adoption of this Resolution 07-05

14. The Advisory Committee has approved the Peace II measures and recommended Watermaster's adoption of this Resolution 07-05.

15. In adopting this Resolution and by its agreement to implement the Peace II measures, Watermaster is not committing to carry out any project within the meaning of CEQA unless and until CEQA compliance has been demonstrated for any such project.

16. The Watermaster Board will transmit this Resolution 07-05, and the Peace II implementing measures, and the referenced Attachments to the Court along with other supporting materials and request the Court to approve the proposed Judgment Amendments and to further order that Watermaster proceed to further implement the 2007 Supplement to the OBMP as provided in the Peace II measures.

Date: 10-25-07

for CHINO BASIN WATERMASTER

Attachment A

September 21, 2007

Attachment "A"
Project Description
for the
2007 Amendment to the Chino Basin
Optimum Basin Management Program

Introduction

This document contains the project description for the Chino Basin desalting and re-operation programs that has been distilled from various planning investigations and was described in the Stakeholder Non-Binding Term Sheet. This document was prepared for use in: (a) Chino Basin Watermaster's evaluation of the potential actions to cause Material Physical Injury to the Basin or the Parties to the Judgment; (b) in connection with Watermaster's request for Court review and approval of proposed actions in further implementation of the Optimum Basin Management Program ("OBMP"); and (c) an environmental impact report to be prepared as part of the expansion of the desalters.

Requirements of the 2004 Amendment to the Water Quality Control Plan for the Santa Ana Watershed

Water quality objectives are established by the Regional Water Quality Control Board, Santa Ana Region ("Regional Board") to preserve the beneficial uses of the Chino Basin and the Orange County Basin located downstream of the Chino Basin. Prior to the 2004 Amendment, the Regional Water Quality Control Plan (Basin Plan) contained restrictions on the use of recycled water within the Chino Basin for irrigation and groundwater recharge. The pre-2004 Basin Plan contained TDS "anti-degradation" objectives that ranged from 220 to 330 mg/L over most of the Chino Basin. Ambient TDS concentrations slightly exceeded these objectives. There was no assimilative capacity for TDS; thus, the use of the Inland Empire Utilities Agency's ("IEUA") recycled water for irrigation and groundwater recharge would have required mitigation even though the impact of this reuse would not have materially impacted future TDS concentrations or impaired the beneficial uses of Chino Basin groundwater.

In 1995, the Regional Board initiated a collaborative study with 22 water supply and wastewater agencies, including Watermaster and the IEUA, to devise a new TDS and nitrogen (total inorganic nitrogen or TIN) control strategy for the Santa Ana Watershed. This study culminated in the Regional Board's adoption of the 2004 Basin Plan Amendment in January 2004 (Santa Ana Regional Water Quality Control Board, 2004). The 2004 Basin Plan Amendment included two sets of TDS objectives – antidegradation objectives that ranged between 280, 250 and 260 mg/L for Management Zones 1, 2, and 3, respectively; and a "maximum benefit"-based TDS objective of 420 mg/L for the Chino North Management Zone, which consists of almost all of Management Zones 1, 2, and 3. The relationship of the Management Zones that were developed for the OBMP and the "maximum benefit" based management zones is shown in Figure 1. Under the "maximum benefit"-based objective, the new TDS concentration limit for recycled water

that is to be used for recharge and other direct uses is 550 mg/L as a 12-month average. This discharge requirement has been incorporated into the IEUA's National Pollutant Discharge Elimination System (NPDES) permits for its wastewater treatment facilities.

In order for the IEUA and Watermaster to gain access to the assimilative capacity afforded by the "maximum benefit"-based objectives, the IEUA and Watermaster have to demonstrate that the maximum beneficial use of the waters of the State is being achieved. The 2004 Basin Plan Amendment contains a series of commitments that must be met in order to demonstrate that the maximum benefit is being achieved. These commitments include:

1. The implementation of a surface water monitoring program;
2. The implementation of groundwater monitoring programs;
3. The expansion of Desalter I to 10 million gallons per day (mgd) and the construction of a 10-mgd Desalter II
4. The commitment to future desalters pursuant to the OBMP and the Peace Agreement;
5. The completion of the recharge facilities included in the Chino Basin Facilities Improvement Program;
6. The management of recycled water quality;
7. The management of the volume-weighted TDS and nitrogen in artificial recharge to less than or equal to the maximum benefit objectives;
8. The achievement and maintenance of hydraulic control of subsurface outflows from the Chino Basin to protect the Santa Ana River water quality; and
9. The determination of the ambient TDS and nitrogen concentrations in the Chino Basin every three years.

The IEUA and Watermaster have previously demonstrated compliance with all of these requirements with the sole exception of hydraulic control. Hydraulic control is defined as the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimus quantities. Hydraulic control ensures that the water management activities in the Chino North Management Zone do not result in material adverse impacts on the beneficial uses of the Santa Ana River downstream of Prado Dam. Achieving hydraulic control also maximizes the safe yield of the Chino Basin as required by Paragraph 30 and 41 of the Judgment. Two reports by Wildermuth Environmental, Inc. ("WEI"), prepared in 2006 at the direction of Watermaster, demonstrate that hydraulic control has not yet been achieved in the area between the Chino Hills and Chino Desalter I, well number 5 (WEI, 2006a and b).

Without hydraulic control, the IEUA and Watermaster will have to cease the use of recycled water in the Chino Basin and will have to mitigate the effects of using recycled water back to the adoption of the 2004 Basin Plan Amendment, which is December 2004. The demand for recycled water in the Chino Basin is projected to reach from about 12,500 acre-ft/yr in 2005 to 58,000 acre-ft/yr in 2010, 68,000 acre-ft/yr in 2015, 79,000 acre-ft/yr in 2020 and 89,000 acre-ft/yr in 2025. Recycled water reduces the demand of

State Water Project ("SWP") water by an equal amount, thereby reducing the demand on the Sacramento Delta and reducing energy consumption. Recycled water is a critical element of the OBMP and water supply reliability in the Chino Basin area.

Failure to achieve hydraulic control could lead to restrictions from the Regional Board on the use of imported SWP water for replenishment when the TDS concentration in SWP water exceeds the antidegradation objectives. The Regional Board produced a draft order that would treat the recharge of SWP water as a waste discharge. There would be no assimilative capacity if the Chino Basin antidegradation objectives were in force. Figure 2 shows the percent of time that the TDS concentration at Devil Canyon is less than or equal to a specific value based on observed TDS concentrations at the Devil Canyon Afterbay. This restriction will occur about 35, 52, and 50 percent of the time for Management Zones 1, 2, and 3, respectively. This will affect other basins in the Santa Ana Watershed, and the Regional Board is encouraging all basin managers to propose "maximum benefit"-based objectives similar to those in Chino Basin. With the "maximum benefit"-based TDS objective in the Chino Basin, there is assimilative capacity, and there would be no such restriction on the recharge of imported water.

The Regional Board is using its discretion in granting "maximum benefit" objectives even though hydraulic control has not been demonstrated. The Regional Board will continue to use "maximum benefit"-based objectives in the Chino Basin as long as the IEUA and Watermaster continue to develop and implement, in a timely manner, the OBMP desalter program as described in the project description below.

The Stakeholder Non-Binding Term Sheet: Peace II Implementing Measures

Under Watermaster oversight, the Chino Basin OBMP stakeholders have been engaged in, among other things, complying with the Peace Agreement provision regarding the planning and financing of the expansion of the OBMP desalting program to its full planned capacity generally referred to as Future Desalters (See Peace Agreement Article VII.). The stakeholders have been evaluating various alternatives since early 2004 and produced the Stakeholders' Non-Binding Term Sheet that was transmitted to the Court along with a request by Watermaster for further technical review by the Assistant to the Special Referee in May of 2006. The Assistant's review was completed in March of 2007.

The Non-Binding Term Sheet includes several items that will collectively further implement the existing OBMP Implementation Plan (Peace II Measures). The two items of interest to this project description are: the expansion of the desalting program and "Basin Re-Operation," which are both physically described in Section II, Refined Basin Management Strategy, subsections A and B; and Section IV, Future Desalters.

The construction of a new desalter well field will be sized and located to achieve hydraulic control. The desalter will produce at least 9 mgd of product water. New groundwater production for the expanded desalter program will occur in the Southern end of the basin. Some of this new desalter supply will come from a new well field that will

be constructed in a location among Desalter I wells 1 through 4 and west of these wells. These wells will be constructed to pump groundwater from the shallow part of the aquifer system, which is defined herein to be the saturated zone that occurs within about 300 feet of the ground surface. The total groundwater pumping for all of the desalters authorized in the term sheet will be about 40,000 acre-ft/yr.

"Re-operation" means the increase in controlled overdraft, as defined in the Judgment, from 200,000 acre-ft over the period of 1978 through 2017 to 600,000 acre-ft through 2030 with the 400,000 acre-ft increase allocated specifically to the meet the replenishment obligation of the desalters. Re-operation is required to achieve hydraulic control. Re-Operation and Watermaster's apportionment of controlled overdraft will not be suspended in the event Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been produced so long as: (i) Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures to avoid Material Physical Injury and that equitably addresses this contingency, and (ii) Watermaster continues to demonstrate credible material progress toward obtaining sufficient capacity to recharge sufficient quantities of water to cause the Basin to return to a new equilibrium at the conclusion of the Re-Operation period. In addition to contributing to the achievement of hydraulic control, Re-operation will contribute to the creation of new yield. Watermaster has the discretion to apportion the 400,000 acre-feet increase in controlled overdraft under a schedule for re-operation that best meets the needs of the Parties and the conditions of the basin over the Initial Term of the Peace Agreement (before June 30, 2030).

The Project Description

The proposed project has two main features: the expansion of the desalter program such that the groundwater pumping for the desalters will reach about 40,000 acre-ft and that the pumping will occur in amounts and at locations that contribute to the achievement of hydraulic control; and the strategic reduction in groundwater storage (re-operation) that, along with the expanded desalter program, significantly achieves hydraulic control.

The Expanded Desalting Program. A new well field, referred to as the Chino Creek Well Field (CCWF), will be constructed. The capacity of this well field could range from about 5,000 acre-ft/yr to 7,700 acre-ft/yr. The capacity of the CCWF will be determined during the design of the well field. Groundwater produced at the CCWF will be conveyed to Desalter I. The approximate location of the CCWF is shown in Figure 3. The capacity of Desalter I will not be increased; although, it is likely that the treatment systems at Desalter I will be modified to accommodate the chemistry of the raw water pumped from the CCWF. The product water capacity of Desalter I is about 14,200 acre-ft/yr which corresponds to a raw water pumping requirement of about 16,100 acre-ft/yr. The volume of groundwater pumping at existing Desalter I wells 13, 14, and 15 and conveyed to Desalter I will be reduced to accommodate new pumping at the CCWF.

The treatment capacity of Desalter II will be increased from 10,400 acre-ft/yr to about 21,000 acre-ft/yr, which corresponds to the raw water pumping requirement of 11,800

acre-ft/yr expanding to 23,900 acre-ft/yr. The increase in groundwater pumping for Desalter II will come in part from greater utilization of the existing Desalter II wells and the addition of new wells to the Desalter II well field from either the construction of new wells and/or connecting Desalter I wells 13, 14, and 15.

The new product water developed at Desalter II would be conveyed to the Jurupa Community Services District ("JCSD"), the City of Ontario, and/or Western Municipal Water District ("WMWD") through existing and new pipelines. The facilities required to convey this water include pipelines, pump stations, and reservoirs. The precise locations of these facilities are unknown at this time.

The most current working description of these facilities is contained a report that was prepared for the City of Ontario and WMWD, entitled Chino Desalter Phase 3 Alternatives Evaluation (Carollo, 2007). Currently (September 2007), the City of Ontario and the WMWD are working with the JCSD and others to refine the alternatives in the Carollo report. The assumed startup for the expanded desalters is January 2013.

Finally, 40,000 acre-ft/yr of groundwater is expected to be produced by all Existing and Future Desalters. The parties that are engaged in developing the desalter expansion are planning for a total of 40,000 acre-ft/yr of desalter groundwater pumping. Watermaster, on behalf of the Parties, will review the desalter pumping requirements to achieve hydraulic control during the project evaluation in the summer and fall of 2007.

Re-Operation. Through re-operation and pursuant to a Judgment Amendment, Watermaster will engage in controlled overdraft and use up to a maximum of 400,000 acre-ft to off-set Desalter replenishment through 2030. After the 400,000 acre-ft is exhausted and the period of Re-Operation is complete, Watermaster will recalculate the safe yield of the basin. The Re-Operation will have no impact on Operating Safe Yield or on the parties' respective rights thereto. For project evaluation purposes, the Re-Operation and controlled overdraft of 400,000 will be examined under two different schedules that bracket the range in expected schedules. The first schedule will be based on allocating the 400,000 acre-ft at a constant percentage of desalter pumping such that the 400,000 acre-ft is used up in a constant proportion of the desalter pumping through 2030. The second schedule will use the controlled overdraft to off-set desalter the applicable replenishment obligation completely each year until the 400,000 acre-ft is completely exhausted.

The New Yield as defined by the Peace Agreement, attributable to the authorized desalters and the reduction in storage from re-operation, will be assigned to the authorized desalters. The resulting replenishment obligation assigned to the authorized desalters will then be handled as any other replenishment obligation pursuant to the Judgment. The New Yield is expected to come from a reduction in groundwater discharge from the Chino Basin to the Santa Ana River within the reservoir created by Prado Dam and from new induced recharge of the Santa Ana River upstream of Prado Dam.

Other Important Facility and Operational Plans that Will Occur Concurrently with the Proposed Project

Expansion of Artificial Recharge Capacity. Watermaster and the IEUA will need to expand artificial recharge capacity in the Chino Basin to meet future replenishment obligations. This will occur independently from the proposed project. Current supplemental water recharge capacity is about 91,000 acre-ft/yr. The required recharge capacity to meet future replenishment obligations is about 150,000 acre-ft, a capacity expansion of about 59,000 acre-ft/yr. This expansion will occur through construction of new spreading basins, improvements to existing spreading basins and stormwater retention facilities, aquifer storage and recovery wells. The proposed project will be analyzed without recharge expansion projects.

Expansion of Storage and Recovery Programs. Currently, there is only one groundwater storage program approved in the Chino Basin: the 100,000 acre-ft Dry Year Yield Program with the Metropolitan Water District of Southern California (Metropolitan). Metropolitan, the IEUA, and Watermaster are considering expanding this program an additional 50,000 acre-ft to 150,000 acre-ft over the next few years. Watermaster is also considering an additional 150,000 acre-ft in programs with non-party water agencies. The total volume of groundwater storage allocated to storage programs that could overlay the proposed project is about 300,000 acre-ft.

These storage programs, if not sensitive to the needs of hydraulic control, could cause groundwater discharge to the Santa Ana River and result in non-compliance with hydraulic control and a loss in safe yield. There have been no planning investigations that articulate how the expansion from the existing 100,000 acre-ft program to the future 300,000 acre-ft set of programs will occur and thus this expansion is not included herein

References

Santa Ana Regional Water Quality Control Board, 2004, Resolution No R8-2004-0001, http://www.waterboards.ca.gov/santaana/pdf/04-01.pdf

Stakeholder Non-Binding Term Sheet, in the form transmitted to the Court, 2006

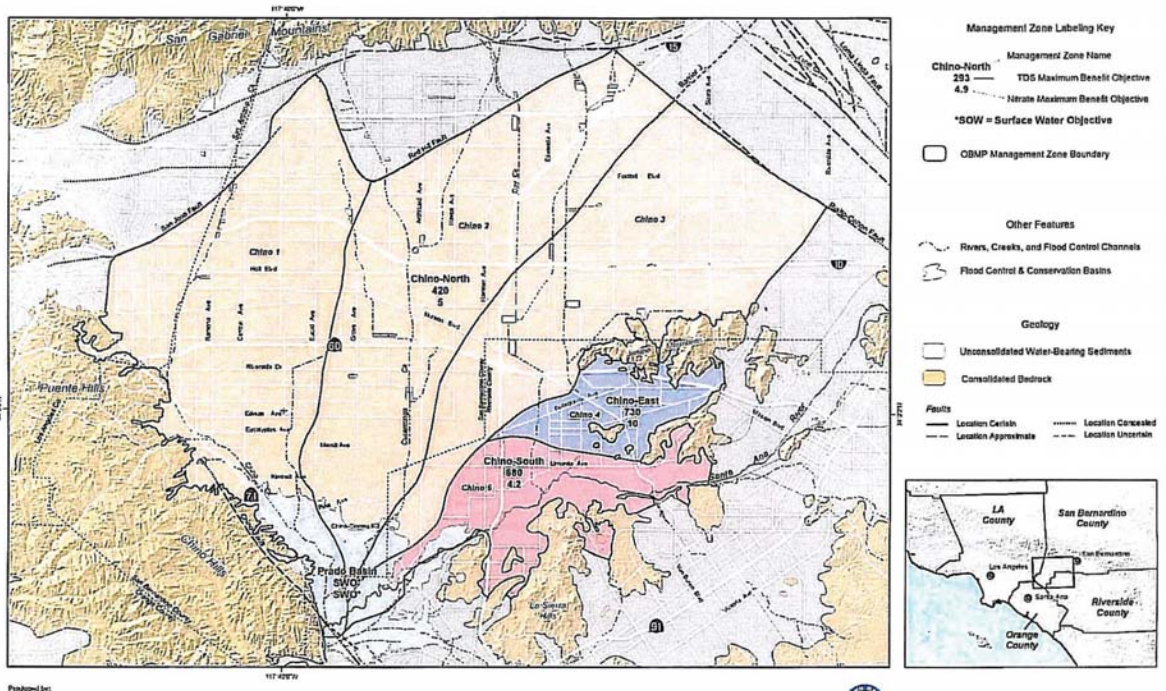
Wildermuth Environmental, Inc., 2006a. Draft Report, Analysis of Future Replenishment and Desalter Plans Pursuant to the Peace Agreement and Peace II Process, April 2006; prepared for the Chino Basin Watermaster.

Wildermuth Environmental, Inc., 2006b. Chino Basin Maximum Benefit Monitoring Program Annual Report, April 2006; prepared for the Chino Basin Watermaster and Inland Empire Utilities Agency.

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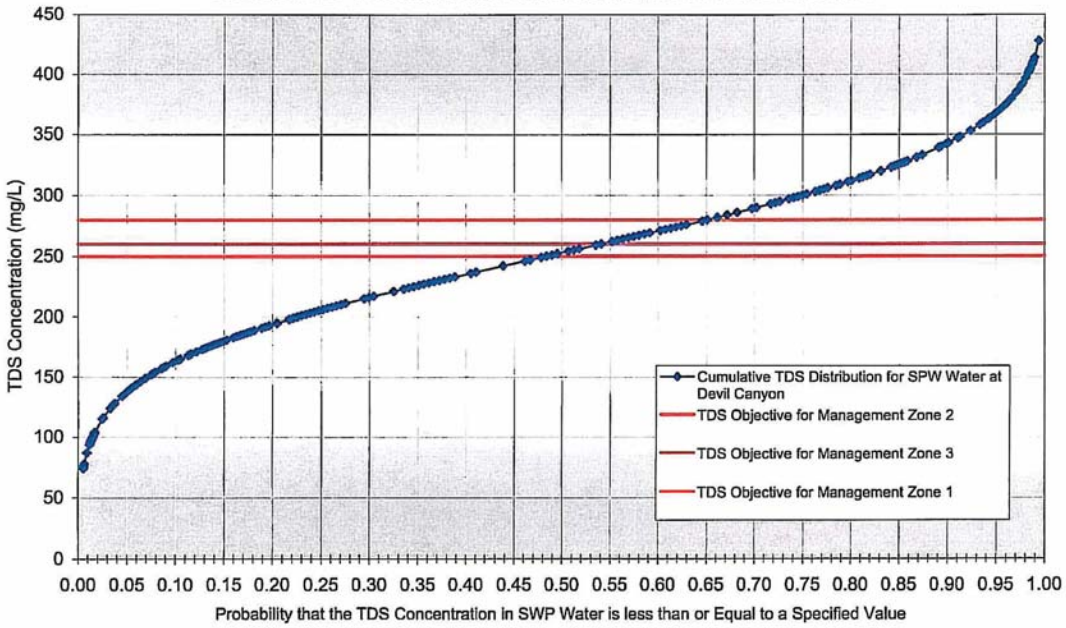
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Comparison of OBMP Management Zones and RWQCB Basin Plan Management Zones

Figure 1

Figure 2
Historical TDS Concentration in State Water Project Water at Devil Canyon



20070701Figure 2 Devils_TDS.xls – Figure 2 Project Description

Attachment B

Analysis of Aggregate Costs and Benefits of Hydraulic Control, Basin Re-Operation and Desalter Elements of Non-Binding Term Sheet

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November 29, 2006

Summary

The report measures the economic costs and benefits of achieving hydraulic control through re-operation of the Chino Basin. Various scenarios are considered in the analysis, with scenarios chosen to reflect uncertainty regarding future values of water, the time path of annual overdrafts selected to dewater the basin, and the use of the resulting induced inflow from the Santa Ana River. As shown in Table 1, depending on the scenario chosen, the net benefits of achieving hydraulic control through basin re-operation range between $283.1 million and $438.8 million in 2006 dollars.

1. Introduction

Hydraulic control refers to the elimination or reduction to negligible quantities of discharge from the Chino North Management Zone to the Santa Ana River. Basin re-operation is defined as the increase in controlled overdraft as defined in the Judgment from 200,000 acre-feet over the period 1978 through 2017, to 600,000 acre-feet through 2030 with the 400,000 acre-feet allocated specifically to meet the replenishment obligation of the desalters.

2. Framework

The model of groundwater value used in this report is standard in the academic literature.[1] The net benefits in each period resulting from access to a groundwater resource are the gains from pumping (i.e., the demand for water) minus the costs of extraction in the current period and a "user cost" term that reflects the change in future consumption possibilities resulting from current choices. The stream of annual net benefits is then discounted back to current dollars using a discount factor predicated on the rate of interest.

[1] Brozovic, N., D. Sunding and D. Zilberman, "Optimal Management of Groundwater Over Space and Time." *Frontiers in Water Resource Economics*. D. Berga and R. Goetz, eds. New York: Springer-Verlag, 2005; Gisser, M., and Sanchez, D.A. "Competition versus Optimal Control in Groundwater Pumping." *Water Resources Research* (1980): 638-642; Brown, G., Jr., and Deacon, R. "Economic Optimization of a Single-Cell Aquifer." *Water Resources Research* (1975): 557-564.

The interest rate used in the analysis is 5.5%. This rate corresponds to the current risk-free long-term rate of interest, a relevant rate for public agencies with good credit. The discount factor for a payment occurring in some future period t is then $(1.055)^{-t} \approx e^{-0.055t}$.

Let y_t denote groundwater produced during period t, and x_t equal the stock of groundwater at beginning of period t. The value of the groundwater resource is then

$$Value = \sum_{t=0}^{\infty}(1+r)^{-t}\left[B(y_t) - C(x_t, y_t)\right],$$

where $B(y_t)$ denotes the benefits from groundwater production in period t, and $C(x_t, y_t)$ is the cost of extraction and recharge. In an economic optimization model, the problem is to find the time path of production and stock that maximizes the present value of access to the aquifer, subject to physical constraints such as the equation of motion $x_{t+1} = x_t + g(x_t, y_t) - y_t$ (where $g(x_t, y_t)$ denotes natural and artificial recharge) and regulatory constraints such as water quality objectives and requirements to operate the basin in a steady-state condition.

Viewed this way, basin re-operation and its alternatives can be modeled as different evolutions of production, stock and recharge. The net benefit of a particular basin re-operation strategy versus a baseline that maintains the current stock of groundwater is the difference of present value resulting from a particular choice of these policy variables.

The study period extends indefinitely into the future, but the period between the present and 2030 is modeled in more detail. This feature results from the fact that the Peace Agreement lasts until 2030, and more detailed environmental and water use modeling is available to this date. As described below, terminal values are assigned to key parameters from 2031 on, and at this point the groundwater system in the Chino Basin is assumed to enter into a steady state, with no expected change in production, groundwater elevation or recharge amounts.

Table 2 displays the assumptions made about groundwater production from the Chino Basin. All figures in the table are common to all scenarios considered, and thus these assumptions are not the basis for differences in value between scenarios. The table shows groundwater production increasing steadily throughout the study period. Desalter production is also increasing throughout the study period. Operating yield is set at 145,000 acre-feet through 2017, at which point it declines to 140,000 acre-feet annually. Finally, new stormwater recharge is assumed to be 12,000 acre-feet annually.

It is necessary to describe a scenario without basin re-operation in order to calculate the net benefits, if any, from this type of strategy. Table 3 displays the physical consequences of such an alternative. If the basin is not de-watered, then hydraulic control will not be achieved, and there will be water quality costs as a result. One such consequence is that relatively high-quality water must be used for recharge. In particular, the Basin would lose the ability to use relatively inexpensive recycled water for replenishment purposes

and would be forced to use water purchased from MWD instead.[2] Thus, Table 3 shows that the entire replenishment obligation for both normal and desalter production is met through the purchase of replenishment water from MWD.

In the event that hydraulic control is achieved, there are two types of benefits to the Chino Basin as a whole. The first benefit relates to water quality. As discussed above, if hydraulic control is achieved, then recycled water can be used for 30% of the total Basin replenishment obligation, up to an assumed capacity of 30,000 acre-feet annually.[3] The second benefit is that lowering the groundwater elevation in the Basin induces an inflow of water from the Santa Ana River. Specifically, forgiving a reduction in the stock of groundwater in the Basin results in an average of 9,900 acre-feet annually until the 400,000 acre-feet of depletion credits are exhausted, and then 12,500 acre-feet annually thereafter. This natural recharge is new yield in the Basin; as discussed below, it can be used either for reducing the desalter replenishment obligation or as an asset in its own right.

3. Scenarios

The valuation model is implemented under a variety of assumptions about how re-operation will occur, how the Santa Ana River inflows are treated, and the level of future water prices. This section describes the construction of alternative scenarios.

Implementation of Basin Re-Operation

The basic principle of basin re-operation is that it is a means of achieving hydraulic control by increasing cumulative overdraft by 400,000 acre-feet through 2030. Overdraft is to be achieved by forgiving the replenishment obligation of the desalters by some annual amount over a defined period of time. This general principle is silent about *how* the total quantity of forgiveness of desalter replenishment is to be allocated over time.

This analysis considers two possible implementation scenarios. The first scenario, termed the straightline alternative, envisions an annual overdraft of 20,346 acre-feet occurring until 2030, at which time the annual overdraft would fall to zero and the system is assumed to enter into a new steady-state from 2031 onward. The second scenario, called the most rapid depletion path alternative, sets the annual overdraft to eliminate the desalter replenishment obligation for as long as possible.

Tables 4 and 7 display annual overdraft amounts under these two alternatives for implementing basin re-operation. As described, the straightline alternative entails constant annual overdraft quantities, resetting to zero from 2031 onwards. The most rapid

[2] Alternatively, recycled water would have to be desalted prior to recharge. Costs are not available at this time for this option.
[3] Assumptions provided by Watermaster staff. If hydraulic control is achieved, it may be possible to increase this limit. In this case, the benefits resulting from basin re-operation would increase.

depletion path reaches a maximum annual overdraft of 30,289 acre-feet before dropping to zero in 2020.

Allocation of Induced Santa Ana River Inflow

A second dimension along which the scenarios vary is with regard to the allocation of Santa Ana River inflows induced by the reduction of the groundwater stock. A total of 12,500 acre-feet of new yield is assumed to result from the dewatering, and the scenarios differ in terms of the use of this new yield. One scenario allocates all Santa Ana River inflows from re-operation to reducing the desalter replenishment obligation. An alternative scenario treats these inflows as a resource to be used for any purpose; consequently, desalter replenishment obligations are higher under this assumption.

Tables 5 and 6 relate to the straightline depletion case and show replenishment obligations and sources under the two Santa Ana River inflow allocation alternatives. In Table 5, new yield is allocated to desalter replenishment, and the desalter replenishment obligation is negligible in the near term and reaches a maximum of 9,943 acre-feet during the study period. In Table 6, by contrast, total replenishment obligations are higher since the new yield can be used for any chosen purpose.

Tables 8 and 9 show replenishment obligations under the most rapid depletion path scenario. Results are similar as in the straightline depletion scenario, with the exception that desalter replenishment is forestalled until 2025 if new yield is allocated to this purpose.

Future Water Prices

Given the important role of relative prices in the economic analysis, and given uncertainties regarding the evolution of water values in Southern California, the analysis considers two alternative scenarios regarding future water prices. These scenarios are taken from MWD and are commonly referred to as the high rate and low rate scenarios. MWD scenarios cover Tier 1 and Tier 2 water, as well as replenishment water. The high rate scenario has the Tier 2 rate growing at an annual rate of 3.11% for the next five years, and then by 4.50% from 2011 to 2030. The replenishment rate grows at 6.94% through 2011, and then at 4.50% to 2030. In the low rate scenario, the Tier 2 rate grows by 2.28% annually for the next five years, and then by 3.00% from 2011 to 2030. The replenishment rate is assumed to grow by 4.79% through 2011, and by 3.00% thereafter.

The current price of recycled water for replenishment is assumed to be $69 per acre-foot.[4] In the high rate scenario, this price was assumed to grow at the same rate of inflation as

[4] One public comment received after the July 26, 2006 presentation stated that the actual price paid for recycled water should be used in the analysis. While this price is not yet known, it is likely to exceed $69 per acre-foot. Note, however, that this study considers the aggregate costs and benefits of elements of the non-binding term sheet. Thus, changes in the price of recycled water have distributional as opposed to efficiency effects, that is, they change the relative level of benefits enjoyed by the parties in the Chino Basin rather than affecting the total level of benefits.

the Tier 2 and MWD replenishment prices: 4.50%. Similarly, the recycled water price grows by 3.00% annually in the low rate scenario.

4. Other Effects of Basin Re-Operation

An additional benefit of hydraulic control is a reduction in storage losses. Measuring the value of reduced storage losses is conditioned on several factors that are not fully known at present. Of course, the ex post performance of any groundwater storage program depends on the sequence of puts and takes, which depend in turn on the sequence of wet and dry years. Based on conversations with Watermaster staff, the groundwater storage program is assumed to be 400,000 acre-feet over the study period, but may range from 300,000 to 500,000 acre-feet.[5] Calculations provided by Wildermuth Environmental detail the relationship between average storage over the life of the MWD Dry Year Yield program and associated losses at 0.66 and 2 percent. Table 12 summarizes cumulative losses through 2028, together with present values calculated using the high and low rate scenarios for MWD replenishment rates as described above.

Assuming 2 percent loss and a 400,000 acre-foot storage program, the present value of reduced storage losses is $24.9 million in 2006 dollars in the high rate scenario and $20.4 million in the low rate scenario. These calculations are performed ex ante, and the actual magnitude of reduced storage losses will depend on factors including the size of the storage program, the percentage storage loss, the timing of puts and takes, and the actual replenishment rates charged by MWD. For the purpose of aggregating reduced storage loss benefits with other benefits and costs of basin re-operation, we will assume a 400,000 acre-foot storage program for both the high and low rate scenarios with storage losses equal to half of the amounts in Table 12 (recall that storage losses could range from 0 to 2 percent). The corresponding values of reduced storage losses are $12.4 million and $10.2 million for the high and low rate scenarios, respectively.

Achieving hydraulic control through basin re-operation will also result in higher pumping costs since forgiveness of the desalter replenishment operation is intended to lower the groundwater elevation in certain regions. The information needed to calculate the present value of increased pumping costs includes the quantity-weighted average change in lift in the Basin resulting from re-operation, the energy requirement per unit lift and energy costs per kilowatt-hour. Wildermuth Environmental provided the weighted average changes in groundwater elevation. The price of electricity is assumed to be $0.14/kwh, and the pumping efficiency is taken to be 75 percent. The California Energy Commission forecasts that commercial and agricultural electricity rates charged by investor-owner utilities operating in California will decline slightly in nominal terms until 2013, when

[5] The Peace Agreement provides that there is Target Storage of 500,000 acre-feet *in excess* of then existing storage, whereas this report only considers the Safe Harbor quantity of 500,000 acre-feet of storage in total. In some sense, there is a tradeoff between the decision to pursue max-benefit and the feasibility of obtaining the higher amount of storage. It should also be noted, however, that the basin is at the limit of shift capacity for export, and expansion of recharge to achieve greater storage is costly. Further, the PEIR only considered an additional 250,000 acre-feet of storage.

their forecast terminates.[6] This analysis assumes that nominal electricity prices are constant.

Combining this information, increased pump lift costs have a present value of $14.9 million in the straightline depletion scenario. In the rapid pulldown scenario, re-operation has a larger impact on the present value of energy costs since the groundwater elevation is reduced to the same level but at an earlier date. Increased energy costs have a present value of $19.4 million in this scenario. Both calculations include increased energy costs in the new basin steady state achieved after 2030.

5. Results

Table 1 summarizes the results of the economic analysis. The figures in the table are the net benefits resulting from access to the Chino Basin aquifer under the alternative management and price scenarios described in the previous section. In all cases, basin re-operation results in aggregate net benefits. However, there are significant differences in net benefits depending on the realization of future water prices and the use of Santa Ana River inflows induced by reducing the stock of groundwater. The rapidity with which basin re-operation is implemented matters less.

When Santa Ana River inflow is allocated to desalter replenishment and overdraft occurs in constant annual amounts to 2030, basin re-operation results in gains of between $283.1 and $391.4 million in present value terms, depending on the growth of water prices and how the replenishment credit is used over time. These gains result from the ability to use recycled water for a fraction of recharge if hydraulic control is achieved, the value of new yield, and the value of the forgiven desalter replenishment.[7]

Since new yield is reliable, in any case more reliable than a supply of replenishment water, allocating it to desalter replenishment would seem to be inefficient. The Tier 2 rate is well above the price of replenishment water, which is a weighted average of the MWD replenishment rate and the price of recycled water. When Santa Ana River inflows are decoupled from replenishment obligations, the gains from straightline basin re-operation are between $341.9 and $438.8 million.

There is a small increase in the net benefits of basin re-operation when the most rapid overdraft strategy is implemented. Several factors explain this result. First, in the most rapid depletion scenario, the 30,000 acre-foot constraint on annual recycling recharge binds more frequently. Accordingly, less recycled water is recharged over the study

[6] http://www.energy.ca.gov/electricity/rates_iou_vs_muni_nominal/medium_commercial.html; http://www.energy.ca.gov/electricity/rates_iou_vs_muni_nominal/agricultural.html

[7] Another potential source of loss is the option value of the water taken from the groundwater stock. That is, water used to avoid desalter replenishment is water that is not available in the event of a major disruption in surface water supplies to the region. Given the difficulty of describing and quantifying these future states of nature, option values have not been calculated. However, conversations with Watermaster staff indicate that dewatering will not result in any meaningful loss of operational flexibility since the percentage depletion of the aquifer envisioned through re-operation is relatively small.

period under this scenario. Second, while the most rapid depletion strategy delays replenishment, it also hastens the date at which a large replenishment obligation occurs once the desalter replenishment forgiveness of 400,000 acre-feet is exhausted.[8] Given the relatively low real discount rate used in this study (i.e., the nominal discount rate minus the rate of growth of water prices), it is not surprising that dynamic factors such as this do not have a large effect on net benefits.

[8] This study has not considered the capital and operating costs of expanding recharge capacity. Allocating Santa Ana River inflows to desalter replenishment delays the date at which capacity is exceeded, as does the most rapid depletion strategy.

Table 1: Net Benefits of Hydraulic Control, Basin Re-Operation and Desalter Production

(Figures in millions of 2006 dollars)

Gain Over Baseline: SAR Inflow Allocated to Desalter Replenishment

	High Rate	*Low Rate*
Straightline	388.6	283.1
Most Rapid	391.4	288.4

Gain Over Baseline: SAR Inflow Unallocated

	High Rate	*Low Rate*
Straightline	436.2	341.9
Most Rapid	438.8	347.7

Source: Calculated.

Table 2: Production, Operating Yield and Stormwater Recharge

Year	*Total Production*	*Chino Desalter Production*	*Operating Yield*	*New Stormwater Recharge*
2006	223,505	30,019	145,000	12,000
2007	230,566	31,923	145,000	12,000
2008	237,634	33,827	145,000	12,000
2009	244,702	35,731	145,000	12,000
2010	251,874	37,748	145,000	12,000
2011	251,768	38,980	145,000	12,000
2012	251,661	40,212	145,000	12,000
2013	251,551	41,445	145,000	12,000
2014	251,557	42,789	145,000	12,000
2015	250,216	42,789	145,000	12,000
2016	250,427	42,789	145,000	12,000
2017	250,640	42,789	145,000	12,000
2018	250,851	42,789	140,000	12,000
2019	251,060	42,789	140,000	12,000
2020	251,270	42,789	140,000	12,000
2021	254,049	42,789	140,000	12,000
2022	256,827	42,789	140,000	12,000
2023	259,605	42,789	140,000	12,000
2024	262,384	42,789	140,000	12,000
2025	265,163	42,789	140,000	12,000
2026	266,133	42,789	140,000	12,000
2027	267,104	42,789	140,000	12,000
2028	268,074	42,789	140,000	12,000
2029	269,044	42,789	140,000	12,000
2030	270,014	42,789	140,000	12,000

Source: Wildermuth Environmental.

Table 3: Replenishment Obligations and Sources – No Basin Re-Operation

Year	*Normal Production Replenishment Obligation*	*Chino Desalter Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	36,487	30,019	66,505	0
2007	41,643	31,923	73,566	0
2008	46,806	33,827	80,634	0
2009	51,970	35,731	87,702	0
2010	57,126	37,748	94,874	0
2011	55,788	38,980	94,768	0
2012	54,448	40,212	94,661	0
2013	53,107	41,445	94,551	0
2014	51,768	42,789	94,557	0
2015	50,427	42,789	93,216	0
2016	50,638	42,789	93,427	0
2017	50,851	42,789	93,640	0
2018	56,062	42,789	98,851	0
2019	56,271	42,789	99,060	0
2020	56,482	42,789	99,270	0
2021	59,260	42,789	102,049	0
2022	62,038	42,789	104,827	0
2023	64,816	42,789	107,605	0
2024	67,595	42,789	110,384	0
2025	70,374	42,789	113,163	0
2026	71,344	42,789	114,133	0
2027	72,315	42,789	115,104	0
2028	73,285	42,789	116,074	0
2029	74,255	42,789	117,044	0
2030	75,225	42,789	118,014	0

Source: Calculated.

Normal Production Replenishment Obligation = Total Production – Desalter Production – Operating Yield – New Stormwater Recharge

Desalter Replenishment Obligation = Desalter Production

Table 4: Overdraft and SAR Inflow – Straightline Depletion Scenario

Year	*Annual Overdraft*	*Cumulative Overdraft*	*SAR Inflow*
2006	16,000	16,000	9,900
2007	16,000	32,000	9,900
2008	16,000	48,000	9,900
2009	16,000	64,000	9,900
2010	16,000	80,000	9,900
2011	16,000	96,000	9,900
2012	16,000	112,000	9,900
2013	16,000	128,000	9,900
2014	16,000	144,000	9,900
2015	16,000	160,000	9,900
2016	16,000	176,000	9,900
2017	16,000	192,000	9,900
2018	16,000	208,000	9,900
2019	16,000	224,000	9,900
2020	16,000	240,000	9,900
2021	16,000	256,000	9,900
2022	16,000	272,000	9,900
2023	16,000	288,000	9,900
2024	16,000	304,000	9,900
2025	16,000	320,000	9,900
2026	16,000	336,000	9,900
2027	16,000	352,000	9,900
2028	16,000	368,000	9,900
2029	16,000	384,000	9,900
2030	16,000	400,000	9,900

Sources: Annual and Cumulative Overdraft: Assumed; SAR Inflow, Wildermuth Environmental.

Table 5: Replenishment Obligations and Sources – Straightline Depletion Scenario with SAR Inflow Allocated to Desalter Replenishment

Year	*Normal Production Replenishment Obligation*	*Chino Desalter Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	36,487	4,119	28,424	12,182
2007	41,643	6,023	33,366	14,300
2008	46,806	7,927	38,314	16,420
2009	51,970	9,831	43,261	18,541
2010	57,126	11,848	48,282	20,692
2011	55,788	13,080	48,208	20,660
2012	54,448	14,312	48,133	20,628
2013	53,107	15,545	48,056	20,595
2014	51,768	16,889	48,060	20,597
2015	50,427	16,889	47,121	20,195
2016	50,638	16,889	47,269	20,258
2017	50,851	16,889	47,418	20,322
2018	56,062	16,889	51,065	21,885
2019	56,271	16,889	51,212	21,948
2020	56,482	16,889	51,359	22,011
2021	59,260	16,889	53,304	22,845
2022	62,038	16,889	55,249	23,678
2023	64,816	16,889	57,194	24,512
2024	67,595	16,889	59,139	25,345
2025	70,374	16,889	61,084	26,179
2026	71,344	16,889	61,763	26,470
2027	72,315	16,889	62,443	26,761
2028	73,285	16,889	63,121	27,052
2029	74,255	16,889	63,801	27,343
2030	75,225	16,889	64,480	27,634

Source: Calculated.

Normal Production Replenishment Obligation = Total Production – Desalter Production – Operating Yield – New Stormwater Recharge

Desalter Replenishment Obligation = Desalter Production – Annual Overdraft – SAR Inflow

Recycling Replenishment = min[0.3*(Normal Production Replenishment Obligation + Desalter Replenishment Obligation), 30,000]

MWD Replenishment = Normal Production Replenishment Obligation + Desalter Replenishment Obligation - Recycling Replenishment

Table 6: Replenishment Obligations and Sources – Straightline Depletion Scenario with SAR Inflow Unllocated

Year	*Total Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	50,505	35,354	15,152
2007	57,566	40,296	17,270
2008	64,634	45,244	19,390
2009	71,702	50,191	21,511
2010	78,874	55,212	23,662
2011	78,768	55,138	23,630
2012	78,661	55,063	23,598
2013	78,551	54,986	23,565
2014	78,557	54,990	23,567
2015	77,216	54,051	23,165
2016	77,427	54,199	23,228
2017	77,640	54,348	23,292
2018	82,851	57,995	24,855
2019	83,060	58,142	24,918
2020	83,270	58,289	24,981
2021	86,049	60,234	25,815
2022	88,827	62,179	26,648
2023	91,605	64,124	27,482
2024	94,384	66,069	28,315
2025	97,163	68,014	29,149
2026	98,133	68,693	29,440
2027	99,104	69,373	29,731
2028	100,074	70,074	30,000
2029	101,044	71,044	30,000
2030	102,014	72,014	30,000

Source: Calculated.

Total Replenishment Obligation = Total Production – Operating Yield – Annual Overdraft – New Stormwater Recharge

Recycling Replenishment = min[0.3*Total Replenishment Obligation, 30,000]

MWD Replenishment = Total Replenishment Obligation - Recycling Replenishment

Table 7: Overdraft and SAR Inflow – Most Rapid Depletion Scenario

Year	*Annual Overdraft*	*Cumulative Overdraft*	*SAR Inflow*
2006	20,119	20,119	9,900
2007	22,023	42,141	9,900
2008	23,927	66,069	9,900
2009	25,831	91,900	9,900
2010	27,848	119,748	9,900
2011	29,080	148,828	9,900
2012	30,312	179,141	9,900
2013	31,545	210,685	9,900
2014	32,889	243,574	9,900
2015	32,889	276,463	9,900
2016	32,889	309,352	9,900
2017	32,889	342,241	9,900
2018	32,889	375,130	9,900
2019	24,870	400,000	9,900
2020	0	400,000	12,500
2021	0	400,000	12,500
2022	0	400,000	12,500
2023	0	400,000	12,500
2024	0	400,000	12,500
2025	0	400,000	12,500
2026	0	400,000	12,500
2027	0	400,000	12,500
2028	0	400,000	12,500
2029	0	400,000	12,500
2030	0	400,000	12,500

Sources: Annual and Cumulative Overdraft: Assumed; SAR Inflow: Wildermuth Environmental.

Table 8: Replenishment Obligations and Sources – Most Rapid Depletion Scenario with SAR Inflow Allocated to Desalter Replenishment

Year	*Normal Production Replenishment Obligation*	*Chino Desalter Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	36,487	0	25,541	10,946
2007	41,643	0	29,150	12,493
2008	46,806	0	32,764	14,042
2009	51,970	0	36,379	15,591
2010	57,126	0	39,988	17,138
2011	55,788	0	39,051	16,736
2012	54,448	0	38,114	16,335
2013	53,107	0	37,175	15,932
2014	51,768	0	36,238	15,530
2015	50,427	0	35,299	15,128
2016	50,638	0	35,447	15,191
2017	50,851	0	35,596	15,255
2018	56,062	0	39,243	16,819
2019	56,271	8,019	45,003	19,287
2020	56,482	30,289	60,739	26,031
2021	59,260	30,289	62,684	26,865
2022	62,038	30,289	64,629	27,698
2023	64,816	30,289	66,574	28,532
2024	67,595	30,289	68,519	29,365
2025	70,374	30,289	70,663	30,000
2026	71,344	30,289	71,633	30,000
2027	72,315	30,289	72,604	30,000
2028	73,285	30,289	73,574	30,000
2029	74,255	30,289	74,544	30,000
2030	75,225	30,289	75,514	30,000

Source: Calculated.

Normal Production Replenishment Obligation = Total Production – Desalter Production – Operating Yield – New Stormwater Recharge

Desalter Replenishment Obligation = Desalter Production – Annual Overdraft – SAR Inflow

Recycling Replenishment = min[0.3*(Normal Production Replenishment Obligation + Desalter Replenishment Obligation), 30,000]

MWD Replenishment = Normal Production Replenishment Obligation + Desalter Replenishment Obligation - Recycling Replenishment

Table 9: Replenishment Obligations and Sources – Most Rapid Depletion Scenario with SAR Inflow Unllocated

Year	*Total Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	46,387	32,471	13,916
2007	51,543	36,080	15,463
2008	56,706	39,694	17,012
2009	61,870	43,309	18,561
2010	67,026	46,918	20,108
2011	65,688	45,981	19,706
2012	64,348	45,044	19,305
2013	63,007	44,105	18,902
2014	61,668	43,168	18,500
2015	60,327	42,229	18,098
2016	60,538	42,377	18,161
2017	60,751	42,526	18,225
2018	65,962	46,173	19,789
2019	74,190	51,933	22,257
2020	99,270	69,489	29,781
2021	102,049	72,049	30,000
2022	104,827	74,827	30,000
2023	107,605	77,605	30,000
2024	110,384	80,384	30,000
2025	113,163	83,163	30,000
2026	114,133	84,133	30,000
2027	115,104	85,104	30,000
2028	116,074	86,074	30,000
2029	117,044	87,044	30,000
2030	118,014	88,014	30,000

Source: Calculated.

Total Replenishment Obligation = Total Production – Operating Yield – Annual Overdraft – New Stormwater Recharge

Recycling Replenishment = min[0.3*Total Replenishment Obligation, 30,000]

MWD Replenishment = Total Replenishment Obligation - Recycling Replenishment

Table 10: Prices – High Price Scenario

Year	*Tier 2 Price*	*Replenishment Price*	*Recycling Price*
2006	427	238	69
2007	427	238	72
2008	459	275	75
2009	473	297	79
2010	486	314	82
2011	497	331	86
2012	519	346	90
2013	543	361	94
2014	567	378	98
2015	593	395	103
2016	619	412	107
2017	647	431	112
2018	676	450	117
2019	707	471	122
2020	739	492	128
2021	772	514	134
2022	807	537	140
2023	843	561	146
2024	881	587	152
2025	920	613	159
2026	962	641	166
2027	1,005	669	174
2028	1,050	700	182
2029	1,098	731	190
2030	1,147	764	198

Source: Metropolitan Water District of Southern California.

Table 11: Prices – Low Price Scenario

Year	*Tier 2 Price*	*Replenishment Price*	*Recycling Price*
2006	427	238	69
2007	427	238	71
2008	450	261	73
2009	457	268	75
2010	463	282	78
2011	477	300	80
2012	491	309	82
2013	506	318	85
2014	521	328	87
2015	537	338	90
2016	553	348	93
2017	570	358	96
2018	587	369	98
2019	604	380	101
2020	622	391	104
2021	641	403	107
2022	660	415	111
2023	680	428	114
2024	700	441	117
2025	722	454	121
2026	743	467	125
2027	765	481	128
2028	788	496	132
2029	812	511	136
2030	836	526	140

Source: Metropolitan Water District of Southern California.

Table 12: Expected Value of Reduced Storage Losses

Program Size	*Losses*	*Present Value - High Rate*	*Present Value - Low Rate*
300,000	80,175	18,647,350	15,290,827
400,000	106,900	24,863,133	20,387,769
500,000	133,626	31,079,149	25,484,903

Source: Wildermuth Environmental.

Attachment C

Report on the Distribution of Benefits to Basin Agencies from the Major Program Elements Encompassed by the Peace Agreement and Non-Binding Term Sheet

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1. Introduction and Summary of Findings

This report measures the costs and benefits to various Chino Basin agencies of the program elements encompassed by the Peace I and Peace II Agreements. Both agreements are considered relative to a baseline state of the world existing after the Judgment but prior to the Peace Agreement. The analysis examines net returns to the ten largest agencies that hold groundwater rights in the Basin over the time period 2007 to 2030. Together, these agencies account for over 91 percent of Basin safe operating yield.

Overall, the study shows that the two agreements produce substantial net benefits to Chino Basin agencies – over $904 million in present value terms. The provisions of the Peace II Agreement are especially valuable, as they account for $723 million (80 percent) of the total net benefit to the Basin agencies studied. Through the attainment of hydraulic control, the program elements in Peace II Agreement include the introduction of large quantities of recycled water in the Basin, which lessens the need to procure other supplies to meet growing demand for water. With respect to the distribution of net benefits across agencies, shown in the summary tables below, the main outcome is that all agencies benefit from the agreements, although the magnitude of the net benefit varies considerably among agencies.

	Total Net Benefit (1000s of 2007$)		
	Peace I vs. Baseline	*Peace II vs. Peace I*	*Peace II vs. Baseline*
City of Chino	$20,294	$75,671	$95,966
City of Chino Hills	$12,217	$61,320	$73,537
City of Ontario	$42,547	$189,724	$232,271
City of Upland	$9,442	$34,644	$44,086
Cucamonga Valley Water District	$60,667	$217,462	$278,128
Fontana Union Water Co.	$4,839	$25,429	$30,268
Monte Vista Water District	$7,025	$33,455	$40,480
San Antonio Water Company	$1,141	$5,995	$7,136
Jurupa CSD	$15,772	$19,482	$35,254
City of Pomona	$8,189	$59,348	$67,537
Total	**$182,133**	**$722,530**	**$904,663**

	Net Benefit per Acre-Foot (2007$)		
	Peace I vs. Baseline	*Peace II vs. Peace 1*	*Peace II vs. Baseline*
City of Chino	$31.30	$116.70	$148.00
City of Chino Hills	$20.60	$103.38	$123.98
City of Ontario	$24.20	$107.91	$132.11
City of Upland	$17.46	$64.07	$81.54
Cucamonga Valley Water District	$32.92	$118.01	$150.93
Monte Vista Water District	$20.13	$95.88	$116.01
Jurupa CSD	$17.86	$22.06	$39.92
City of Pomona	$11.10	$80.47	$91.58
Overall Average	**$19.84**	**$78.69**	**$98.53**

In terms of total net benefit, two agencies, City of Ontario and Cucamonga Valley Water District, receive over half of all the net benefits resulting from the agreements. An important reason these agencies receive a large share of the net benefit from the agreements is due to their relative size: the two agencies combined account for approximately half of the consumer demand for Basin water.[1] Controlling for agency size on the basis of demand for Basin water, the net benefit resulting from the combined program elements in the Peace I and Peace II Agreements shows considerably less variation. The table above indicates that 7 of the 8 agencies with positive demand for Basin water receiving benefits ranging from $82 to $151 per acre –foot.[2]

2. Conceptual Framework

The model of groundwater value used in this report is standard in the academic literature and builds on the methodology used in the earlier aggregate study of Basin net benefits. The net benefits resulting from access to a groundwater resource are the gains from pumping (the demand for water) less the cost of extraction and conveyance, and a user cost component, which reflects the lost option value entailed by removing a unit of water from storage. The stream of annual net benefits is discounted back to current dollars using a discount factor predicated on the rate of interest, which is taken to be the current risk-free long-term rate of interest and is set at 4.5 percent per year.

Allocation of aggregate costs and benefits to individual agencies in the Basin is accomplished by a complex set of legal rules (e.g., shares of operating yield), cost-sharing arrangements that fund programs for Basin improvements through collective institutions, and market forces. The goal of this study is to measure net benefits to individual agencies under three scenarios: (i) a baseline case defined by the Judgment; (ii) a set of rules to operate the Basin and fund programs through collections as defined by the Peace Agreement; and (iii) an alternative set of rules that are

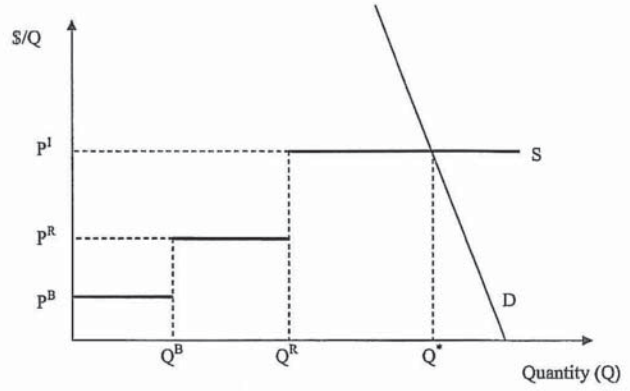
[1] Consumer demand for Basin water, which is met through some combination of Basin supply and water imports, is calculated for each agency as Urban Water Demand less available surface water and other groundwater supplies. Over the 2007-2030 period of study, the City of Ontario and Cucamonga Valley Water District are projected to meet consumer demand of 3.4 million acre-feet out of 6.9 million acre-feet (49 percent) of total consumer demand for Basin water.

[2] Fontana Union Water Company and San Antonio Water Company are not included in these calculations, because the available surface water and other groundwater supplies for these agencies exceed their Urban Water Demand.

designed to achieve hydraulic control and are defined in Peace II Agreement (as represented in the Non-Binding Term Sheet dated May 23, 2006).

To understand the allocation of benefits among individual agencies in the appropriative pool most clearly, consider for the moment the case in which the appropriative pool comprises 100 percent of the Basin water. Figure 1 depicts the aggregate supply (S) and demand (D) schedules for this Basin. Aggregate demand is total water demand in the Basin, and the supply curve is a step function, ordered from the least expensive uses of water to the most expensive uses of water.[3] Many of the effects modeled in this study amount to changes in agencies' cost of meeting water demand. An arrangement or cost-sharing rule that reduces an agency's cost of service provides a net benefit to that agency and its ratepayers.

Figure 1. Conceptual Model: Aggregate Demand and Supply



The first step of the supply curve, which represents the least expensive water source, is groundwater pumped directly from the Basin. The extent of groundwater pumping in the Basin is limited by the steady-state ("safe") yield, which is represented in the figure by quantity Q^B. The cost per unit of Basin water is denoted by the (implicit) price P^B, which includes lift costs, conveyance costs, and user cost. The second step of the supply curve represents replenishment water. After the safe yield of the Basin is exhausted, additional groundwater pumping can occur provided that replenishment water is purchased to recharge the Basin. The effective capacity of the Basin is the sum of Basin safe yield and Basin recharge capacity, denoted by the quantity Q^R in the figure. (The recharge capacity of the Basin is given by the difference Q^R - Q^B.)

[3] In practice, the water supply function has multiple steps, with each step representing the various pumping and conveyance costs of a sequence of wells, and, for this reason, aggregate supply conditions are often approximated by an upwards-sloping, continuous supply function; however, the essential points of the model can be made more clearly by grouping water costs into common categories represented by each of the three steps.

Replenishment water is supplied to the Basin through replenishment water imports at the MWD replenishment rate, which is denoted in the figure by P^R. The third step in the supply function, the most-expensive source of water, is imported water for direct (consumptive) use. Imported water for direct use is available to agencies in the Basin at a price denoted by P^I, which reflects the cost of procuring new water supplies from outside the Basin. The cost of developing reliable sources of water outside the Basin may differ across agencies in practice according to the options available to each agency in developing outside water sources. The outside option for each agency in the present study, unless stated otherwise, is taken to have a cost equal to the Tier 2 MWD rate for untreated water.

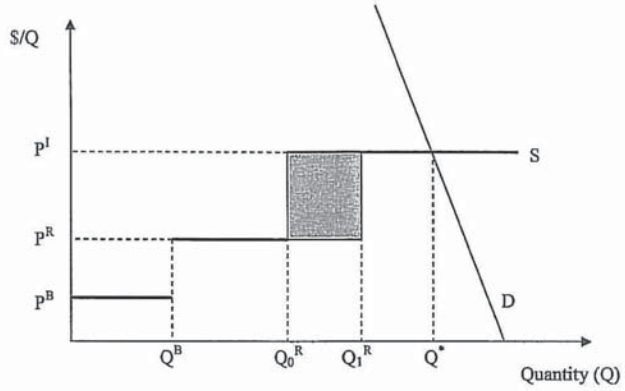
The equilibrium quantity of water consumed is given by the intersection of supply and demand, which occurs at the quantity Q* and the price P^I. The key to characterizing the distribution of benefits from policies that increase the effective yield from the Basin, either by expanding Basin safe yield or by augmenting Basin recharge capacity, is the understanding that economic values, as captured by prices, are realized on the margin of water use where supply intersects with demand (the third step in the figure). Gains from management of the Basin are created by replacing units of water at the third and most-expensive step of the supply function with less expensive sources of water. Because individual supplies are added together to get aggregate supply, the distribution of market benefits to individual agencies in response to Basin improvements depends on the composition of water use by each agency across each of the steps of supply, in effect where each agency is "located" on the supply schedule. In general, agencies who meet their meet urban water demand to a greater degree with marginal units of water (i.e., imported water for direct use) acquire a larger share of the benefits from Basin improvements than agencies that are less represented on this "extensive margin" of supply.[4]

Consider a policy that increases the recharge capacity of the Basin. In general, such an effort has two effects that, taken together, can alter the net benefits received by water agencies: (i) increasing the Basin recharge capacity involves a fixed cost component that must be allocated among agencies according to some cooperative, cost-sharing rule; and (ii) increasing the Basin recharge capacity allows for greater use of replenishment water that can displace expensive Tier 2 water on the margin. The distribution of net benefits in the Basin is altered in cases where the market allocation of benefits from the increased use of replenishment water differs from the allocation of cost among individual agencies.

Figure 2 shows the gain from an increase in recharge capacity in the Basin. The increase in recharge capacity increases the effective yield in the Basin, which is depicted in the figure by the movement from Q_0^R to Q_1^R. The increased recharge capacity allows Basin agencies to incur additional replenishment obligations that displace $Q_1^R - Q_0^R$ units of imported water for direct use. The total producer benefit resulting from the increase in recharge capacity is represented by the shaded region in the figure, which sums the difference between the Tier 2 rate and replenishment rate for each additional unit of water that can be replenished.

[4] Generally, users disproportionately represented on the margin of supply represent agencies that incurred large increases in urban water demand subsequent to the assignment of safe operating yield and were forced to meet the increase in demand with relatively expensive sources of imported water.

Figure 2. Benefit of an Increase in Basin Recharge Capacity

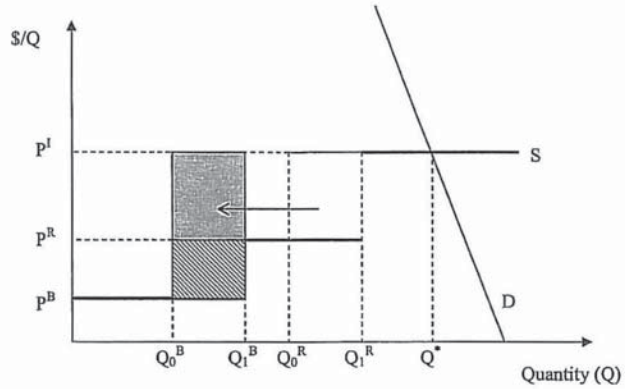


Among individual agencies in the Basin, the benefit of an increase in recharge capacity is distributed exclusively to agencies on the extensive margin of water supply. For this reason, the market return from an increase in recharge capacity can be distributed equally across agencies only in the case where the agencies have equal shares of the third step of water supply in the Basin. To illustrate this point, consider an agency that faces sufficiently small water demand relative to its share of Basin production rights that its urban water demand can be met each year entirely through the use of Basin safe yield. Such an agency would require the use of neither imported replenishment water nor imported water for direct use to meet its urban water demand, and would stand to receive no market benefit from participating in a cooperative policy designed to increase Basin recharge capacity. To the extent that cooperative assessments levied to recoup the cost of increasing Basin recharge capacity are based on relative share of operating yield, as opposed to being levied in proportion to the initial share of imported water deliveries for direct use across agencies, policies that increase Basin recharge capacity alter the distribution of net benefits.

Next, consider the benefit associated with an increase in Basin safe yield. Figure 3 shows the effect of an increase in Basin safe yield from $Q_0{}^B$ to $Q_1{}^B$ units. The increase in Basin safe yield extends the lowest step of the supply function and displaces $Q_1{}^B - Q_0{}^B$ units of replenishment water purchases. The value of the displaced replenishment water (net of the cost of Basin water) is shown by the cross-hatched region in the figure. The increase in Basin safe yield, in turn, increases the effective yield in the Basin (the sum of Basin yield and recharge capacity) from $Q_0{}^R$ to $Q_1{}^R$, which is represented in the figure by a rightward shift in the replenishment step of supply. The increase in Basin safe yield therefore also displaces $Q_1{}^R - Q_0{}^R = Q_1{}^B - Q_0{}^B$ units of imported water on the extensive margin of supply, which provides an additional gain represented by the shaded region of the figure. The total market benefit to all agencies is represented by the sum of these two regions. The value of an increase in Basin safe yield is the difference between

the price of imported water for direct use and the procurement cost of Basin groundwater for each unit of additional water made available to Basin agencies.

Figure 3. Benefit of an Increase in Basin Safe Yield



The economic value of an increase in safe yield conveys upward into market benefit across both steps of supply. For this reason, policies which lead an increase in Basin safe yield are not only more valuable to agencies in the Basin than an increase in recharge capacity, but the benefits are also distributed more equally. As in the case of an increase in replenishment capacity, the ultimate repository of market value for a one-unit increase in safe yield is a unit of displaced water on the extensive margin of supply; however, this displacement now occurs with Basin safe yield rather than through the use of imported replenishment water. To see how the market benefits of a policy that increases Basin safe yield are distributed to individual agencies, consider again an agency that meets its urban water demand each year entirely through the use of Basin safe yield without the need for replenishment water or imported water for direct use. Unlike the case of an increase in replenishment capacity, the increase in Basin safe yield provides each agency with physical water assets (e.g., according to its share of Basin safe yield) that can be sold to other agencies in the transfer market. The gain to this agency following the increase in Basin safe yield depends on the price it receives in the transfer market, for instance if the transfer price is equal to the replenishment rate (P^R) then the agency acquires a share of the benefits in the cross-hatched region of the figure in proportion to its share of Basin safe yield. The remaining benefit of each unit of water provided as the share of safe yield to this agency is acquired by the water purchaser in the transfer market.

In sum, agencies that initially meet their urban water demand with a relatively large share of imported water for direct use receive the largest share of the market benefit from a policy that increases Basin safe yield. These agencies receive the full market value ($P^I - P^B$) for each unit of water displaced through their allocated share of the increase in Basin safe yield. To the extent

that agencies with an initially large share of imported water purchases for direct use participate in the transfer market, these agencies also acquire the difference between the Tier 2 water price and the transfer price for each unit of water purchased from agencies that are under-represented on the extensive margin of supply. If the transfer price of water is taken to be equal to the replenishment rate (P^R), then the market benefit represented by the shaded region of Figure 3 is divided among agencies according to their relative share of production on the extensive margin of supply, while the market benefit represented by the cross-hatched region of Figure 3 is divided among agencies according to their relative share of Basin safe yield.[5] Policies that expand Basin safe yield lead to redistributive effects on the net benefits received by individual agencies whenever the allocation of costs in the cooperative arrangement differ from this distribution of benefits provided in the market.

The above framework for calculating the distribution of net benefits from various program elements is applied to the Chino Basin as follows. First, the water yield in the Basin is calibrated to the relevant quantity supplied by the appropriative pool by netting out production by the overlying rights-holders from the Basin safe yield. This is essentially the distinction made in practice between "safe yield" and "safe operating yield" in the Basin. As it pertains to the calculation of net benefits to agencies with appropriative rights, policies that increase the Basin yield (as in Figure 3) now refer both to policies that directly increase Basin safe yield as well as to policies that redistribute the existing safe yield from overlying right-holders to members of the appropriative pool, for instance through net agricultural transfer.

Second, as defined by the framework above, net benefits are calculated for individual agencies according to calculations on the avoided cost of Tier 2 water purchases provided by program elements in the Peace I and Peace II agreements, respectively, relative to the baseline scenario.[6] Considering the change in cost from the introduction of new program elements suppresses the need to explicitly calculate components of cost that are common to the baseline, Peace I, and Peace II scenarios.

Third, the analysis abstracts from seasonal and annual cycles in water availability by considering expected values where possible. Seasonal cycles are smoothed in all scenarios by using annual data on demand and supply conditions facing agencies. Annual cycles are smoothed in all scenarios by treating each year as an average weather occurrence represented by the expectation that each 10-year future horizon in the model is comprised of 7 "wet" years, in which replenishment water is available to agencies in the Basin, and 3 "dry" years, in which replenishment water is not available.[7] Each year in the model thus has the interpretation of representing production decisions that are 30 percent dry and 70 percent wet. By smoothing annual production outcomes into an expected value framework, this implies that a replenishment

[5] This argument does not rely on the water transfer price being equal to the replenishment rate and applies to any water transfer pricing rule that divides the gains from exchange (defined here by the value $P^1 - P^B$).

[6] An alternative scenario is also considered that denominates the avoided cost of imported water for direct use at the Tier 1 rate, which provides a bracketing condition on the range of outside options available to individual agencies for procuring reliable new sources of water at rates between the Tier 1 and Tier 2 MWD prices.

[7] The expected sequence of wet and dry years is based on the assumption that underlies program element 2 of the OBMP that "replenishment water is available 7 out of 10 years." (Implementation Plan: Optimal Basin Management Plan for the Chino Basin, p13: http://www.cbwm.org/docs/legaldocs/Implementation_Plan.pdf.)

water step exists in the supply function in each year of the study, but that the length of the step is treated as 70 percent of the recharge capacity in the Basin.

Fourth, the net benefit of policies that increase the safe operating yield of the appropriative pool is distributed among individual agencies, in part, through water exchanges between agencies in the transfer market. Water transfers are specified to exchange units of water between agencies that are not adequately represented on the extensive margin of supply to agencies which are more highly represented on this margin. Specifically, the water price in the transfer market is fixed at the prevailing MWD replenishment rate in each period to divide these rents from exchange.

Finally, the net benefit returned to each agency under Peace I and Peace II rules relative to the baseline scenario is computed by coupling the market distribution of benefits, as outlined by the framework here, with the distribution of cost implied by the rules encompassed by each agreement. These rules are defined in the following description of scenarios.

3. Common Components

Several components common to all scenarios frame the overall analysis.

3.1. Agencies Considered

Because of the detailed calculations required to divide the net benefit created by each scenario among individual agencies in the study, the study encompasses only the ten largest water-holding agencies in the Basin (the cities of Chino, Chino Hills, Ontario, Pomona, and Upland, Fontana Union Water Company, Monte Vista Water District, Cucamonga Valley Water District, Jurupa Community Services District, and San Antonio Water Company). These ten agencies account for 91.2 percent of the Basin-wide safe operating yield.

3.2. Smoothing Across Hydrologic Years

Because production is smoothed across years, the patterns of local storage and local supplemental storage are also smoothed for each agency. This abstracts from the actual series of puts and takes that rely on temporal adjustments in water storage by accounting for the expected local storage need of individual agencies. (Recall that each year is a representative hydrologic year characterized by expected conditions that are 70 percent wet and 30 percent dry.) A single local storage account is constructed for each agency that combines local storage with local supplemental storage in all scenarios, and the local storage balance of each agency is adjusted each year to reflect the fact that replenishment water is available to meet replenishment obligations only 70 percent of the time.

For this reason, the annual amount held in storage for each agency is 3/7 ($3/7 = 10/7 - 1$) of the annual excess demand for water that cannot be met by the agency through the allocation of contemporaneous supply. The expected arrival time of a dry year in which replenishment water is not available is given by the mean of a Poisson process ($\mu = 10/3$), and the average holding time for a unit of water held in storage is half the expected arrival time of a dry year, which implies that the average annual amount of water held in local storage is 5/7 ($5/7 = 3/7*10/3*1/2$) of the annual excess demand for each agency that cannot be met through the allocation of contemporaneous water supply. In each year, the local storage account is reconciled with the storage balance in the previous year by adding the increment in local storage to the excess

demand for water for each agency. Local storage levels increase smoothly over time in the model for most agencies due to the projected increases in urban water demand.

3.3. Water Prices

Annual water prices and the discount factor that converts annual values into present value are common across all scenarios. The market rates used in 2007 are the current water rates listed by MWD ($427/AF for Tier 2 water, $238/AF for replenishment water), and a $13 surcharge is added to the replenishment rate to reflect the $251/AF charge currently paid by each agency for replenishment water procured through Watermaster. The price of water transactions in the transfer market is taken in each period to be the price of replenishment water.[8] The MWD rate forecast through 2012 is taken as the mean of the high- and low-rate forecasts provided by MWD over this horizon. Recycled water rates through 2011 are taken from IEUA projections provided in the 2007 IEUA Long-Run Plan of Finance, with a 25 percent non-member surcharge included for recycled water deliveries outside the IEUA service area (Jurupa Community Services District and the City of Pomona). The price of desalter water for urban supply is taken to be the price cap specified in section 7.6d of the Peace Agreement, which is $375 in 2007. All water rates outside the range of published forecasts are assumed to increase at a rate of 4.5 percent per year. The discount factor is also taken to be 4.5 percent.

3.4. Demand

Demand for Basin water for each agency is identical across all three scenarios. Agency-level demand for Basin water is calculated from data provided in the relevant 2005 Urban Water Management Plans (UWMP) by taking the projected demand (gross of conservation) compiled by each agency and converting this into a residual (Basin) demand component by netting out available supplies of surface water and other groundwater sources available to each agency.[9] In the case of Pomona, residual demand for Basin water is taken to be net of Puente and Spadra Basin recycled water, which implicitly assumes that this water would be available to Pomona irrespective of whether hydraulic control is attained in Chino Basin. Residual Basin water demand is linearized for each agency to recover values in the intervening years between the 5-year intervals reported in each UWMP. Residual demand for Fontana Union Water Co., which has rights but serves no subscribers, is zero in all scenarios, as is residual demand facing San Antonio Water Co., which has available surface water and other basin groundwater supply in excess of demand. The combined residual demand for the remaining agencies in the Basin is 215,996 AF in 2007 and increases over time with population growth projections to 337,246 AF in 2030. Among agencies with positive demand values, residual demand in 2007 ranges from a low of 12,753 AF for Monte Vista Water District to a high of 49,552 AF for the City of Ontario, and the residual water demand for the City of Ontario and Cucamonga Valley Water District over the entire horizon is about double the residual water demand of Pomona, 2-3 times greater than the City of Chino, City of Chino Hills, and Jurupa Community Services District, and 5-6

[8] The average water transaction price in the data provided in the Watermaster's 2006-2007 Assessment Packet is $177, which represents an approximate 30 percent discount below the current replenishment rate of $251. This observed price discount below the expected transfer price accords with the "wet year" transfer price that would arise in a representative hydrologic year that is 70 percent wet and 30 percent dry when the "dry year" transfer price is $422, a value bounded by the prevailing Tier 2 price of untreated water of $427.

[9] for IEUA members, these data are taken from the IEUA Urban Water Management Plan (2005), Table 2-7, and, for Jurupa Community Services District and the City of Pomona, these data are taken from the individual 2005 Urban Water Management Plans (2005) available on each agencies website.

times greater than the residual demand facing the City of Upland and Monte Vista Water District.

3.5. Desalter Production

Desalter production is treated as equal across all scenarios. Implicitly, this views the level and location of desalter activity to be determined by the requirements outlined by the Judgment.[10] An alternative approach would be to construct a baseline scenario in which agencies provide their own salt removal infrastructure. One difference between this alternative approach and the present one is that, under baseline conditions with individual desalting O&M costs would be roughly the same, whereas the capital costs of building desalter facilities would be larger by the amount of funding that became available in the Basin through grants made possible by the Peace Agreement.

The projected desalter water for urban supply sets a schedule of delivery to three agencies considered in the study (City of Chino, City of Chino Hills, and Jurupa). The desalter water for urban supply rises from 15,230 AF to 38,088 AF over the period 2007-2030 among agencies in the study, with the remaining desalter supply being delivered to the City of Norco and the Santa Ana River Water Company. Each unit of desalter water supply, including deliveries to the City of Norco and the Santa Ana River Water Company, creates a replenishment obligation for producers in the Basin, and this obligation is divided among agencies according to the various rules encompassed by each of the three scenarios considered (as described below).

3.6. Watermaster Assessments

Although the assessment fees levied by Watermaster differ across the scenarios according to the total cost of the program elements embodied in each scenario, the rules in which assessments are distributed across individual agencies are common to all scenarios. Specifically, appropriative pool assessments are based on each agency's calculated share of actual fiscal year production. Given that total production and the share of production by individual agencies encompasses only a subset of total Basin production (e.g., roughly 87 percent in 2007), this approach slightly over-estimates assessment costs in all scenarios by attributing 100 percent of the program cost to the ten agencies included in the study. Because the assessment costs used under the Peace I and Peace II scenarios include the baseline costs, as well as significant additional program costs, the over-allocation of assessment costs to individual agencies in the study provides a conservative estimate of the total benefit generated under Peace I and Peace II. The different components of the assessment costs were decomposed into program expenses from the 3-year assessment projections provided by Watermaster.[11] All cost components thereafter are assumed to increase at a rate of 4.5 percent.

[10] Projected desalter production is taken from IEUA's UWMP (2005, Table 3-10 and Table 7-1), and includes the desalter production of Chino I, Chino I expansion, Chino II, and Desalter 3. The overall level of desalter activity, which grows to an ultimate production level of 43,000 AF by year 2025, an amount slightly below the 50,457 AF desalter production level anticipated by 2020 in the OBMP: (Implementation Plan: Optimal Basin Management Plan for the Chino Basin, Table 3, p59: http://www.cbwm.org/docs/legaldocs/Implementation_Plan.pdf.)

[11] Personal correspondence with Watermaster staff (August 7, 2007).

4. Baseline Scenario

4.1. Basin Supply

In the baseline scenario, available Basin supply for each agency in each year is comprised of the agency's share of: (i) safe operating yield, (ii) projected desalter water for urban supply, and (iii) the net agricultural pool transfer. The safe operating yield is allocated to individual agencies based on the share of safe operating yield in the Basin defined by the Judgment.

The projected desalter water for urban supply is taken for the baseline case (as well as for the remaining scenarios) from projections available in the IEUA UWMP.[12] Desalter water for urban use is treated in the model both as a source of water supply in the Basin and as a replenishment obligation, where the replenishment obligation associated with each unit of desalter water supply is shared by agencies through the allocation of storage losses and replenishment assessments by Watermaster, which are calculated for the baseline case according to each agencies pro rata share of safe operating yield up to the available recharge capacity in the Basin and by in lieu recharge according to each agencies pro rata share of safe operating yield for any obligation above the available recharge capacity.

The net agricultural transfer to each agency in each year is calculated by taking a straight-line projection of land-use conversions between 2006 conditions reported in the 2006-2007 Watermaster Assessment Package, and assumed "full build-out conditions" in 2030 in which all acres in the agricultural pool eligible for conversion are converted.[13] For the baseline scenario, each converter is credited with 1.3 AF of Basin water for each acre converted, and the sum of water allocated to all land-use conversions and agricultural pool production in each year is deducted from the agricultural pool safe yield of 82,800 AF to get the net agricultural pool transfer to the appropriative pool in each year.[14] Among the ten largest members of the appropriative pool considered in the study, the net agricultural transfer increases from 46,265 AF to 71,377 AF over the 2007-2030 period, which accounts for approximately 92 percent of the total water transfer to the appropriative pool in each year.

Under baseline conditions, there is also an issue of timing of the agricultural pool transfer, with no early transfer of agricultural pool water being made to the appropriative pool prior to the Peace Agreement. Under the Judgment, the agricultural pool allocation was defined to be 414,000 AF in every 5 years. This implies a 4-year waiting period for the appropriative pool before any agricultural transfer takes place, followed by a large allocation of the cumulative agricultural pool under-production in year 5, and an annual stream of transfers thereafter based on a rolling horizon comprised of the previous 5 years agricultural pool under-production. In the

[12] IEUA Urban Water Management Plan (2005), Tables 3-10 and 7-1.

[13] Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Land Use Conversion Summary (p10): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf. Values after the conversion of all agricultural land eligible for conversion are based on Watermaster calculations (personal communication with Watermaster staff, July 12, 2007).

[14] Under baseline conditions, 1.3 AF of water is allocated to the appropriative pool based on share of safe operating yield in the baseline scenario. This value is not parsed out from the net agricultural transfer that occurs each year, because all water transfers between the agricultural pool and the appropriative pool are based on shares of safe operating yield and an amount greater than 1.3 AF per acre is transferred from the agricultural pool to the appropriative pool in each year.

baseline scenario, the agricultural pool transfer is calculated on an annual basis and timing lags in the delivery of water are suppressed. Differences in the actual timing of the water have no implications for the baseline values in the study, because the rate of water price inflation is taken to be equal to the discount rate, so that delays in water delivery have no implications for the present value calculation.

The sum of these components in each year gives Basin supply for each agency. This represents the first step of the supply function depicted in Figure 1.[15] In total, Basin supply among the ten largest agencies considered in the study rises from 116,044 AF to 164,014 AF over the 2007-2030 period, with the increase in supply generated through land use conversions and increased desalter water for urban supply. (This latter source of water supply is matched by an associated increase in the desalter replenishment obligation, as discussed below.)

4.2. Import Demand

Import demand for each agency in the Basin represents the amount of demand facing each agency that cannot be met with available Basin supplies (including supplies which can be purchased from other Basin agencies in the transfer market). Import demand for each agency, which must be met through some combination of replenishment water purchases and imported water purchases for direct use, is the sum of three components: (i) excess demand for water; (ii) storage account adjustments; and (iii) water transfers.

Excess demand for each agency in the Basin is calculated as residual demand less the available Basin supply. Excess demand for water is negative in each year for Fontana Union Water Co. and San Antonio Water Co., which implies that these agencies are water suppliers in the transfer market. In each year, approximately 70 percent of the excess demand for water in the Basin is derived from Cucamonga Valley Water District and the City of Ontario, which indicates a large water demand for Basin water among these agencies relative to their share of Basin supply.

In practice, the demand for water in dry years is met, in part, by smoothing the additional water supplies available in wet years across time through local storage. As discussed above, the model considers each year to be a representative year (30 percent dry and 70 percent wet), so that the annual amount of water held in local storage by each agency is 5/7 of the annual excess demand that cannot be met with contemporaneous supply. Local storage in the model, which represents the combined total held in local storage and local supplemental storage accounts in a representative year, increases over the period 2007-2030 from 83,706 AF to 141,565 AF among agencies in the study, where the growth in local storage over the period occurs in proportion to the 70 percent increase in excess demand for Basin water as population increases in the region.

Local storage accounts are not constructed for Fontana Union Water Co. and San Antonio Water Co., because these agencies have excess supply of water in each year above what is necessary to meet their urban water demands. In practice, these agencies may hold water in local storage to arbitrage expected differences in transfer prices between wet and dry years, but such arbitrage

[15] Because desalter water is not a unique source of supply, an accounting adjustment is made later to back out desalter water supplies from Basin supply by creating an off-setting replenishment obligation for each unit of desalter water used for urban supply.

opportunities are suppressed in the model, because variations in annual water availability are smoothed in the model to a basis of a representative hydrologic year.

In each year, a storage account adjustment is made for each agency by adding the incremental growth in local storage from the previous year's value to the excess demand for water. The amount of water held in local storage adjusts upward each year to meet the growth in excess demand, and this need for added storage to smooth increasing volumes of water between wet and dry years is deducted from contemporaneous water supply.

After storage account adjustments are made in each year, individual excess demand and individual excess supply conditions clear each year in the transfer market. Excess supply to be cleared in the transfer market in each year is comprised of sales by Fontana Union Water Co. and San Antonio Water Co., and, to a lesser extent, by Jurupa Community Services District beginning in 2021. Jurupa CSD becomes a net supplier of water in the transfer market due to the relatively large purchases of desalter water for urban supply in the data provided in IEUA's UWMP (2005). Water transfers are allocated from these suppliers to individual agencies with positive demand for transfer water in proportion to each agency's share of excess demand relative to total excess demand for water in the Basin. The total amount of water transacted in the Basin rises from 12,677 AF to 20,401 AF over the 2007-2030 period, and the largest buyers of transfer water in each period are Cucamonga Valley Water District and the City of Ontario.

4.3. Water Imports

Water is imported into the Basin to meet the sum of import demand for direct use and desalter replenishment requirements. Imported water is taken as replenishment water in each period up to the limit on recharge capacity in the Basin (i.e., the second step of the water supply relationship in Figure 1), and the residual quantity of imported water that cannot be met with replenishment water is taken as Tier 2 water imports. Under baseline conditions, the recharge capacity of the Basin is taken to be 29,000 AF per year, which represents the available spreading facilities discussed as pre-existing facilities in program element 2 of the OBMP.[16] Given the smoothing of production into the basis of representative hydrologic years, this implies that baseline conditions in the Basin can accommodate 20,300 AF of recharge per year (0.7*29,000 AF). This recharge capacity defines the limit to which imported water in the Basin can be taken at the lower MWD replenishment rate.[17]

Imported replenishment water in the Basin must first be taken to meet the replenishment obligation of the desalters. The desalter replenishment obligation under baseline conditions is desalter production for urban supply less a 2 percent storage loss component deducted from individual local storage accounts.[18] Under baseline conditions, the desalter replenishment obligation (net of the storage loss allocation) begins at 13,556 AF in 2007 and grows to 40,169 AF per year in 2030. In the year 2010, the desalter replenishment obligation rises to 22,604 AF,

[16] Implementation Plan: Optimal Basin Management Plan for the Chino Basin, p13: http://www.cbwm.org/docs/legaldocs/Implementation_Plan.pdf.

[17] The increase in Basin recharge capacity, as described in the Recharge Master Plan (WEI, Black and Veatch 2001: http://www.cbwm.org/docs/rechdocs/rechmastplanphase2rep/chapters/pdf/) is a major program element considered in the Peace Agreement, both in terms of benefit and cost.

[18] Personal correspondence with Watermaster staff.

an amount in excess of the 20,300 AF recharge capacity of the Basin in the baseline scenario, and the replenishment obligation remains above the recharge capacity for the remainder of the time horizon. Over the period 2007-2009, the amount of recharge capacity in excess of the desalter replenishment requirement (e.g., 20,300 – 13,556 = 6,744 AF in 2007) is allocated to individual agencies in proportion to each agency's share of imported water demand relative to total imported water demand in the Basin. Over the period 2010-2030, the desalter replenishment obligation exceeds the recharge capacity of the Basin, and the remaining desalter replenishment obligation above 20,300 AF is met through in lieu production by individual agencies in the Basin. In the baseline scenario, the desalter replenishment obligation, both the portion met with replenishment water purchases and the portion taken as in lieu production, is met by individual agencies according to each agency's pro rata share of safe operating yield.[19]

Aggregate supply and demand are cleared each year on the third step of supply by reconciling effective Basin water supply (Basin supply plus Basin recharge) with import demand through purchases of Tier 2 water from MWD. Tier 2 MWD water purchases are allocated to individual agencies based on the share of each agency's imported water demand relative to total imported water demand in the Basin. Under baseline conditions, the total purchases of Tier 2 water among agencies in the Basin rises from 97,766 AF in 2007 to 200,097 AF in 2030, with the combined purchase share of Cucamonga Valley Water District and the City of Ontario—the two largest purchasers of imported water—representing between 62 percent and 73 percent of total Tier 2 water purchases in each year.

4.4. Water Procurement Costs

The total cost of water procurement to individual agencies is the sum of five components: (i) Tier 2 water purchases; (ii) transfer water purchases; (iii) desalter water purchases for urban supply; (iv) desalter replenishment costs; and (v) Watermaster general assessments on the appropriative pool. Water procurement costs associated with Basin production also exist, but these costs exist in all scenarios and consequently net out of the comparison of the various program net benefits.

For the purpose of allocating Watermaster assessments, Tier 2 water purchases are assumed to occur outside the framework of the cooperative organization. That is, the actual production level of each agency, as recorded by the Watermaster each fiscal year for the basis of assessments, does not include any production demands that an individual agency meets through Tier 2 purchases acquired from MWD. For this reason, a separate accounting calculation is made for actual production to recover the allocation of Watermaster assessment costs to individual agencies in each period. Actual production for each agency is residual demand for Basin water less Tier 2 water purchases less storage losses and adjustments to the storage account balance.

Watermaster replenishment assessments are levied to recover desalter replenishment costs (for units up to the 20,300 AF recharge capacity of the Basin) through replenishment water purchased from MWD each year. These costs are allocated to individual agencies according to each agencies pro rata share of safe operating yield.

Watermaster general assessments are levied under baseline conditions to cover the cost of administrative costs, exclusive of the OBMP costs and the special project costs that pertain to

[19] Personal correspondence with Watermaster staff (August 29, 2007).

Peace I and Peace II. In 2007, these costs account for $816 thousand of the projected $7.87 million costs to be levied for general assessments under prevailing Peace conditions. Under baseline conditions, moreover, only the appropriative pool share of general assessment costs is paid by the appropriative pool, which amounts to $624 thousand of the $816 thousand administrative costs in 2007, with the remaining share of costs paid by the overlying agricultural and non-agricultural pools. The costs attributed to the appropriative pool are allocated across to individual agencies according to each agency's share of actual production relative to total Basin production.

4.5. Summary of Baseline Outcomes

Table 1 provides a breakdown of the projected outcome for the eight largest producers under baseline conditions in the year 2015. Total urban water demand for these producers is 293,214 AF in 2015. Total residual demand, which is the difference between urban water demand and the Basin supply available to each agency, is 273,430 AF. Available Basin water supply, the sum of the shares of safe operating yield, net agricultural transfer (inclusive of land-use conversions), and desalter water for urban supply, is 123,554 AF in the year 2015. The total water transfers of 13,089 AF reflect sales by Fontana Union Water Company and San Antonio Water Company to the remaining producers encompassed by the study. The net storage acquisition of 1,022 AF reflects the change in the local storage balance between the year 2014 (106,032 AF) and the year 2015 (107,054 AF). This increment in the water held in local storage, which must be met by in lieu production by agencies, adds to residual demand for water in the Basin, and the difference between this term and the sum of available Basin water supply and water purchases in the transfer market results in a combined import demand among producers of 137,809 AF.

Total desalter production in the year 2015 is 34,122 AF, which exceeds the available recharge capacity of the Basin, so that imported water demand is met entirely with Tier 2 water purchases.[20] Actual production among these eight agencies (123,250 AF) is the difference between residual demand for Basin water, Tier 2 purchases from MWD, in lieu recharge taken to meet the desalter replenishment obligation, storage losses (2% of local storage = 2,141 AF), and the net storage acquisition. Watermaster administrative assessments are in 2015 are $1.2 million, of which $957 thousand is paid by agencies in the appropriative pool.

[20] An additional 3,905 AF of desalter water production is projected for the Santa Ana River Water Company and City of Norco, who are not considered in this study.

Table 1: Year 2015 Outcome Under the Baseline Scenario

	Appropriator									
Component	Chino	Chino Hills	Ontario	Upland	Cucamonga	Monte Vista	Jurupa	Pomona	Total
Urban Water Demand	26,200	24,700	66,600	22,500	72,500	14,100	36,350	30,264	**293,214**
Available Surface Water	0	0	0	5,200	3,000	0	500	0	**8,700**
Available Other Groundwater	0	0	0	3,800	5,400	0	0	1,884	**11,084**
Residual Demand	*26,200*	*24,700*	*66,600*	*13,500*	*64,100*	*14,100*	*35,850*	*28,380*	**273,430**
Safe Operating Yield	4,034	2,111	11,374	2,852	3,619	4,824	2,061	11,216	**42,092**
Net Ag Transfer	8,916	2,398	8,660	1,875	2,980	3,228	12,840	7,371	**48,268**
Desalter Water Supply	5,000	4,200	5,000	0	0	0	19,922	0	**34,122**
Available Supply	*17,950*	*8,709*	*25,033*	*4,727*	*6,600*	*8,052*	*33,896*	*18,587*	**123,554**
Net Storage	487	280	717	-122	1,039	108	-1,653	166	**1,022**
Transfers	758	1,411	3,668	750	5,078	534	26	864	**13,089**
Import Demand	*7,979*	*14,860*	*38,616*	*7,901*	*53,461*	*5,622*	*275*	*9,095*	**137,809**
Local Storage	5,893	11,422	29,690	6,266	41,072	4,320	1,396	6,995	**107,054**
Tier 2 Purchases	7,979	14,860	38,616	7,901	53,461	5,622	275	9,095	**137,809**
Actual Production	17,512	9,328	25,067	4,589	9,889	7,210	33,343	16,312	**123,250**
Watermaster Assessments	$97	$52	$139	$26	$55	$40	$185	$91	**$685**

Notes:
1. All figures in acre-feet except Watermaster assessments.
2. Watermaster assessments are expressed in real terms (1,000s of 2007$.)

5. Peace I Scenario

The Peace Agreement introduced various program elements in the Basin that were not present under baseline conditions. The main components of the Peace Agreement considered here that altered net benefits in the Basin are: (i) an increase in Basin recharge capacity from 29,000 AF to 134,000 AF; (ii) a change in the rules for land use conversion; (iii) transfer of agricultural pool assessments to the appropriative pool; (iv) the introduction of a storage and recovery program; (v) an increase in stormwater recovery from 5,000 AF per year to 12,000 AF per year; and (v) the Pomona credit. This section describes the changes that occurred through these program elements to alter net benefits received by individual agencies in relation to the earlier discussion of the baseline outcome detailed above.

5.1. Basin Supply

Under the set of Basin programs encompassed by the Peace Agreement, three factors led to changes in available Basin supply: (i) increased stormwater capture; (ii) a change in the water allocation resulting from land use conversions (including "early transfer"); and (iii) the introduction of the Dry Year Yield program for storage and recovery through MWD. The increased stormwater capture is represented by an annual increase in Basin supply by 12,000 AF of "new yield" in exchange for tying up 12,000 AF of recharge capacity.

The net agricultural transfer to each agency under Peace conditions increased the return to each converter from 1.3 AF of Basin water for each acre converted to 2.0 AF of Basin water for each acre converted. An early transfer program of 32,800 AF per year to the appropriative pool was also introduced, which ultimately led to an over-allocation of agricultural pool water to the appropriative pool.[21] The net agricultural pool allocation to individual agencies replicates the Watermaster calculation in each year, given the projected pattern of land use conversion calculated through 2030. The agricultural pool transfer provides a credit of 2.0 AF per acre for all land-use conversions taking place after the signing of the Peace Agreement and credits earlier conversions at the 1.3 AF per acre rate and the early transfer to members of the appropriative pool is based on each agency's share of safe operating yield. Because the sum of these two components and the projected agricultural pool production level after land-use conversions have been made exceeds the 82,800 AF of available agricultural pool water in every year, each agency is charged a replenishment obligation for the amount of over-allocated agricultural pool water in proportion to each agency's share of safe operating yield. This is equivalent to deducting the over-allocation of agricultural pool water from the 32,800 AF early transfer after land use conversions take place and dividing this residual amount of water (e.g., 32,800 – 4,270 = 28,530 AF in Fiscal Year 2006-2007) pro rata among members of the appropriative pool.

In total, the net agricultural pool transfer to the appropriative pool is the same under baseline and Peace rules (49,831 AF in 2007 and 76,909 AF in 2030). Among appropriators considered in the

[21] Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Land Use Conversion Summary (p10): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf. In the Fiscal Year 2006-2007 Final Assessment Package provided by the Watermaster, the amount of over-allocation was 4,270 AF (3,893 AF of which is incurred as a replenishment obligation to agencies encompassed by the study), and the model projects this total to increase through the process of future land use conversions to 5,127 AF in 2030 (4,674 AF of which is incurred as a replenishment obligation to agencies encompassed by the study).

study, which encompass 91.2 percent of safe operating yield but 100 percent of land use conversions, the change in land-use conversion rules under the Peace Agreement provides a slightly larger net agricultural transfer among agencies considered than under baseline conditions (e.g., 71,673 AF after all conversions take place compared to 71,377 AF under baseline rules). The outcome for individual agencies under the Peace rules for net agricultural pool transfer relative to the baseline scenario is discussed later.

The DYY storage and recovery program alters the allocation of Basin water supply by allowing individual agencies to purchase water from MWD in wet years and store it for use in subsequent dry years. The effective rate paid to MWD for DYY water inputs, net of subsidies paid to the participating agencies, is approximately equal to the current replenishment rate,[22] and the annual MWD replenishment rate is used in each period to price DYY water inputs to individual producers. The present analysis considers the value of the currently-approved 150,000 AF storage and recovery program.[23] Although further expansion beyond this level has been discussed, the study does not consider the potential expansion of this program to 500,000 AF nor the possibility for sales of this water to take place outside the Basin. The increase in the DYY program from 100,000 AF to 150,000 AF is assumed to take place immediately in the year 2007. To adjust the implied pattern of puts and takes of a 150,000 AF storage and recovery program to the smooth production horizon of a representative hydrologic year, we assume that water production in the DYY program is limited to 50,000 AF in each dry year. Given a 0.3 probability of a dry year, this implies an average of 15,000 AF of water is made available in the Basin each year through the DYY program. The distribution of the DYY program storage across individual agencies is given by the table of DYY shift obligations provided by IEUA for the current DYY-100 program, and these values are scaled upwards proportionately to 150,000 AF.[24] It is assumed that there is no storage loss for units of water placed in storage.[25] In effect, this implies that participating agencies in the DYY program purchase 15,000 AF of water in a representative hydrologic year at MWD replenishment rates and covert this amount into 15,000 AF of reliable Basin supply through the use of existing recharge facilities.

Among the ten largest agencies considered in the study, Basin supply under Peace conditions rises from 137,416 AF in 2007 to 185,692 AF in 2030. This reflects an approximate increase of 26,000 AF per year relative to baseline conditions (under baseline conditions, Basin supply is 111,486 AF in 2007 and 159,496 AF in 2030), and the source of the additional Basin supply under the Peace Agreement amounts to the roughly 11,000 AF increased stormwater yield (the share of the 12,000 AF "new yield" acquired by the ten largest agencies) plus the 15,000 AF recovery of DYY storage water.

5.2. Import Demand

Import demand for each agency in the Basin is calculated in the same manner as the baseline case. As noted above, this involves deducting Basin supply from the Basin water demand facing each agency to get excess demand, correcting excess demand to account for the dynamic adjustments that occur in local storage accounts, and then reconciling excess supply and excess

[22] Personal communication with IEUA staff.
[23] Personal communication with Watermaster staff.
[24] IEUA Urban Water Management Plan (2005), Table 6-5.
[25] Personal correspondence with Watermaster staff.

demand among individual agencies in the Basin through water transactions in the transfer market.

Two major changes occur under Peace in the resulting evaluation of import demand. First, import demand is now lower each year than under baseline conditions by the approximate 26,000 AF of additional Basin supply that is available each year. This ultimately defrays Tier 2 water purchases as the supply-side of the model is built upwards to the third step of supply. Second, the amount of water held in the local storage account of individual agencies decreases, for instance by 17,769 AF in 2007 (83,706 AF in the baseline versus 65,937 AF under Peace.) Much of this difference in local storage balances is the result of participation in the DYY program crowding-out storage activities that would otherwise take place in local storage accounts.

5.3. Water Imports

As in the baseline case, annual water imports must flow into the Basin to meet the sum of import demand and replenishment requirements, where the Basin replenishment requirements now include 12,000 AF of stormwater recharge and 15,000 AF of replenishment water purchases for the DYY program in addition to the desalter replenishment obligation. Imported replenishment water represents the second step of the water supply relationship in Figure 2, and this step is elongated under Peace by the increase in Basin recharge capacity to 134,000 AF. Given the smoothing of production, this implies that Basin recharge capacity is 93,800 AF per year (0.7*134,000 AF) in a representative hydrologic year. Of this amount, 27,000 AF per year of recharge capacity is now used to accommodate the combined requirements of stormwater recharge and DYY program recharge, and a substantial share of the remaining recharge capacity is used to fulfill the replenishment obligation of the desalters. The desalter replenishment obligation in each year is defined in the same manner as in the baseline scenario to be desalter production less storage losses of 2 percent deducted from the local storage accounts of producers in the Basin.[26]

Under Peace conditions the need for imported Tier 2 water is smaller than under the baseline. Three main effects drive this change: (i) the recharge capacity of the Basin can now accommodate the entire desalter replenishment obligation each year without requiring agencies to engage in in-lieu recharge; (ii) the amount of annual Basin over-production that can be sustained in the Basin is larger by the amount of the increase in recharge capacity; and (iii) the reduction in local storage reduces the allocation of Basin storage losses to the desalter. The first two components produce direct value to agencies on the extensive margin of supply by defraying Tier 2 purchases (as depicted in Figure 2). The third component, the change in the designation of storage losses against the replenishment obligation of the desalters, creates no economic benefit to the Basin and is purely redistributional in its effects, because the change in the designation of storage losses does not alter the physical recharge capacity of the Basin. An individual agency that incurs a one-unit storage loss gives up a unit of water from local storage, and the value of this unit of water is distributed back to other agencies in the form of a credit against the desalter replenishment obligation.

[26] Peace Agreement, Article 5.2b(xii).

Under Peace conditions, the amount of replenishment water that is purchased from MWD in each representative hydrologic year is 81,800 AF (93,800 AF of recharge capacity less the 12,000 AF stormwater recharge). This 81,800 AF of replenishment water, which is purchased at MWD replenishment rates, is allocated first to meet the 15,000 AF per year replenishment water requirement for DYY participants and to meet the replenishment obligation of the desalter, with the remaining recharge capacity in each year allocated among individual agencies according to each agency's imported water demand relative to total imported water demand in the Basin.

As in the baseline scenario, imported water demand in excess of the recharge capacity of the Basin is cleared each year in the Peace I scenario on the third step of supply through purchases of Tier 2 water from MWD. Tier 2 MWD water purchases, as in the baseline case, are allocated to individual agencies based on the share of each agency's imported water demand relative to total imported water demand in the Basin.

Under peace conditions, the total purchases of Tier 2 water among agencies in the Basin rise from 25,692 AF in 2007 to 127,710 AF in 2030, a decline of approximately 72,000 AF per year relative to the baseline scenario. This decline in Tier 2 water purchases is approximately equal to the increase in recharge capacity under the Peace Agreement and represents a replacement of Tier 2 water purchases with replenishment water purchases at the lower MWD rate in each year. Cucamonga Valley Water District and the City of Ontario, the two largest buyers of imported water in both the baseline and Peace I, receive the largest share of the net benefit of this offset in Tier 2 water, because of their disproportionate representation on the extensive margin of supply.

5.4. Water Procurement Costs

The total cost of water procurement to individual agencies is the sum of eight components: (i) Tier 2 water purchases; (ii) transfer water purchases; (iii) desalter water purchases for urban supply; (iv) replenishment water purchases; (v) desalter replenishment costs; (vi) Watermaster general assessments on the appropriative pool; (vii) Watermaster general assessments on the agricultural pool paid by the appropriative pool; and (viii) the Pomona credit. The first three components of water procurement cost are calculated in the same manner as in the baseline case, with the exception that the total quantities of Tier 2 purchases and transactions in the transfer market differ.[27]

Desalter replenishment costs are recovered through Watermaster replenishment assessments in an amount equal to the cost of replenishment water purchased from MWD to meet the replenishment obligation of the desalters each year. As in the baseline case, these costs are allocated to individual agencies according to each agencies pro rata share of safe operating yield.[28]

Replenishment water purchases allocated to individual agencies related to the DYY program are levied back on individual agencies in proportion to their storage claims in the program, as detailed above. Any remaining recharge capacity in excess of the amount needed to fulfill DYY

[27] Changes in the pattern of Tier 2 water purchases and water transfers that occur across scenarios and over time within each scenario can have equilibrium effects on market prices; however, price changes in these markets are not considered in the scope of the present study.

[28] Personal correspondence with Watermaster staff (August 29, 2007).

contributions and the replenishment obligation of the desalters and DYY is allocated in each year to individual agencies according to each agency's imported water demand relative to total imported water demand in the Basin.

The total costs recovered through Watermaster general assessments for the program elements in the Peace I scenario include OBMP assessments, special project assessments, and recharge debt payments. The additional OBMP and special project assessments in the Peace I scenario amount to a total $7.05 million out of the $7.87 million (90 percent) in total Watermaster expenses in 2007, and these additional costs of implementing the program elements in the Peace I scenario rise to $13.8 million in 2030. As in the baseline scenario, the allocation of all appropriative pool general assessments to individual agencies is made based on each agency's share of safe operating yield in the Basin.

The Peace Agreement negotiated the transfer of all general assessment fees from the agricultural pool to the appropriative pool. The total assessment fees paid by the agricultural pool, which are now assumed by members of the appropriative pool, amount to $1.1 million in 2007 and decline to $460 thousand in 2030 due to land use conversions that result in a decline in agricultural water use as a share of total Basin safe yield. In total, the general assessments paid by the appropriative pool inclusive of the transfer of agricultural pool assessments increase ten-fold from $624 thousand in the baseline scenario to $6.3 million under Peace conditions in 2007 and the assessment costs in the Peace I scenario remain at least 7 times as large as the costs attributable to baseline conditions in the Basin throughout the production horizon. The agricultural pool share of Watermaster assessment fees is paid by individual agencies in the appropriative pool according to the agency's share of the net agricultural transfer in each year.[29]

Finally, the Pomona credit of $66,667 per year is paid every year by each agency in proportion to the agency's share of safe operating yield.

5.5. Comparison of Baseline and Peace Agreement Outcomes

Under the terms of the Peace Agreement, the present value of the net benefit of the program elements for the ten agencies encompassed by the study is $182 million. The main component associated with this increased net benefit is the displacement of Tier 2 water with new Basin yield and replenishment water. Under baseline conditions, the present value of total Tier 2 water purchases over the 2007-2030 period is $1.53 billion, whereas, under Peace conditions, the present value of Tier 2 water purchase over the period decreases to $931 million. This decrease in Tier 2 water under Peace conditions was replaced with replenishment water at the lower MWD rate, and the combined cost of imported water in the Peace I scenario decreased by $310 million in present value terms (from $2.06 billion under baseline conditions to $1.75 billion under Peace conditions). This benefit was acquired at the expense of an increase in the present value of assessment costs from $16.7 million to $146 million.

[29] For details on this calculation and the distribution of general appropriative pool assessments based on pro rata share of safe operating yield, see Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Pool 3 Assessments Summary (p5): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf.

Table 2 provides a breakdown of the projected outcomes under Peace conditions in the year 2015 for the eight largest producers in the study. A comparison of these outcomes with those that emerge under baseline conditions in Table 1 provides a useful profile of the essential differences in Basin performance under each scenario. Residual demand for Basin water is identical in each scenario. This quantity corresponds to the value Q* in Figure 1. The safe operating yield of the agencies considered is the same in both cases, as is desalter water for urban supply. The net agricultural pool allocation to the appropriative pool is slightly higher under Peace (48,848 AF relative to 48,268 AF under baseline rules). This is because the agencies considered in the study represent 91 percent of Basin production and nearly 100 percent of the land use conversions, which are credited with a larger water allocation under Peace. Available Basin supply in the Peace I scenario is accordingly higher by the sum of this component and the 15,000 AF of supply available to agencies through the DYY program, which leads to a commensurate reduction in imported water demand.

The level of local storage is lower under Peace by approximately the 15,000 AF of storage that is now accounted for in the DYY program. Replenishment purchases are now possible due to the increase in Basin recharge capacity, and the agencies combine to purchase 31,533 AF of replenishment water in the year 2015.

In total, Tier 2 water use falls from 137,809 AF under baseline conditions (inclusive of the purchases required by in lieu recharge) to 82,658 AF under Peace conditions. This decrease in Tier 2 water imports reflects the displacement of Tier 2 water purchases through a combination of new Basin yield and increased replenishment water purchases made possible by the expansion of Basin recharge capacity.

Actual production among these eight agencies is higher in the Peace I scenario by 36,953 AF in the year 2015 (160,203 AF vs. 123,250 AF in the baseline scenario). This increment in Basin production represents the effective increase in Basin recharge capacity available to these producers after accounting for the combined 27,000 AF of recharge capacity utilized by stormwater and DYY program recharge.

Table 2: Year 2015 Outcome Under Peace I Scenario

	Appropriator								
Component	Chino	Chino Hills	Ontario	Upland	Cucamonga	Monte Vista	Jurupa	Pomona	**Total**
Urban Water Demand	26,200	24,700	66,600	22,500	72,500	14,100	36,350	30,264	**293,214**
Available Surface Water	0	0	0	5,200	3,000	0	500	0	**8,700**
Available Other Groundwater	0	0	0	3,800	5,400	0	0	1,884	**11,084**
Residual Demand	*26,200*	*24,700*	*66,600*	*13,500*	*64,100*	*14,100*	*35,850*	*28,380*	**273,430**
Safe Operating Yield	4,034	2,111	11,374	2,852	3,619	4,824	2,061	11,216	**42,092**
New Yield	883	462	2,489	624	792	2,455	451	2,489	**10,645**
Net Ag Transfer	10,558	2,173	7,210	1,467	2,460	2,553	16,658	5,769	**48,848**
Desalter Water Supply	5,000	4,200	5,000	0	0	0	19,922	0	**34,122**
Storage & Recovery	527	658	3,671	1,364	5,160	1,801	909	909	**15,000**
Available Supply	*21,001*	*9,604*	*29,744*	*6,308*	*12,032*	*10,234*	*39,074*	*20,349*	**148,346**
Net Storage	428	288	771	-107	1,058	133	0	225	**2,797**
Transfers	726	1,985	4,854	914	6,854	516	-3,224	1,065	**13,690**
Import Demand	*4,901*	*13,399*	*32,773*	*6,171*	*46,272*	*3,483*	*0*	*7,192*	**114,191**
Local Storage	3,713	10,783	26,326	5,137	37,191	2,761	0	5,737	**91,649**
Replenishment Purchases	1,353	3,700	9,050	1,704	12,778	962	0	1,986	**31,533**
Tier 2 Purchases	3,548	9,699	23,723	4,467	33,494	2,521	0	5,206	**82,658**
Actual Production	21,653	11,373	34,071	7,119	18,142	10,695	35,850	21,299	**160,203**
Watermaster Assessments	$849	$401	$1,258	$267	$629	$411	$1,353	$795	**$5,963**

Figure 1 compares the benefit received by each agency from reduced water procurement costs to the increase in assessment cost that result from the implementation of the program elements in the Peace I scenario. The assessment costs associated with implementing the program elements considered in the Peace I scenario are represented by an overall increase from $16.7 million to $146 million in present value terms. The program benefits in present value terms in the Peace II scenario are reflected in the decrease in water procurement costs from $2.1 billion under baseline conditions to $1.8 billion in the Peace I scenario.

In terms of the total benefit, two agencies, City of Ontario and Cucamonga Valley Water District, receive the largest share of the benefits resulting from the Peace I program elements, while the assessment costs are distributed more equally among producers. In total, the City of Ontario and Cucamonga Valley Water District together receive 46 percent of the benefit of decreased water procurement costs and incur 32 percent of the increase in assessment costs. An important reason these agencies receive a large share of the net benefit from the agreements is due to a scale effect in the annual level of residual demand for Basin water, for instance in 2015 these two agencies combined account for 48 percent of residual demand for Basin water (130,700 AF out of 273,430 AF).

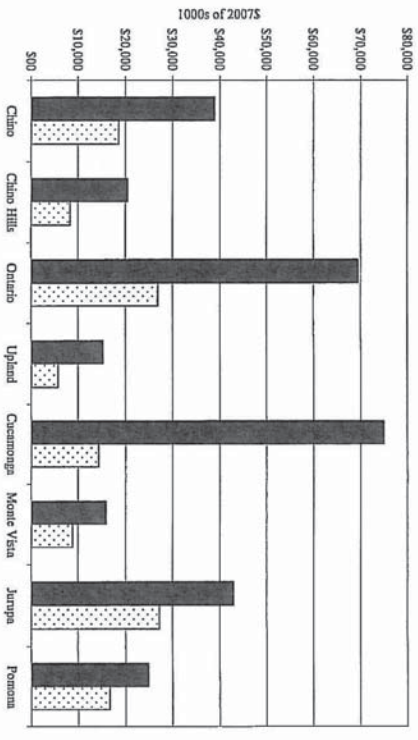


Figure 1

Distribution of Net Benefit, Peace I vs. Baseline ($/per AF)

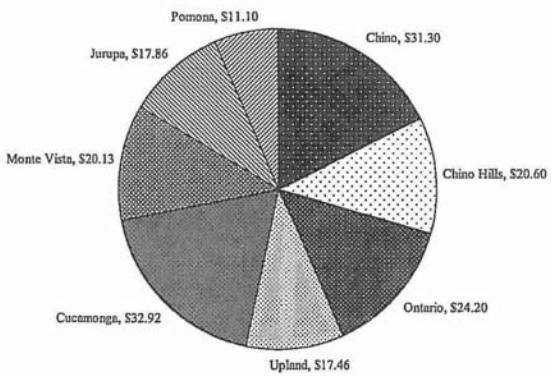


Figure 2

Figure 2 shows the distribution of net benefits per acre-foot of residual water demand across individual agencies in the Basin resulting from the program elements in the Peace I scenario. Fontana Union Water Company and San Antonio Water Company are not included in these calculations, because the available surface water and other groundwater supplies for these agencies exceed their total demand. Controlling for agency scale on the basis of residual demand for Basin water among the remaining producers, the net benefit resulting from the combined program elements in the Peace II Agreement is grouped between $11.10/AF for the City of Pomona to $32.92/AF for Cucamonga Valley Water District. Overall, the present value of the net benefit to all parties over the 24 year horizon resulting from a move from baseline conditions to Peace conditions is $182 million and the total residual demand for water over this period is 6.9 million AF, which implies an average return of $19.84 per acre-foot to the agencies encompassed by the study.

6. Peace II Scenario

The Peace II scenario introduces several major program elements in the Basin that build on the existing conditions under Peace. The main components of the Peace II scenario that alter market values in the Basin relative to the Peace I scenario are: (i) hydraulic control, which provides 400,000 AF of cumulative forgiveness and SAR inflow of 9,900 AF per year in the Basin; (ii)

the production of recycled water; (iii) a change in the allocation of the replenishment obligation associated with over-production in the agricultural pool transfer; (iv) a transfer of overlying non-agricultural pool water to the appropriative pool; and (v) a transfer of the Pomona credit from Basin agency to Three Valleys. This section describes the changes that occurred through these program elements to alter net benefits received by individual agencies in relation to the earlier discussion of the existing program elements in Peace Agreement.

6.1. Basin Supply

Under the set of programs encompassed by the Peace II Agreement, five factors led to changes in available Basin supply relative to prevailing conditions under Peace: (i) a change in the water allocation resulting from land use conversions; (ii) the influx of recycled water (for direct use and groundwater recharge), (iii) the transfer of 49,178 AF of overlying non-agricultural water to the appropriative pool; (iv) 9,900 AF per year of inflow from the Santa Ana River (SAR), eventually rising to 12,500 AF per year; and (v) 400,000 AF of cumulative forgiveness for Basin over-production. Unlike the program elements implemented in the Peace I scenario, all elements of the Peace II scenario (with the exception of the transfer of the Pomona credit to Three Valleys) fundamentally alter supply conditions on the lowest step of the supply relationship by contributing new sources of Basin yield.

The net agricultural transfer to each agency in the Peace II scenario maintains the return to each converter of 2.0 AF of Basin water for each acre converted and the early transfer of 32,800 AF per year to the appropriative pool, but alters the allocation rule for the replenishment obligation for the amount of over-allocated agricultural pool water. Under Peace II rules, the replenishment obligation for over-allocated agricultural pool water is made on the basis of a weighted average of the share of safe operating yield and share of cumulative land-use conversions for each agency (the "proportion of water available for reallocation (PAR)") rather than in proportion to each agency's share of safe operating yield in the Peace I scenario. By placing greater weight on land use conversions, a greater share of the replenishment obligation for over-allocated agricultural pool water is placed on land-use converters. For instance, the combined share of safe operating yield of the two largest land-use converters in the Basin—City of Chino and Jurupa Community Services District—is approximately 10 percent, whereas the combined PAR share of these agencies in Fiscal Year 2006-2007 is 38 percent.[30]

The use of significant quantities of recycled water is made possible in the Basin by the attainment of hydraulic control.[31] Recycled water projections for direct use in the Basin increase from 11,924 AF in 2007 to 60,450 AF in 2030 and recycled water use for groundwater recharge rises over the period from 3,443 AF to 35,000 AF.[32, 33] The recycled water price charged by

[30] Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Land Use Conversion Summary (p10): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf.
[31] Personal correspondence with IEUA staff.
[32] Projections on recycled water deliveries for direct use and on total recycled water for groundwater recharge is provided for IEUA members in IEUA Urban Water Management Plan (2005), Table 3-13. The projections on recycled water deliveries for direct use to non-IEUA members as well as the distribution of recycled water deliveries for groundwater recharge across individual agencies are based on personal communication with IEUA staff (July 11, 2007).
[33] In no case does the amount of recycled water used for recharge exceed the DHS-approved dilution rates.

IEUA for recycled water deliveries in each period is viewed as sufficient to recover the fully amortized capital and operating costs of their recycled water operations.[34]

The amount of transfer of overlying non-agricultural water to the appropriative pool is taken to be 49,178 AF, which is the ending total balance in the pool 2 local storage account in the Watermaster final assessment package for fiscal year 2006-2007.[35] This amount of water is allocated proportionally in four equal installments over the four-year period 2007-2010 to agencies in the appropriative pool according to their share of safe operating yield, and the price in each period is set at 92 percent of the prevailing MWD replenishment rate.[36]

Finally, in meeting the goal of hydraulic control in the Peace II scenario, two sources of water are created: (i) the Santa Ana River (SAR) inflow is calculated to generate 9,900 AF of new Basin yield each year, eventually rising to 12,500 AF per year; and (ii) 400,000 AF of cumulative overdraft is necessary in the Basin over the period 2007-2030.[37] Both the 9,900 AF per year of SAR inflow and the allocation of the 400,000 AF of cumulative forgiveness are allocated to meet the replenishment obligation of the desalters. The dynamic path of forgiveness for the desalter obligation follows the most-rapid depletion path defined by the aggregate study, which assumes that the Basin overdraft occurs to whatever extent is necessary to meet the replenishment obligation of the desalters (net of storage losses and SAR inflow). Under the most-rapid depletion path, hydraulic control is achieved on the cumulative overdraft of 400,000 AF from the Basin in the year 2024, which raises the SAR inflow from 9,900 AF to 12,500 AF over the remaining period 2025-2030.

6.2. Import Demand

The demand for imported water for each agency in the Basin is calculated in the same manner as in the Peace scenario. In terms of the resulting values, the influx of new Basin water supply in response to recycled water use alter the resulting evaluation of import demand relative to the prevailing conditions under Peace in two significant ways. First, import demand is now lower each year relative to the outcome under Peace conditions by the amount of new Basin supply. This water ultimately defrays Tier 2 water purchases as the supply side of the model is built upwards and aggregated across each step towards the extensive margin of supply. As these supplies are developed, available supply in the Basin rises to 266,134 AF by the year 2030, an increase of 80,442 AF above the Peace I scenario and 106,678 AF above the baseline conditions.

Second, the amount of water held in local storage by individual agencies decreases to account for the effect of these new, reliable water sources in the Basin and the corresponding reduction in the need to smooth out the cyclical components of water supplies with puts and takes. As recycled water supplies are developed in the Basin, the need for local storage decreases; for instance, the total amount of water held in local storage in the Basin in 2030 decreases from 141,565 AF under baseline conditions, to 129,259 AF in the Peace I scenario, to 80,500 AF in the Peace II scenario.

[34] IEUA, Operating and Capital Program Budget, Fiscal Year 2007/08, Volume 1 (July 2007), p231.
[35] Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Pool 2 Water/Storage Transactions (p12): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf.
[36] Non-Binding Term Sheet, item IX.C.
[37] Personal correspondence with staff at Wildermuth Environmental.

The quantity of water transactions in the water transfer market rises significantly as the number of agencies selling water increases with the influx of recycled water supplies. This changes the distribution of net benefits, both directly by the allocation of recycled water supplies based on proximity of users (rather than according to the share of safe operating yield) and indirectly by reducing the number of agencies that procure water on the extensive margin of supply.

6.3. Water Imports

An important outcome in the Peace II scenario as a result of hydraulic control is the decrease in Tier 2 water purchases relative to both the baseline and Peace I scenarios. Unlike the case of the Peace I scenario, in which the decline in Tier 2 purchases was largely offset by an increase in assessment costs to support the increase in recharge capacity, the avoided Tier 2 water purchases in the Peace II scenario are associated either with negligible costs (SAR inflow and forgiveness for Basin over-draft) or with the relatively low cost associated with recycled water, which is valued at IEUA recycled water rates. These differences are characterized in the discussion below.

In addition, the level of water imports increases slightly in the Peace II scenario, because of a reduction in the storage loss component allocated to meet the desalter replenishment obligation. In the Peace II scenario, the desalter replenishment obligation is taken to be desalter production less storage losses of 1 percent from the local storage accounts of producers in the Basin.[38]

6.4. Water Procurement Costs

All program costs that form the basis for Watermaster assessments in the Peace I scenario (as described above) are considered in the Peace II scenario, with the exception of the Pomona credit, which is no longer paid by appropriators in the Basin and is instead paid by Three Valleys Municipal Water District.[39] The removal of this fee from Watermaster assessments leads to an increase in net benefit to agencies in the Basin by $66,667, and this is returned to agencies in proportion to each agency's share of safe operating yield. The increase in net benefit is offset by a proportional increase in cost for Three Valleys Municipal Water District, and the present value of this stream of payments over the period 2007-2030 at the prevailing rate of discount (4.5 percent) is $1.0 million.

Recycled water costs are allocated to each agency using the recycled water prices provided by IEUA, as discussed above. The desalter replenishment obligation, which begins in the year 2024 after the 400,000 AF of over-draft credits are exhausted, is met in the Peace II scenario through Watermaster replenishment assessments as follows. Half of the desalter replenishment obligation is met by individual agencies according to pro rata shares of safe operating yield, as in the Peace I scenario, and the remaining half of the desalter replenishment obligation is met according to each agency's share of actual production relative to total production in the Basin.[40] This latter portion of the Watermaster replenishment assessments accords with the method of allocating Watermaster general assessments to the appropriative pool in all three scenarios considered. The

[38] Non-Binding Term Sheet, Item VI.B.1.
[39] Non-Binding Term Sheet, item VII.A.
[40] Personal correspondence with Watermaster staff (August 29, 2007).

method for calculating the remaining water procurement costs for each agency is identical to the method described above for the Peace I scenario.

6.5. Comparison of Baseline, Peace I, and Peace II Outcomes

Relative to baseline conditions, the present value of total net benefit among the ten agencies encompassed by the study for the program elements contained in the Peace II scenario is $904.6 million, which represents an additional net benefits of $722.5 million relative to the outcome of the Peace I scenario.

The main factor associated with this increased net benefit is the displacement of Tier 2 water with recycled water, SAR in-flow, and, in the period 2007-2024, with forgiveness for 400,000 AF of Basin over-draft to attain hydraulic control. Under peace I conditions, the present value of total Tier 2 water purchases over the period 2007-2030 is $931 million, whereas, in the Peace II scenario, the present value of Tier 2 water purchases over the period is $271 million. This decrease in Tier 2 water costs in the Peace II scenario was replaced with a combination of 400,000 AF of forgiveness for Basin over-draft and recycled water at the lower IEUA recycled water rate.[41] The combined present value of cost of imported water and recycled water inputs in the Peace II scenario is $1.0 billion, which represents a substantial reduction in the present value of water procurement cost from $1.75 billion in the Peace I scenario.

Table 3 depicts the projected outcomes to individual agencies in the Peace II scenario for the year 2015. A comparison of these outcomes with those that emerge in the baseline scenario in Table 1 and the Peace I scenario in Table 2 provides a useful profile of the essential differences in Basin performance under Peace II conditions. Residual demand, which corresponds to the value Q* in Figure 1, is identical in all three scenarios, as is the safe operating yield of the agencies and desalter production. The net agricultural pool transfer to the appropriative pool (48,530 AF) is between the values that emerge in the Peace I scenario (48,848 AF) and the baseline scenario (48,268 AF). Relative to the outcome under Peace I conditions, the new rules for assessing replenishment obligations for the over-allocated agricultural pool water redistribute the net returns away from the major land-use converters in the Basin (in particular, the City of Chino and Jurupa Community Services District).

Available Basin supply in the Peace II scenario in the year 2015 (208,199 AF) is considerably higher than the available Basin supply in the baseline scenario (123,554 AF) and Peace I scenario (148,346 AF), which leads to a commensurate reduction in imported water demand. Virtually the entire difference in imported water demand between the Peace I scenario and the Peace II scenario is the result of the 60,171 AF addition of recycled water (direct use plus groundwater replenishment).

The level of local storage in the Peace II scenario in, 53,293 AF, is lower than local storage levels in the baseline (107,054 AF) and Peace I scenarios (91,649 AF) due to the large influx of

[41] The allocation of the 400,000 AF of forgiveness to meet the replenishment obligations of the desalters is implicitly valued at the Tier 2 rate, because each unit of forgiveness that is credited against the desalter replenishment obligation, which is valued directly in the model at the replenishment rate, "frees up" a unit of recharge capacity that allows a unit of Tier 2 water to be displaced on the extensive margin of supply.

reliable Basin water through the development of the recycling program and the acquisition of SAR inflow. This greater availability of Basin water supply also facilitates a richer pattern of water transfers in the Peace II scenario.

In total, Tier 2 water purchases in the year 2015 are 10,186 AF, which represents a substantial reduction from the 137,089 AF of Tier 2 water purchases that take place under baseline conditions (inclusive of the purchases required by in lieu recharge) and the 82,658 AF under Peace I conditions. Replenishment water purchases increase in the Peace II scenario from 31,533 AF in the Peace I scenario to 41,800 AF in the Peace II scenario. The increase in replenishment imports reflects the replacement of 35,267 AF of replenishment obligations in the Peace I scenario with SAR inflow and desalter forgiveness in the year 2015, less the 20,671 AF claim on recharge facilities associated with the groundwater recharge component of the recycled water program in the Peace II scenario. The decrease in Tier 2 water imports of 72,430 AF between the Peace I and Peace II scenario is the result of the displacement of Tier 2 water purchases with a combination of recycled water, SAR in-flow, and allowed over-draft.

Actual production among these eight agencies in the year 2015 (182,170 AF) is higher in the Peace II scenario than in the Peace I scenario (160,203 AF) and the baseline scenario (121,138 AF). This increment in Basin production relative to the Peace I scenario represents the increase in Basin supply resulting from the use of recycled water for groundwater recharge as well as small adjustments in storage loss and net storage requirements.[42]

Finally, notice in the comparison of Tier 2 purchases by individual agencies in Tables 1-3 that the distribution of Tier 2 water purchases across individual agencies in the Basin differs in all three scenarios relative to the distributions of safe operating yield and the distribution of actual production. These elements together comprise the basis for the allocation of collective Basin net benefits to individual agencies, with the division of market benefits from Basin improvement activities determined by each agency's share of Tier 2 water purchases, and the allocation of cost determined through Watermaster formulas that are based either on a individual agency's share of actual production to total Basin production or on a individual agency's share of safe operating yield. Differences in the distributions of these three key values across individual agencies in the Basin are responsible for inequalities in the distribution the net benefit from the various program elements that improve the management of Chino Basin water resources.

[42] Recycled water for direct use offsets urban water demand, but does not otherwise influence Basin production.

Table 3: Year 2015 Outcome Under Peace II Scenario

	Appropriator								
Component	Chino	Chino Hills	Ontario	Upland	Cucamonga	Monte Vista	Jurupa	Pomona	**Total**
Urban Water Demand	26,200	24,700	66,600	22,500	72,500	14,100	36,350	30,264	**293,214**
Available Surface Water	0	0	0	5,200	3,000	0	500	0	**8,700**
Available Other Groundwater	0	0	0	3,800	5,400	0	0	1,884	**11,084**
Residual Demand	*26,200*	*24,700*	*66,600*	*13,500*	*64,100*	*14,100*	*35,850*	*28,380*	**273,430**
Safe Operating Yield	4,034	2,111	11,374	2,852	3,619	4,824	2,061	11,216	**42,092**
New Yield	883	462	2,489	624	792	2,455	451	2,489	**10,645**
Net Ag Transfer	10,103	2,176	7,559	1,581	2,560	2,739	15,599	6,215	**48,530**
Desalter Water Supply	5,000	4,200	5,000	0	0	0	19,922	0	**34,122**
Storage & Recovery	527	658	3,671	1,364	5,160	1,801	909	909	**15,000**
Recycled Water, Direct Use	6,300	4,000	8,800	0	15,900	500	2,500	1,500	**39,500**
Recycled Water, Replenishment	2,402	2,188	5,590	2,450	5,304	1,070	1,667	0	**20,671**
Available Supply	*29,248*	*15,796*	*44,482*	*8,871*	*33,336*	*11,990*	*42,181*	*22,294*	**208,199**
Net Storage	0	69	527	-153	5	94	0	217	**759**
Transfers	-3,048	2,784	7,026	1,389	9,546	684	-6,331	1,955	**14,004**
Import Demand	*0*	*6,190*	*15,619*	*3,087*	*21,223*	*1,520*	*0*	*4,347*	**51,986**
Local Storage	0	6,360	15,798	3,306	21,974	1,507	0	4,347	**53,293**
Replenishment Purchases	0	4,977	12,559	2,482	17,064	1,222	0	3,495	**41,800**
Tier 2 Purchases	0	1,213	3,060	605	4,158	298	0	852	**10,186**
Actual Production	19,900	14,516	42,550	10,227	26,762	12,159	33,350	22,706	**182,170**
Watermaster Assessments	$707	$447	$1,368	$327	$804	$411	$1,129	$753	**$5,946**

Figure 3 compares the benefit received by each agency from reduced water procurement costs to the increase in assessment cost that result from the implementation of the program elements in the Peace II scenario. The program costs in the Peace II scenario do not differ substantively from program costs in the Peace I scenario, and represent an overall increase from $17 million to $143.2 million in present value terms. The program benefits in present value terms in the Peace II scenario are reflected in the decrease in water procurement costs from $2.1 billion under baseline conditions to $1.1 billion in the Peace II scenario.

City of Ontario and Cucamonga Valley Water District receive the largest share of the benefits resulting from the Peace II program elements, while the assessment costs resulting from the Peace II program elements are notably smaller and distributed more equally across the agencies. In total, the City of Ontario and Cucamonga Valley Water District together receive 56 percent of the benefit of decreased water procurement costs and incur 39 percent of the increase in assessment costs.

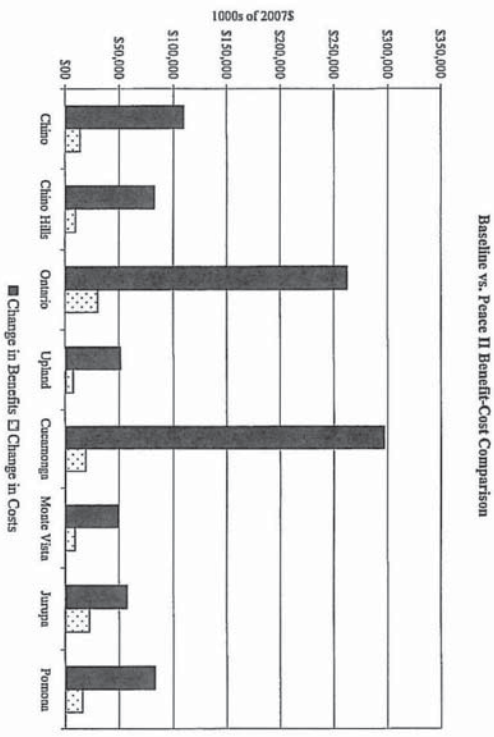


Figure 3

Distribution of Net Benefit, Peace II vs. Baseline ($/per AF)

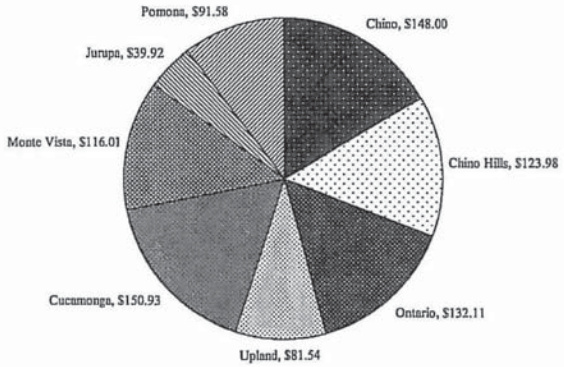


Figure 4

Figure 4 depicts the distribution of net benefits per acre-foot of residual water demand across individual agencies in the Basin resulting from the program elements in the Peace II scenario. Overall, the present value of the net benefit to all parties over the 24 year horizon resulting from a move from baseline conditions to Peace conditions is $905 million and the total projected water demand over this period is 9.1 million AF, which implies an average return of $98.53 per acre-foot to the agencies encompassed by the study.

Noting, as before, that Fontana Union Water Company and San Antonio Water Company have available surface water and other groundwater supplies in excess of their demand, and controlling for agency scale on the basis of residual demand for Basin water among the remaining producers, the net benefit resulting from the combined program elements in the Peace II Agreement lies between $39.92/AF for Jurupa CSD to $150.93 for Cucamonga Valley Water District.

The net benefit/AF received by Jurupa Community Services District is significantly smaller than the net benefit/AF received by other producers, because of systematic differences in the way this agency meets consumer water demand. Jurupa Community Services District is disadvantaged in the ability to capitalize on program elements that improve Basin performance by the large share of desalter water for urban water supply it receives, which cannot be defrayed by the development of new Basin supplies, and by a negligible reliance on imported water from MWD.

Among the remaining agencies, the Cities of Pomona and Upland receive a smaller share of the net benefit/AF, while Monte Vista Water District, the Cities of Chino, Ontario, Upland, and Chino Hills, and Cucamonga Valley Water District each receive a net benefit/AF above $116/AF.

7. Alternative Scenarios

This section examines the sensitivity of the results to variations in various assumptions underlying the model. In theory, each of the factors considered here has the potential to change the relative rankings among agencies with respect to benefits per acre-foot. For example, increasing the cost of capital will tend to elevate the ranking of agencies that receive benefits in early years. These sensitivity analyses are intended to bracket actual results and measure the sensitivity of outcomes to changes in assumptions.

Five parameters are varied and the model results are recalculated in each case. The alternative scenarios considered are: (i) variation in the share of the desalter replenishment obligation attributed to the appropriative pool in the baseline case; (ii) variation in the discount rate; (iii) variation in Urban Water Demands; (iv) variation in the availability of Tier 1 water to agencies in the Basin; and (v) increases in effective recycled water prices due to the long-run average cost of recycled water infrastructure improvements.

The model results are most sensitive to the scenario in which all Tier 2 water purchases in the model are replaced with Tier 1 water purchases at the lower MWD rate. The results of this scenario are shown in Table 4. This scenario provides a bracketing assumption on the value of the outside water options available to agencies and it is unlikely that each agency can meet annual increases in urban water demand every year with a continued expansion of Tier 1 purchases. To the extent that individual agencies differ in their access to Tier 1 water, moreover, market forces would lead to a displacement of Tier 2 water purchases on the extensive margin of supply before any displacement occurs of Tier 1 water purchases, so that a model that considered a relatively equal mix of Tier 1 and Tier 2 water supplies would not result in values near the mid-point between the Tier 1 scenario and the Tier 2 scenario. Nonetheless, the total net benefit in the Basin under Peace II scenario remains high—$611.7 million ($88.89/AF)—even when the entire increase in Basin supply is valued at the displacement cost of Tier 1 water.

The model results are fairly robust to variations in the remaining parameters. In total, the net benefit of the Peace II program elements varies across the scenarios in a range between $806.7 million - $864.4 million ($87.87/AF - $104.22/AF) in each scenario, relative to the $904.6 million ($98.53/AF) at baseline levels of the parameters.

Table 4: Tier 2 Replaced By Tier 1

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$8,549	$77,828	$13.18	$120.03
City of Chino Hills	$18	$46,218	$0.03	$77.92
City of Ontario	$1,451	$148,970	$0.83	$84.73
City of Upland	$328	$27,599	$0.61	$51.04
Cucamonga Valley Water District	$14,025	$175,240	$7.61	$95.10
Fontana Union Water Co.	$1,451	$26,880		
Monte Vista Water District	($2,090)	$27,005	($5.99)	$77.39
San Antonio Water Company	$342	$6,337		
Jurupa CSD	$10,611	$29,242	$12.01	$33.11
City of Pomona	($5,720)	$46,453	($7.76)	$62.99
Total	**$28,965**	**$611,773**	**$3.15**	**$66.63**

Table 5: 50% of Desalter Obligation Paid by Ag Pool

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$15,450	$91,122	$23.83	$140.53
City of Chino Hills	$9,681	$71,001	$16.32	$119.70
City of Ontario	$28,888	$218,613	$16.43	$124.34
City of Upland	$6,017	$40,661	$11.13	$75.20
Cucamonga Valley Water District	$56,320	$273,782	$30.56	$148.57
Fontana Union Water Co.	($2,836)	$22,592		
Monte Vista Water District	$1,232	$34,687	$3.53	$99.41
San Antonio Water Company	($669)	$5,326		
Jurupa CSD	$13,297	$32,779	$15.06	$37.11
City of Pomona	($5,280)	$54,068	($7.16)	$73.31
Total	**$122,101**	**$844,632**	**$13.30**	**$91.99**

Table 6: 5.5% Discount Rate

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$17,681	$84,906	$27.27	$130.95
City of Chino Hills	$11,108	$65,916	$18.73	$111.13
City of Ontario	$38,234	$207,227	$21.75	$117.86
City of Upland	$8,595	$39,560	$15.90	$73.16
Cucamonga Valley Water District	$54,862	$247,990	$29.77	$134.57
Fontana Union Water Co.	$4,231	$26,907		
Monte Vista Water District	$6,265	$36,087	$17.95	$103.42
San Antonio Water Company	$997	$6,343		
Jurupa CSD	$13,877	$31,426	$15.71	$35.58
City of Pomona	$7,315	$60,400	$9.92	$81.90
Total	**$163,165**	**$806,761**	**$17.77**	**$87.87**

Table 7: 10% Conservation

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$18,131	$88,819	$31.07	$152.20
City of Chino Hills	$13,070	$70,172	$24.48	$131.45
City of Ontario	$44,196	$223,937	$27.93	$141.52
City of Upland	$8,602	$39,805	$17.68	$81.80
Cucamonga Valley Water District	$64,718	$268,848	$39.02	$162.10
Fontana Union Water Co.	$4,989	$30,656		
Monte Vista Water District	$6,205	$37,920	$19.76	$120.75
San Antonio Water Company	$1,176	$7,227		
Jurupa CSD	$15,189	$33,707	$19.11	$42.40
City of Pomona	$6,788	$63,259	$10.23	$95.30
Total	**$183,064**	**$864,350**	**$22.07**	**$104.22**

Table 8: 50% Increase in Recycled Water Price

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$20,294	$88,913	$31.30	$137.13
City of Chino Hills	$12,217	$69,270	$20.60	$116.78
City of Ontario	$42,547	$220,779	$24.20	$125.57
City of Upland	$9,442	$42,215	$17.46	$78.07
Cucamonga Valley Water District	$60,667	$262,234	$32.92	$142.30
Fontana Union Water Co.	$4,839	$30,268		
Monte Vista Water District	$7,025	$39,277	$20.13	$112.56
San Antonio Water Company	$1,141	$7,136		
Jurupa CSD	$15,772	$31,962	$17.86	$36.19
City of Pomona	$8,189	$66,517	$11.10	$90.19
Total	**$182,133**	**$858,571**	**$19.84**	**$93.51**

Attachment D

Attachment "D"

2007 SUPPLEMENT TO THE IMPLEMENTATION PLAN OPTIMUM BASIN MANAGEMENT PROGRAM FOR THE CHINO BASIN

INTRODUCTION

This document describes the supplement to the implementation plan for the Chino Basin Optimum Basin Management Program (OBMP), as determined through the 2007 "Peace II" process.

PROGRAM ELEMENT 1 DEVELOP AND IMPLEMENT COMPREHENSIVE MONITORING PROGRAM

A. Production Monitoring Program

All active wells (except for minimum user wells) are now metered. Watermaster reads the production data from the meters on a quarterly basis and enters these data into Watermaster's relational database.

B. Surface Water Discharge and Quality Monitoring

Water Quality and Quantity in Recharge Basins. Watermaster measures the quantity and quality of storm and supplemental water entering the recharge basins. Pressure transducers or staff gauges are used to measure water levels during recharge operations. In addition to these quantity measurements, imported water quality values for State Water Project water are obtained from the Metropolitan Water District of Southern California (MWDSC) and recycled water quality values for the RP1 and RP4 treatment plant effluents are obtained from IEUA. Watermaster monitors the storm water quality in the eight major channels (San Antonio, West Cucamonga, Cucamonga, Deer Creek, Day Creek, San Sevaine, West Fontana, and DeClez) usually after each major storm event. Combining the measured flow data with the respective water qualities enables the

calculation of the blended water quality in each recharge basin, the "new yield" to the Chino Basin, and the adequate dilution of recycled water.

Surface Water Monitoring in Santa Ana River (SAR). Watermaster measures the discharge of the river and selected water quality parameters to determine those reaches of the SAR that are gaining flow from Chino Basin and/or, conversely, those reaches that are losing flow into the Chino Basin. These bi-weekly flow and water quality measurements are combined with discharge data from permanent USGS and Orange County Water District (OCWD) stream gauges and discharge data from publicly owned treatment works (POTWs). These data are used in groundwater modeling to assess the extent of hydraulic control.

HCMP Annual Report

In January 2004, the RWQCB amended the Water Quality Control Plan (Basin Plan) for the Santa Ana River Basin to incorporate an updated total dissolved solids (TDS) and nitrogen (N) management plan. The Basin Plan Amendment includes both "antidegradation" and "maximum benefit" objectives for TDS and nitrate-nitrogen for the Chino and Cucamonga groundwater management zones. The application of the "maximum benefit" objectives relies on Watermaster and the IEUA's implementation of a specific program of projects and requirements, which are an integral part of the OBMP. On April 15, 2005, the RWQCB adopted resolution R8-2005-0064; thus approving the Surface Water Monitoring Program and Groundwater Monitoring Program in support of maximum benefit commitments in the Chino and Cucamonga Basins. Watermaster and the IEUA completed the 2006 Annual Report, which summarizes the results for those two programs, and submitted it to the RWQCB on April 16, 2007 in partial fulfillment of maximum benefit commitments.

Chino Basin Recycled Water Groundwater Recharge Program

The IEUA, Watermaster, Chino Basin Water Conservation District, and San Bernardino County Flood Control District jointly sponsor the Chino Basin Recycled Water Groundwater Recharge Program. This is a comprehensive water supply program to enhance water supply reliability and improve the groundwater quality in local drinking water wells throughout the Chino Groundwater Basin by increasing the recharge of stormwater, imported water, and recycled water. The recharge program is regulated under RWQCB Order No. R8-2005-0033 and Monitoring and Reporting Program No. R8-2005-0033.

Monitoring Activities. Watermaster and the IEUA collect weekly and bi-weekly water quality samples from basins that are actively recharging recycled water and from lysimeters installed within those basins. Monitoring wells located down gradient of the recharge basins are sampled every two weeks during the reporting period for a total of about 100 samples.

Construction Activities. Lysimeters and monitoring wells associated with the RP-3, DeClez, and Ely Basins were installed in fiscal year (FY) 2006/07.

C. Ground Level Monitoring Program

Watermaster developed a multifaceted land surface monitoring program to develop data for a long-term management plan for land subsidence in Management Zone 1 (MZ-1). The monitoring program consisted of three main elements:

- An aquifer system monitoring facility consisting of multiple depth piezometers and a dual bore extensometer.
- The application of synthetic aperture radar interferometry (InSAR) to measure historical land surface deformation.
- Benchmark surveys to measure land surface deformation, "ground truth" the InSAR data, and evaluate effectiveness of the long term management plan.

Following two years of data collection and analysis, Watermaster submitted the MZ-1 Summary Report in October 2005, which contained Guidance Criteria to minimize subsidence and fissuring. The Guidance Criteria included a listing of Managed Wells and their owners subject to the criteria, a map of the so-called Managed Area, an initial threshold water level (Guidance Level) of 245 feet below the top of the PA-7 well casing, and a plan for ongoing monitoring and notification. Since October 2005, the MZ-1 Summary Report and the Guidance Criteria contained therein have been discussed extensively by the parties involved, and were adopted by the Watermaster Board at its May 2006 Meeting. The final MZ-1 Subsidence Management Plan was adopted by the Watermaster Board at its June 2007 Meeting, was subsequently revised, and was submitted to the Court for approval at a hearing on November 15, 2007.

The MZ-1 monitoring program continues unabated. Water level monitoring expanded to the central regions of MZ-1 with the installation of transducers/data loggers at selected wells owned by the City of Chino, the Monte Vista Water District, and the City of Pomona. This expansion of the water level monitoring program is the initial effort to better understand the mechanisms behind ongoing land subsidence in this region.

PROGRAM ELEMENT 2 – DEVELOP AND IMPLEMENT COMPREHENSIVE RECHARGE PROGRAM

INTRODUCTION

Construction on the Chino Basin Facilities Improvement Project (CBFIP) Phase I was completed by December 31, 2005 at a cost of $38M; 50% from a SWRCB Proposition 13 Grant, and 25% each from Watermaster and the IEUA. A CBFIP Phase II list of projects was developed by Watermaster and the IEUA, including monitoring wells, lysimeters, recycled water connections, SCADA system expansions, three MWDSC turnouts, and berm heightening and hardening. At a cost of approximately $15M, these Phase II facilities will be financed through a 50% Grant from DWR and 25% each from Watermaster and the IEUA.

In FY 2005-2006, the CBFIP Phase I facilities were able to recharge 49,000 AF of storm and supplemental water. By the start of FY 2009-2010, most of the basins will be able to operate on a 12 months per year basis with combinations of storm, imported, and recycled water, with occasional downtime for silt and organic growth removal. Operations and basin planning are coordinated through the Groundwater Recharge Coordinating Committee (GRCC) which meets monthly.

Update to the Recharge Master Plan. The Recharge Master Plan will be updated as frequently as necessary and not less than every five (5) years, to reflect an appropriate schedule for planning, design, and physical improvements as may be required to offset the controlled mining at the end of the Peace Agreement and the end of forgiveness for Desalter replenishment.

Coordination. Watermaster will ensure that the members of the Appropriative Pool will coordinate the development of their respective Urban Water Management Plans and Water Supply Master Plans with Watermaster as follows.

(a) Watermaster will obtain from each Appropriator that prepares an Urban Water Management Plan and Water Supply Plan copies of their existing and proposed plans.

(b) Watermaster will use the Plans in evaluating the adequacy of the Recharge Master Plan and other OBMP Implementation Plan program elements.

(c) Each Appropriator will provide Watermaster with a draft in advance of adopting any proposed changes to their Urban Water Management Plans and in advance of adopting any material changes to their Water Supply Master Plans respectively in accordance with the customary notification routinely provided to other third parties to offer Watermaster a reasonable opportunity to provide informal input and informal comment on the proposed changes.

(d) Any party that experiences the loss or the imminent threatened loss of a material water supply source will provide reasonable notice to Watermaster of the condition and the expected impact, if any, on the projected groundwater use.

Suspension. To ameliorate any long-term risks attributable to reliance upon un-replenished groundwater production by the Desalters, the annual availability of any portion of the 400,000 acre-feet set aside for forgiveness, is expressly subject to Watermaster making an annual finding it is in substantial compliance with the revised Watermaster Recharge Master Plan pursuant to Paragraph 7.3 above.

Acknowledgment re 6,500 Acre-Foot Supplemental Recharge. The Parties have made the following acknowledgments regarding the 6,500 Acre-Foot Supplemental Recharge:

(a) A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To promote the goal of equal access to groundwater within all areas and sub-areas of the Chino Basin, Watermaster has committed to use its best efforts to direct recharge relative to production in each area and sub-area of the Basin and to achieve long-term balance between total recharge and discharge. The Parties acknowledge that to assist Watermaster in providing for recharge, the Peace Agreement sets forth a requirement for Appropriative Pool purchase of 6,500 acre-feet per year of Supplemental Water for recharge in Management Zone 1 (MZ1). The purchases have been credited as an addition to Appropriative Pool storage accounts. The water recharged under this program has not been accounted for as Replenishment water.

(b) Watermaster was required to evaluate the continuance of this requirement in 2005 by taking into account provisions of the Judgment, Peace Agreement and OBMP, among all other relevant factors. It has been determined that other obligations in the Judgment and Peace Agreement, including the requirement of hydrologic balance and projected replenishment obligations, will provide for sufficient wet-water recharge to make the separate commitment of Appropriative Pool purchase of 6,500 acre-feet unnecessary. Therefore, because the recharge target as described in the Peace Agreement has been achieved, further purchases under the program will cease and Watermaster will proceed with operations in accordance with the provisions of paragraphs (c), (d) and (e) below.

(c) The parties acknowledge that, regardless of Replenishment obligations, Watermaster will independently determine whether to require wet-water recharge within MZ1 to maintain hydrologic balance and to provide equal access to groundwater in accordance with the provisions of this Section 8.4 and in a manner consistent with the Peace Agreement, OBMP and the Long Term Plan for Subsidence. Watermaster will conduct its recharge in a manner to provide hydrologic balance within, and will emphasize recharge in MZ1. Accordingly, the Parties acknowledge and agree that each year Watermaster shall continue to be guided in the exercise of its discretion concerning recharge by the principles of hydrologic balance.

(d) Consistent with its overall obligations to manage the Chino Basin to ensure hydrologic balance within each management zone, for the duration of the Peace Agreement (until June of 2030), Watermaster will ensure that a minimum of 6,500 acre-feet of wet water recharge occurs within MZ1 on an annual basis. However, to the extent that water is unavailable for recharge or there is no replenishment obligation in any year, the obligation to recharge 6,500 acre-feet will accrue and be satisfied in subsequent years.

(1) Watermaster will implement this measure in a coordinated manner so as to facilitate compliance with other agreements among the parties, including but not limited to the Dry-Year Yield Agreements.

(2) In preparation of the Recharge Master Plan, Watermaster will consider whether existing groundwater production facilities owned or controlled by producers within MZ1 may be used in connection with an aquifer storage and recovery ("ASR") project so as to further enhance recharge in specific locations and to otherwise meet the objectives of the Recharge Master Plan.

(e) Five years from the effective date of the Peace II Measures, Watermaster will cause an evaluation of the minimum recharge quantity for MZ1. After consideration of the information developed in accordance with the studies conducted pursuant to paragraph 3 below, the observed experiences in complying with the Dry Year Yield Agreements as well as any other pertinent information, Watermaster may increase the minimum requirement for MZ1 to quantities greater than 6,500 acre-feet per year. In no circumstance will the commitment to recharge 6,500 acre-feet be reduced for the duration of the Peace Agreement.

Hydraulic Control. In accordance with the purpose and objective of the Physical Solution to "establish a legal and practical means for making the maximum reasonable beneficial use of the waters of the Chino Basin" (paragraph 39) and the identified Basin Management Parameters, Watermaster will manage the Basin to secure Hydraulic Control through controlled overdraft for a period of approximately 23 (twenty-three) years (Re-Operation). Hydraulic Control ensures that the water management activities in the Chino North Management Zone do not cause materially adverse impacts to the beneficial uses of the Santa Ana River downstream of Prado Dam. "Hydraulic Control" means the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimus quantities. The Chino North Management Zone is more fully described and set forth in Exhibit 1 to this Appendix I.

Re-Operation. Independent of Watermaster determinations regarding Operating Safe Yield and without effect on or regard for the parties' respective rights thereto in any year, Re-Operation of the Basin through the managed withdrawal of groundwater from the Basin is required to achieve and maintain Hydraulic Control. Given the expected water quality, increased yield and economic benefits associated with Hydraulic Control, a Re-Operation through coordinated and controlled overdraft is a prudent and efficient use of the Basin resources *to the extent* groundwater is required to achieve and maintain Hydraulic Control. "Re-operation" means the potential increase in the accumulated overdraft from 200,000 acre-feet previously authorized under Exhibit I over the period 1978 through 2017 to 600,000 acre-feet through 2030, with the 400,000 acre-feet increase being expressly allocated to meet the replenishment obligation of the Desalters. Accordingly, a cumulative change in storage of up to 400,000 acre-feet greater than initially authorized by the original Judgment may result. However, the use of

water pumped pursuant to Re-operation is subject to the following limitations:

(a) Future Desalter Groundwater Production Facilities. Future Desalter groundwater production facilities will emphasize Production from the southern end of the Basin.

(b) The Material Physical Injury. Controlled overdraft must not cause material physical injury to any Party or the Basin.

(c) Proposed Schedule. An initial schedule for Re-Operation, including annual and cumulative quantities to be pumped through Re-Operation will be developed. Watermaster may modify the proposed schedule from time to time as it may be prudent under the circumstances, but only after first obtaining Court approval.

(d) Annual Accounting. Watermaster will prepare an annual summary accounting of the cumulative total of groundwater production and desalting from all authorized desalters and other activities authorized by the Optimum Basin Management Program in a schedule that: (i) identifies the total change in groundwater storage that will result from the Re-Operation; and (ii) characterizes and accounts for all water that is projected to be produced by all authorized desalters.

(e) Recharge and Replenishment Compliance. Watermaster must be in substantial compliance with its then existing recharge and replenishment plans and obligations, and will make an annual finding whether or not it is in compliance.

(f) Replenishment. Groundwater produced by Desalters in connection with Re-Operation to achieve Hydraulic Control will be replenished through, inter alia, the water made available through controlled overdraft.

(g) Suspension. Re-Operation and Watermaster's apportionment of controlled overdraft will not be suspended in the event that Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been produced so long as: (i) Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures to avoid Material Physical Injury and that equitably addresses this contingency, and (ii) Watermaster continues to demonstrate a credible material progress toward obtaining sufficient capacity to recharge sufficient quantities of water to cause the Basin to return to a new equilibrium at the conclusion of the Re-Operation.

(h) Definition of Desalters. "Desalters" means the Chino I Desalter, the Chino I Expansion, the Chino II Desalter and Future Desalters, consisting of all the capital facilities' and processes that remove salt from the Basin water, including extraction wells, transmission facilities for delivery of groundwater to the Desalter. Desalter treatment and delivery facilities for the desalted water include pumping and storage facilities and treatment and

disposal capacity in the Santa Ana Regional Interceptor.

PROGRAM ELEMENT 3 DEVELOP AND IMPLEMENT WATER SUPPLY PLAN FOR THE IMPAIRED AREAS OF THE BASIN, PROGRAM ELEMENT 5 DEVELOP AND IMPLEMENT REGIONAL SUPPLEMENTAL WATER PROGRAM

Construction on the Chino I Desalter Expansion and the Chino II Desalter facilities was completed in February 2006 and an application has been made for $1.6 M in Proposition 50 funds to add 8 MGD of ion exchange capacity to the Chino II Desalter. As currently configured, the Chino I Desalter provides 2.6 MGD of treated (air stripping for VOC removal) water from Wells Nos. 1-4, 4.9 MGD of treated (ion exchange for nitrate removal) water from Wells Nos. 5-15, and 6.7 MGD of treated (reverse osmosis for nitrate and TDS removal) water from Wells Nos. 5-15 for a total of 14.2 MGD (16,000 AFY). The Chino II Desalter provides 4.0 MGD of ion exchange treated water and 6.0 MGD of reverse osmosis treated water from 8 additional wells for a total of 10.0 MGD (11,000 AFY).

Consultants to the City of Ontario and Western Municipal Water District recently completed their evaluation of three alternative configurations for expansion of the Chino Desalters. Their results are presented in the report "Chino Desalter Phase 3 Alternatives Evaluation," dated May 2007. Essentially, they found that the preferred alternative would be to construct a 10.5 mgd (10,600 AFY) expansion to the existing Chino II Desalter, with raw water coming from the existing Wells Nos. 13, 14, and 15. A new Chino Creek Well Field, required for hydraulic control of the basin, would replace the raw water lost from the Wells Nos. 13, 14, and 15. Negotiations are currently underway between the City of Ontario, WMWD, and JCSD to determine capacity allocations and cost sharing for the new facilities.

PROGRAM ELEMENT 4 DEVELOP AND IMPLEMENT COMPREHENSIVE GROUNDWATER MANAGEMENT PLAN FOR MANAGEMENT ZONE 1 (MZ1)

The occurrence of subsidence and fissuring in Management Zone 1 is not acceptable and should be reduced to tolerable levels or abated. The OBMP calls for a management plan to reduce or abate the subsidence and fissuring problems to the extent that it may be caused by production in MZ1.

In October 2005, Watermaster completed the MZ-1 Summary Report, including the Guidance Criteria. Since then the impacted parties have had numerous meetings to transform the Summary Report into a Long-term Management Plan. The Summary Report and the Guidance Criteria

were adopted by the Watermaster Board in May 2006, and the Long-term Management Plan was adopted in June 2007, was subsequently revised, and was submitted to the Court for approval at a hearing on November 15, 2007..

PROGRAM ELEMENT 6 DEVELOP AND IMPLEMENT COOPERATIVE PROGRAMS WITH THE REGIONAL BOARD AND OTHER AGENCIES TO IMPROVE BASIN MANAGEMENT, and PROGRAM ELEMENT 7 SALT MANAGEMENT PROGRAM

On going discussions are being held with the RWQCB and the San Bernardino County Department of Airports in order to determine the engineering solution and costs for remediating the TCE plume at the Chino Airport. The consulting engineer for the SBCDA is currently characterizing the extent of off-site contamination and investigating remedial alternatives. For the Ontario Airport (OIA) plume, the Potentially Responsible Parties (PRPs) have been working with Watermaster to quantify the depth and extent of the TCE plume. At the Stringfellow site, the consultants to DHS have been investigating whether the perchlorate plume from the site adds to the existing perchlorate levels in the Santa Ana River, or whether the perchlorate plume is diverted towards the Chino II Desalter well field. Lastly, Watermaster continues to monitor the activities of General Electric's (GE) remediation at the Flat Iron facility and their efforts to develop a new location for recharge of their treated effluent.

MZ-3 Monitoring Program.
The former Kaiser plume has been incorporated into an overall monitoring program for the MZ-3 area. The MZ-3 monitoring program is also assessing the groundwater quality impairment from total dissolved solids (TDS), nitrate, and perchlorate. Quarterly samples will now be collected from all 4 wells to help recharacterize the Kaiser plume.

Ontario International Airport (OIA) Volatile Organic Chemical Plume.
Watermaster has provided water quality, water level, and well construction data from more than 400 private wells and 200 public wells to the RWQCB, which in turn forwarded the database to the PRPs pursuant to their request. Subsequently the PRPs submitted their sampling work plan and health and safety plan for the well installation and sampling.

Chino Airport VOC Plume.
Watermaster met with the RWQCB, the San Bernardino County Department of Airports, and their consultant Tetra Tech on April 18, May 25, and June 26, 2007 to discuss a joint remediation of the VOC plume from the airport. Such a joint remediation would help address other issues in the southwestern portion of Chino Basin such as maintenance of hydraulic control and the provision of high quality drinking water in an area of increasing demand. As a result of these meetings, Watermaster agreed to provide a database containing well construction information, water quality, water levels, and production for wells located southwest of the Chino airport. In

addition, Watermaster provided results from sampling all the wells in this location to provide up-to-date analytical data on all the possible contaminants in these wells. These data are being reviewed with Tetra Tech to begin the engineering of appropriate remedial actions.

GE Flat Iron Remediation.
Finally, with respect to the GE Flat Iron remediation, GE conducted a screening of options for the disposal of treated effluent from their operational pump and treat facilities. Currently, GE discharges their effluent into the Ely Basins, where it percolates back into the groundwater. However, this operation limits Watermaster's ability to recharge recycled water into the Ely Basins and, consequently, Watermaster has asked that GE develop alternative disposal means. As a result of their screening, GE has decided to investigate, in detail, the construction of groundwater injection wells that would be operated in conjunction with their own recharge basin. GE completed their planning in December 2006 and began detailed design based upon the RWQCB's approval of the concept.

TDS and Nitrogen Monitoring Pursuant to the 2004 Basin Plan Amendment
Pursuant to the 2004 Basin Plan Amendment and the Watermaster/IEUA permit to recharge recycled water, Watermaster and the IEUA have conducted and will continue to conduct groundwater and surface water monitoring programs. Quarterly HCMP reports that summarize data collection efforts will continue to be submitted to the RWQCB.

PROGRAM ELEMENT 8 DEVELOP AND IMPLEMENT GROUNDWATER STORAGE MANAGEMENT PROGRAM, PROGRAM ELEMENT 9 DEVELOP AND IMPLEMENT STORAGE AND RECOVERY PROGRAMS

Currently, there is only one groundwater storage program approved in the Chino Basin: the 100,000 acre-ft Dry-Year Yield Program with the Metropolitan Water District of Southern California (MWD). The MWD, IEUA, and Watermaster are considering expanding this program by an additional 50,000 acre-ft to 150,000 acre-ft over the next few years. Watermaster is also considering an additional 150,000 acre-ft in programs with non-party water agencies.

Attachment E

Attachment "E"
Desalter Replenishment with Most Rapid Depletion of the Re-Operation Account
(acre-ft/yr)

Fiscal Year	Desalter Pumping	New Yield	Re-Operation			Residual Replenishment Obligation
			Replenishment Allocation for Desalter III	Replenishment Allocation to CDA	Balance	
					400,000	0
2006 / 2007	28,700	8,610	0	20,090	379,910	0
2007 / 2008	28,700	8,610	0	20,090	359,820	0
2008 / 2009	28,700	8,610	0	20,090	339,730	0
2009 / 2010	28,700	8,610	0	20,090	319,640	0
2010 / 2011	28,700	8,610	0	20,090	299,550	0
2011 / 2012	28,700	8,610	0	20,090	279,460	0
2012 / 2013	34,050	10,215	5,000	18,835	255,625	0
2013 / 2014	39,400	11,820	10,000	17,580	228,045	0
2014 / 2015	39,400	11,820	10,000	17,580	200,465	0
2015 / 2016	39,400	11,820	10,000	17,580	172,885	0
2016 / 2017	39,400	11,820	10,000	17,580	145,305	0
2017 / 2018	39,400	11,820	10,000	15,305	120,000	2,275
2018 / 2019	39,400	11,820	10,000		110,000	17,580
2019 / 2020	39,400	11,820	10,000		100,000	17,580
2020 / 2021	39,400	11,820	10,000		90,000	17,580
2021 / 2022	39,400	11,820	10,000		80,000	17,580
2022 / 2023	39,400	11,820	10,000		70,000	17,580
2023 / 2024	39,400	11,820	10,000		60,000	17,580
2024 / 2025	39,400	11,820	10,000		50,000	17,580
2025 / 2026	39,400	11,820	10,000		40,000	17,580
2026 / 2027	39,400	11,820	10,000		30,000	17,580
2027 / 2028	39,400	11,820	10,000		20,000	17,580
2028 / 2029	39,400	11,820	10,000		10,000	17,580
2029 / 2030	39,400	11,820	10,000		0	17,580
Totals	876,050	262,815	175,000	225,000		213,235

Attachment "E"

Desalter Replenishment with Proportional Depletion of the Re-Operation Account

(acre-ft/yr)

Fiscal Year	Desalter Pumping	New Yield	Re-Operation			Residual Replenishment Obligation
			Replenishment Allocation for Desalter III	Replenishment Allocation to CDA	Balance	
					400,000	0
2006 / 2007	28,700	8,610	0	7,371	392,629	12,719
2007 / 2008	28,700	8,610	0	7,371	385,258	12,719
2008 / 2009	28,700	8,610	0	7,371	377,886	12,719
2009 / 2010	28,700	8,610	0	7,371	370,515	12,719
2010 / 2011	28,700	8,610	0	7,371	363,144	12,719
2011 / 2012	28,700	8,610	0	7,371	355,773	12,719
2012 / 2013	34,050	10,215	5,000	8,745	342,028	10,090
2013 / 2014	39,400	11,820	10,000	10,119	321,908	7,461
2014 / 2015	39,400	11,820	10,000	10,119	301,789	7,461
2015 / 2016	39,400	11,820	10,000	10,119	281,670	7,461
2016 / 2017	39,400	11,820	10,000	10,119	261,551	7,461
2017 / 2018	39,400	11,820	10,000	10,119	241,431	7,461
2018 / 2019	39,400	11,820	10,000	10,119	221,312	7,461
2019 / 2020	39,400	11,820	10,000	10,119	201,193	7,461
2020 / 2021	39,400	11,820	10,000	10,119	181,073	7,461
2021 / 2022	39,400	11,820	10,000	10,119	160,954	7,461
2022 / 2023	39,400	11,820	10,000	10,119	140,835	7,461
2023 / 2024	39,400	11,820	10,000	10,119	120,715	7,461
2024 / 2025	39,400	11,820	10,000	10,119	100,596	7,461
2025 / 2026	39,400	11,820	10,000	10,119	80,477	7,461
2026 / 2027	39,400	11,820	10,000	10,119	60,357	7,461
2027 / 2028	39,400	11,820	10,000	10,119	40,238	7,461
2028 / 2029	39,400	11,820	10,000	10,119	20,119	7,461
2029 / 2030	39,400	11,820	10,000	10,119	0	7,461
Totals	876,050	262,815	175,000	225,000		213,235

Attachment F

ATTACHMENT "F"

DISCRETIONARY ACTIONS TO AMEND WATERMASTER RULES AND REGULATIONS

Pursuant to the Judgment, the Peace Agreement and Watermaster Rules and Regulations, Watermaster will undertake the following actions:

I. Agricultural Pool Reallocation

A. Section 6.3(c) of the Watermaster Rules and Regulations shall be amended to read:

"(c) In the event actual Production from the Agricultural Pool does not exceed 82,800 acre-feet in any one year or 414,000 acre-feet in any five years but total allocation from all the uses set forth in section 6.3(a) above exceeds 82,800 in any year, the amount of water made available to the members of the Appropriative Pool under section 6.3(a) shall be reduced pro rata in proportion to the benefits received by each member of the Appropriative Pool through such allocation. This reduction shall be accomplished according to the following procedure:

1. All of the amounts to be made available under 6.3(a) shall be added together. This amount shall be the "Potential Acre-Feet Available" for Reallocation.

2. Each Appropriative Pool member's requested share of the Potential Acre-Feet Available for Reallocation shall be determined. This share shall be expressed as a percentage share of the Potential Acre-Feet Available for Reallocation.

3. Each Appropriative Pool member's share of the Potential Acre-Feet Available for Reallocation shall be reduced pro rata according to the percentage determined in 2 above."

B. Section 6.3(d) of the Watermaster Rules and Regulations shall be added to read:

"(d) In the event actual Production from the Agricultural Pool does not exceed 82,800 acre-feet in any one year or 414,000 acre-feet in any five years and total Production from all the uses set forth in section 6.3(a) above does not exceed 82,800 acre-feet in any year, the amount of surplus water made available to the members of the Appropriative Pool shall be allocated according to the formula described in 6.3(c)."

C. Section 9.6 of the Watermaster Rules and Regulations will be amended to include an articulated rule of construction that: "This provision will be construed by as permitting Watermaster to accept new voluntary agreements only to the extent that such voluntary agreements occur within areas eligible for conversion as described in Attachment 1 to the Judgment, previously added to the Judgment as an amendment by Order of the Court dated November 17, 1995."

D. By Resolution, Watermaster will ratify all current Watermaster accounting practices with regard to Land Use Conversions, Assignments, voluntary agreements, Early Transfer, and reallocation of surplus Agricultural Pool water and continue to implement such provisions in a consistent manner.

II. Storage

A. By Resolution, Watermaster has previously established a uniform loss percentage for all water held in storage at 2 percent, until it may be recalculated based upon the best available scientific information.

B. Watermaster will impose a uniform loss against all water in storage in an amount of 2 (two) percent where the Party holding the storage account: (i) has previously contributed to the implementation of the OBMP as a Party to the Judgment, is in compliance with their continuing covenants under the Peace Agreement or in lieu thereof they have paid or delivered to Watermaster "financial equivalent" consideration to offset the cost of past performance prior to the implementation of the OBMP and (ii) promised continued future compliance with Watermaster Rules and Regulations. Where a Party has not satisfied the requirement of B(i) and B(ii) Watermaster will assess a 6 (six) percent loss. Following a Watermaster determination that Hydraulic Control has been achieved, Watermaster will assess losses of less than one 1 percent where the Party satisfies B(i) and B(ii).

C. Section 8.1(f)(iii) a) and b) of Watermaster Rules and Regulations will be amended to substitute the date of July 1, 2010 for July 1, 2005.

D. Section 8.2(a), (b), (g), (h) of Watermaster Rules and Regulations will be amended to substitute the date of July 1, 2010 for July 1, 2005.

III. Errors

A. A new Section 3.3. of Watermaster Rules and Regulations and shall read as follows:

"3.3 Error Corrections. All reports or other information submitted to Watermaster by the parties shall be subject to a four-year limitations period regarding the correction of errors contained in such submittals. In addition, all information generated by Watermaster shall be subject to the same four-year

limitations period. All corrections to errors shall apply retroactively for no more than four years."

IV. Further Conforming Changes.

A. After consultation with the stakeholders, Watermaster may make further conforming changes to its Rules and Regulations to eliminate any inconsistencies with the Peace II measures and to more effectively implement the measures from time to time.

Date: _____ _____

For CHINO BASIN WATERMASTER

Attachment G

Attachment "G"

PURCHASE AND SALE AGREEMENT FOR THE PURCHASE OF WATER BY WATERMASTER FROM OVERLYING (NON-AGRICULTURAL) POOL

THIS AGREEMENT (Agreement) is dated 27th day of September, 2007, regarding the Chino Groundwater Basin.

RECITALS

WHEREAS, the Peace Agreement expressly authorized a transfer of water from the Overlying (Non-Agricultural) Pool to Watermaster for use as replenishment for the Desalters and for use in connection with a Storage and Recovery Program;

WHEREAS, Watermaster is evaluating its replenishment needs under the Judgment and several Storage and Recovery opportunities;

WHEREAS, Watermaster desires to purchase and the Overlying (Non-Agricultural) Pool desires to sell, all of the Non-Agricultural Pool water held in storage as of June 30, 2007;

WHEREAS, Watermaster is proposing an amendment to the Overlying (Non-Agricultural) Pool Pooling Plan set forth in Exhibit "G" to the Judgment whereby members of the Pool may offer water for purchase by Watermaster and thence the members of the Appropriative Pool under the process set forth therein;

NOW THEREFORE, in consideration of the mutual promises specified herein and by conditioning their performance under this Agreement upon the conditions precedent set forth herein, and for other good and valuable consideration, the Parties agree as follows:.

A. **Peace Agreement Transfer.** This purchase and sale agreement is in accordance with Section 5.3(e) of the Peace Agreement that provides that "parties to the Judgment with rights within the Non-Agricultural (Overlying) Pool shall have the additional rights to Transfer their rights to Watermaster for the purposes of Replenishment for a Desalter or for a Storage and Recovery Program."

B. **Quantity**. The quantity of water being made available to Watermaster by the Non-Agricultural (Overlying) Pool on a one-time basis ("Storage Transfer Quantity") is equivalent to the total quantity of water held in storage by the members of the Overlying (Non-Agricultural) Pool held in storage on June 30, 2007 ("Storage Quantity"), less a ten percent dedication for the purpose of Desalter Replenishment, less the quantity of water transferred pursuant to paragraph I below ("Special Transfer Quantity").

C. **Notice.** Within twenty-four months of the final Court approval of this Agreement ("Effective Date"), and only with the prior approval of the Appropriative Pool, Watermaster will provide written **Notice of Intent to Purchase** the Non-Agricultural (Overlying) Pool water pursuant to Section 5.3(a) of the Peace Agreement, which therein identifies whether such payment will be in connection with Desalter Replenishment or a Storage and Recovery Program.

D. **Payment.** Commencing thirty (30) calendar days from the Notice of Intent to Purchase ("Payment Date") Watermaster will pay to the Non-Agricultural Overlying Pool for each acre-foot of the Storage Transfer Quantity in accordance with the following schedule as the schedule is adjusted for inflation by the consumers price index ("cpi") for San Bernardino County from May 31, 2006 until the Payment Date.:

1. $215 times 1/4 of the Storage Transfer Quantity on the Payment Date.
2. $220 times 1/4 of the Storage Transfer Quantity on the first anniversary of the Payment Date.
3. $225 times 1/4 of the Storage Transfer Quantity on the second anniversary of the Payment Date
4. $230 time 1/4 of the Storage Transfer Quantity on the third anniversary of the Payment Date.

However, all payments provided for herein, including inflation adjustments, are subject to an express price cap and will not exceed ninety-two (92) percent of the then prevailing MWD replenishment rate in any year.

E. **Dedication to Desalter Replenishment.** Upon Watermaster's issuance of its written **Notice of Intent to Purchase**, and Watermaster's tender of its initial payment on the Payment Date, ten (10) percent of the Storage Quantity will be dedicated for replenishment of Desalter production without compensation. Watermaster will receive but will not pay for this dedication.

F. **Use and Distribution.** Watermaster will take possession of the water made available pursuant to this Agreement and make use of and distribute the water made available in a manner consistent with Section 5.3(e) of the Peace Agreement.

G. **Condition Precedent.** This Agreement and the Parties performance hereunder are expressly conditioned upon Court approval of this Agreement.

H. **Early Termination.** This Agreement will expire and be of no further force and effect if: Watermaster does not issue its **Notice of Intent to Purchase** in accordance with Paragraph D above within twenty-four (24) months of Court approval. Upon Watermaster's failure to satisfy the condition subsequent, the rights of the Non-Agricultural (Overlying) Pool will remain unaffected and without prejudice as result of their having executed this Agreement except that in the event of Early Termination, the Storage Transfer Quantity, will then be made available for purchase by Watermaster and thence the members of the Appropriative Pool in accordance with Paragraph 9.(iv) of Amended Exhibit G, the Overlying (Non-Agricultural) Pool,

Pooling Plan, including the requirement of a ten percent dedication towards Desalter replenishment.

I. **One Time Transfer in Furtherance of the Physical Solution and in Aid of Desalter Replenishment ("Special Transfer Quantity").** In consideration of the Overlying (Non-Agricultural) Pool members' irrevocable commitment made herein and it the Peace II Measures Watermaster will purchase and immediately make available the quantity of 8,530 acre-feet (less a ten percent dedication to Watermaster for Desalter Production) to the San Antonio Water Company (SAWCO) and Vulcan Materials, a member of the Overlying (Non-Agricultural) Pool under terms established as between those parties. This One Time Transfer is in addition to and without prejudice to the discretionary rights of the members of the Overlying (Non-Agricultural) Pool to make available and Watermaster and members of the Appropriative Pool to purchase water as Physical Solution transfers. No member of the Appropriative Pool, other than SAWCO assumes any responsibility for the purchase of this Special Transfer Quantity from Vulcan.

IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: NON-AGRICULTURAL OVERLYING POOL

By _____

Attachment H

September 21, 2007

Attachment "H"

JUDGMENT AMENDMENT
to Paragraph 8

The Paragraph 8 of the Judgment shall be amended to read as follows:

"8. The parties listed in Exhibits "C" and "D" are the owners or in possession of lands which overlie Chino Basin. As such, said parties have exercised overlying water rights in Chino Basin. All overlying rights owned or exercised by parties listed in Exhibits "C" and "D" have, in the aggregate, been limited by prescription except to the extent such rights have been preserved by self-help by said parties. Aggregate preserved overlying rights in the Safe Yield for Agricultural Pool use, including the rights of the State of California, total 82,800 acre-feet per year. Overlying rights for non-agricultural pool use total 7,366 acre-feet per year and are individually decreed for each affected party in Exhibit "D." No portion of the Safe Yield of Chino Basin exists to satisfy unexercised overlying rights and such rights have all been lost by prescription. However, uses may be made of Basin water on overlying lands which have no preserved overlying rights pursuant to the Physical Solution herein. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom for the term of the Peace Agreement except that the members of the Overlying (Non-Agricultural) Pool shall have the right to Transfer or lease their quantified Production rights: (i) within the Overlying (Non-Agricultural) Pool; (ii) to Watermaster in conformance with the procedures described in the Peace Agreement between the Parties therein, dated June 29, 2000; or (iii) in accordance with the Overlying-(Non-Agricultural) Pool Pooling Plan set forth in Exhibit "G."

Attachment I

Attachment "I"

JUDGMENT AMENDMENT TO EXHIBIT G

Exhibit G, the Overlying (Non-Agricultural) Pool Pooling Plan will be amended to revise Paragraph 5 to read as follows:

"5. Assessments.

(a) Replenishment Assessments. Each member of this Pool shall pay an assessment equal to the cost of replenishment water times the number of acre feet of production by such producer during the preceding year in excess of (a) his decreed share of the Safe Yield, plus (b) any carry-over credit under Paragraph 7 hereof.

(b) Administrative Assessments. In addition, the cost of the allocated share of Watermaster administration expense shall be recovered on an equal assessment against each acre-foot of production in the pool during such preceding fiscal year or calendar quarter; and in the case of Pool members who take substitute groundwater as set forth in Paragraph 8 hereof, such producer shall be liable for its share of administration assessment, as if the water so taken were produced, up to the limit of its decreed share of Safe Yield.

(c) Special Project OBMP Assessment. Each year, every member of this Pool will dedicate ten (10) percent of their annual share of Operating Safe Yield to Watermaster or in lieu thereof Watermaster will levy a Special Project OBMP Assessment in an amount equal to ten percent of the Pool member's respective share of Safe Yield times the then-prevailing MWD Replenishment Rate.

And to renumber Paragraph 9 as Paragraph 10 and add Paragraph 9 to read as follows:

"9. Physical Solution Transfers. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom except that for the term of the Peace Agreement the members of the Overlying (Non-Agricultural) Pool shall have the discretionary right to Transfer or lease their quantified Production rights and carry-over water held in storage accounts in quantities that each member may from time to time individually determine as Transfers in furtherance of the Physical Solution: (i) within the Overlying (Non-Agricultural) Pool; (ii) to Watermaster in conformance with the procedures described in the Peace Agreement between the Parties therein, dated June 29, 2000; (iii) in conformance with the procedures described in Paragraph I of the Purchase and Sale Agreement for the Purchase of Water by Watermaster from Overlying (Non-Agricultural Pool dated June 30, 2007; or (iv) to Watermaster and thence to members of the Appropriative Pool in accordance with the following guidelines and those procedures Watermaster may further provide in Watermaster's Rules and Regulations:

(a) By December 31 of each year, the members of the Overlying (Non-Agricultural) Pool shall notify Watermaster of the amount of water each member shall make available in their individual discretion for purchase by the Appropriators. By January 31 of each year,

Watermaster shall provide a Notice of Availability of each Appropriator's pro-rata share of such water;

(b) Except as they may be limited by paragraph 9(e) below, each member of the Appropriative Pool will have, in their discretion, a right to purchase its pro-rata share of the supply made available from the Overlying (Non-Agricultural) Pool at the price established in 9(d) below. Each Appropriative Pool member's pro-rata share of the available supply will be based on each Producer's combined total share of Operating Safe Yield and the previous year's actual Production by each party;

(c) If any member of the Appropriative Pool fails to irrevocably commit to their allocated share by March 1 of each year, its share of the Overlying (Non-Agricultural) Pool water will be made available to all other members of the Appropriative Pool according to the same proportions as described in 9(b) above and at the price established in Paragraph 9(d) below. Each member of the Appropriative Pool shall complete its payment for its share of water made available by June 30 of each year.

(d) Commensurate with the cumulative commitments by members of the Appropriative Pool pursuant to (b) and (c) above, Watermaster will purchase the surplus water made available by the Overlying (Non-Agricultural) Pool water on behalf of the members of the Appropriative Pool on an annual basis at 92% of the then-prevailing "MWD Replenishment Rate" and each member of the Appropriative Pool shall complete its payment for its determined share of water made available by June 30 of each year.

(e) Any surplus water cumulatively made available by all members of the Overlying (Non-Agricultural) Pool that is not purchased by Watermaster after completion of the process set forth herein will be pro-rated among the members of the Pool in proportion to the total quantity offered for transfer in accordance with this provision and may be retained by the Overlying (Non-Agricultural) Pool member without prejudice to the rights of the members of the Pool to make further beneficial us or transfer of the available surplus.

(f) Each Appropriator shall only be eligible to purchase their pro-rata share under this procedure if the party is: (i) current on all their assessments; and (ii) in compliance with the OBMP.

(g) The right of any member of the Overlying (Non-Agricultural) Pool to transfer water in accordance with this Paragraph 9(a)-(c) in any year is dependent upon Watermaster making a finding that the member of the Overlying (Non-Agricultural) Pool is using recycled water where it is both physically available and appropriate for the designated end use in lieu of pumping groundwater.

(h) Nothing herein shall be construed to affect or limit the rights of any Party to offer or accept an assignment as authorized by the Judgment Exhibit "G" paragraph 6 above, or to affect the rights of any Party under a valid assignment."

Attachment "I-1"

Map Re-Operation

Attachment J

Attachment "J"

JUDGMENT AMENDMENT
to Exhibit I

Exhibit "I" "ENGINEERING APPENDIX" is amended to read as follows:

1. **Basin Management Parameters.** In the process of implementing the physical solution, Watermaster shall consider the following parameters:

(a) Pumping Patterns. Chino Basin is a common supply for all persons and agencies utilizing its waters. It is an objective in management of the Basin's waters that no producer be deprived of access to said waters by reason of unreasonable pumping patterns, nor by regional or localized recharge of replenishment water, insofar as such result may be practically avoided.

(b) Water Quality. Maintenance and improvement of water quality is a prime consideration and function of management decisions by Watermaster.

(c) Economic Considerations. Financial feasibility, economic impact and the cost and optimum utilization of the Basin's resources and the physical facilities of the parties are objectives and concerns equal in importance to water quantity and quality parameters.

2. **Hydraulic Control and Re-Operation.** In accordance with the purpose and objective of the Physical Solution to "establish a legal and practical means for making the maximum reasonable beneficial use of the waters of the Chino Basin" (paragraph 39) including but not limited to the use and recapture of reclaimed water (paragraph 49(a)) and the identified Basin Management Parameters set forth above, Watermaster will manage the Basin to secure and maintain Hydraulic Control through controlled overdraft.

(a) **Hydraulic Control.** "Hydraulic Control" means the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimus quantities. The Chino North Management Zone is more fully described and set forth in Attachment I-1 to this Engineering Appendix. By obtaining Hydraulic Control, Watermaster will ensure that the water management activities in the Chino North Management Zone do not cause materially adverse impacts to the beneficial uses of the Santa Ana River downstream of Prado Dam.

(b) **Re-Operation.** "Re-Operation" means the controlled overdraft of the Basin by the managed withdrawal of groundwater for the Desalters and the potential increase in the cumulative un-replenished Production from 200,000 acre-feet authorized by paragraph 3 below, to 600,000 acre feet for the express purpose of securing and maintaining Hydraulic Control as a component of the Physical Solution.

[1] The increase in the controlled overdraft herein is separate from and in addition to the 200,000 acre-feet of accumulated overdraft authorized in paragraph 3(a) and 3(b) below over the period of 1978 through 2017.

[2] "Desalters" means the Chino I Desalter, the Chino I Expansion, the Chino II Desalter and Future Desalters, consisting of all the capital facilities and processes that remove salt from Basin water, including extraction wells and transmission facilities for delivery of groundwater to the Desalter. Desalter treatment and delivery facilities for the desalted water include pumping and storage facilities and treatment and disposal capacity in the Santa Ana Regional Interceptor.

[3] The groundwater Produced through controlled overdraft pursuant to Re-Operation does not constitute New Yield or Operating Safe Yield and it is made available under the Physical Solution for the express purpose of satisfying some or all of the groundwater Production by the Desalters until December 31, 2030. ("Period of Re-Operation").

[4] The operation of the Desalters, the Production of groundwater for the Desalters and the use of water produced by the Desalters pursuant to Re-Operation are subject to the limitations that may be set forth in Watermaster Rules and Regulations for the Desalters.

(5) Watermaster will update its Recharge Master Plan and obtain Court approval of its update, to address how the Basin will be contemporaneously managed to secure and maintain Hydraulic Control and operated at a new equilibrium at the conclusion of the period of Re-Operation. The Recharge Master Plan shall contain recharge projections and summaries of the projected water supply availability as well as the physical means to accomplish recharge projections. The Recharge Master Plan may be amended from time to time with Court approval.

(6) Re-Operation and Watermaster's apportionment of controlled overdraft in accordance with the Physical Solution will not be suspended in the event that Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been Produced without Replenishment, so long as: (i) Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures that will avoid unreasonable and unmitigated material physical harm to a party or to the Basin and that equitably distributes the cost of any mitigation attributable to the identified contingencies; and (ii) Watermaster is in substantial compliance with a Court approved Recharge Master Plan.

3 **Operating Safe Yield.** Operating Safe Yield in any year shall consist of the Appropriative Pool's share of Safe Yield of the Basin, plus any accumulated overdraft of the Basin which Watermaster may authorize under 3(a) and 3(b) below. In adopting the Operating Safe Yield for any year, Watermaster shall be limited as follows:

(a) Accumulated Overdraft. During this Judgment and Physical Solution, the overdraft accumulated from and after the effective date of the Physical Solution and resulting from an excess of Operating Safe Yield over Safe Yield shall not exceed 200,000 acre feet.

(b) Quantitative Limits. In no event shall Operating Safe Yield in any year be less than the Appropriative Pool's share of Safe Yield, nor shall it exceed such share of Safe Yield by more than 10,000 acre-feet. The Initial Operating Safe Yield is hereby set at 54,834 acre-feet per year. Operating Safe Yield shall not be changed upon less than five (5) years' notice by Watermaster.

Nothing contained in this paragraph shall be deemed to authorize directly or indirectly, any modification of the allocation of shares in Safe Yield to the overlying pools, as set forth in Paragraph 44 of the Judgment.

4. **Groundwater Storage Agreements.** Any agreements authorized by Watermaster for Storage of supplemental water in the available groundwater storage capacity of Chino Basin shall include, but not be limited to:

(a) The quantities and term of the storage right.

(b) A statement of the priority or relations of said right, as against overlying or Safe Yield uses, and other storage rights.

(c) The procedure for establishing delivery rates, schedules and procedures which may include:

[1] spreading or injection, or

[2] in lieu deliveries of supplemental water for direct use.

(d) The procedures for calculation of losses and annual accounting for water in storage by Watermaster.

(e) The procedures for establishment and administration of withdrawal schedules, locations and methods.

Attachment K

PEACE II AGREEMENT:
PARTY SUPPORT FOR WATERMASTER'S OBMP IMPLEMENTATION PLAN, – SETTLEMENT AND RELEASE OF CLAIMS REGARDING FUTURE DESALTERS

WHEREAS, paragraph 41 of the Judgment entered in *Chino Basin Municipal Water District v. City of Chino* (San Bernardino Superior Court Case No. 51010) grants Watermaster, with the advice of the Advisory and Pool Committees, "discretionary powers in order to implement an Optimum Basin Management Program ("OBMP") for the Chino Basin";

WHEREAS, the Parties to the Judgment executed an agreement resolving their differences and pledging their support for Watermaster actions in accordance with specific terms in June of 2000 ("Peace Agreement");

WHEREAS, Watermaster approved Resolution 00-05, and thereby adopted the goals and objectives of the OBMP, the OBMP Implementation Plan and committed to act in accordance with the terms of the Peace Agreement;

WHEREAS, pursuant to Article IV, paragraph 4.2, each of the parties to the Peace Agreement agreed not to oppose Watermaster's adoption and implementation of the OBMP Implementation Plan attached as Exhibit "B" to the Peace Agreement;

WHEREAS, the Peace Agreement, the OBMP Implementation Plan and the Chino Basin Watermaster Rules and Regulations contemplate further actions by Watermaster in furtherance of its responsibilities under paragraph 41 of the Judgment and in accordance with the Peace Agreement and the OBMP Implementation Plan;

WHEREAS, the Parties to the Peace Agreement made certain commitments regarding the funding, design, construction and operation of Future Desalters;

WHEREAS, after receiving input from its stakeholders in the form of the Stakeholder's Non-Binding Term Sheet, Watermaster has proposed to adopt Resolution 07-05 attached as Exhibit "1" hereto to further implement the OBMP through a suite of measures commonly referred to and herein defined as "Peace II Measures", including but not limited to the 2007 Supplement to the OBMP, the Second Amendment to the Peace Agreement, amendments to Watermater's Rules and Regulations, the purchase and sale of water within the Overlying (Non-Agricultural) Pool and certain Judgment amendments; and

NOW, THEREFORE, in consideration of the mutual promises specified herein and by conditioning their performance under this Agreement upon the conditions precedent set forth in Article III herein, the Watermaster Approval, and Court Order, and for other good and valuable consideration, the Parties agree as follows:

ARTICLE I
DEFINITIONS AND RULES OF CONSTRUCTION

1.1 Definitions.

(a) "Desalters" means Desalters and Future Desalters collectively, as defined in the Peace Agreement.

(b) "Hydraulic Control" means the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimus quantities. The Chino North Management Zone is defined in the 2004 Basin Plan amendment (RWQCB resolution R8-2004-001) attached hereto as Exhibit "B."

(c) "Leave Behind" means a contribution to the Basin from water held in storage within the Basin under a Storage and Recovery Agreement that may be established by Watermaster from time to time that may reflect any or all of the following: (i) actual losses; (ii) equitable considerations associated with Watermaster's management of storage agreements; and (iii) protection of the long-term health of the Basin against the cumulative impacts of simultaneous recovery of groundwater under all storage agreements.

(d) Re-Operation" means the controlled overdraft of the Basin by the managed withdrawal of groundwater Production for the Desalters and the potential increase in the cumulative un-replenished Production from 200,000 authorized by paragraph 3 of the Engineering Appendix Exhibit I to the Judgment, to 600,000 acre feet for the express purpose of securing and maintaining Hydraulic Control as a component of the Physical Solution.

(e) Unless otherwise expressly provided herein, all definitions set forth in the Peace Agreement and the Judgment are applicable to the terms as they are used herein.

1.2 Rules of Construction.

(a) Unless the context clearly requires otherwise:

(i) The plural and singular forms include the other;

(ii) "Shall," "will," "must," and "agrees" are each mandatory;

(iii) "May" is permissive;

(iv) "Or" is not exclusive;

(v) "Includes" and "including" are not limiting; and

(vi) "Between" includes the ends of the identified range.

(b) Headings at the beginning of Articles, paragraphs and subparagraphs of this Agreement are solely for the convenience of the Parties, are not a part of this Agreement and shall not be used in construing it.

(c) The masculine gender shall include the feminine and neuter genders and vice versa.

(d) The word "person" shall include individual, partnership, corporation, limited liability company, business trust, joint stock company, trust, unincorporated association, joint venture, governmental authority, water district and other entity of whatever nature.

(e) Reference to any agreement (including this Agreement), document, or instrument means such agreement, document, instrument as amended or modified and in effect from time to time in accordance with the terms thereof and, if applicable, the terms thereof.

(f) Except as specifically provided herein, reference to any law, statute or ordinance, regulation or the like means such law as amended, modified, codified or reenacted, in whole or in part and in effect from time to time, including any rules and regulations promulgated thereunder.

ARTICLE II
COMPLIANCE WITH CEQA

2.1 Project Description. The proposed project description regarding the design, permitting, construction and operation of Future Desalter, securing Hydraulic Control through Basin Re-Operation is set forth in Attachment "A" to Watermaster Resolution 07-05 attached hereto as Exhibit "1."

2.2 Acknowledgment of IEUA as the Lead Agency for CEQA Review. IEUA has been properly designated as the "Lead Agency" for the purposes of completing environmental assessment and review of the proposed project.

2.3 Commitments are Consistent with CEQA. The Parties agree and acknowledge that no commitment will be made to carry out any "project" under the amendments to the OBMP and within the meaning of CEQA unless and until the environmental review and assessment that may be required by CEQA for that defined "project" have been completed.

2.4 Reservation of Discretion. Execution of this Agreement is not intended to commit any Party to undertake a project without compliance with CEQA or to commit the Parties individually or collectively to any specific course of action, which would result in the present approval of a future project.

2.5 No Prejudice by Comment or Failure to Comment. Nothing contained in environmental review of the Project, or a Party's failure to object or comment thereon, shall limit any

Party's right to allege that "Material Physical Injury" will result or has resulted from the implementation of the OBMP or its amendment.

ARTICLE III
CONDITIONS PRECEDENT

3.1 Performance Under Articles IV-XII is Subject to Satisfaction of the Conditions Precedent. Each Party's obligations under this Agreement are subject to the satisfaction of the following conditions precedent on or before the dates specified below, unless satisfaction or a specified condition or conditions is waived in writing by all other Parties:

(a) Watermaster approval of Resolution 07-05 in a form attached hereto as Exhibit "1," including the following Attachments thereto

(i) the amendments to the Chino Basin Watermaster Rules and Regulations set forth in Attachment "F" thereto.

(ii) the 2007 Supplement to the OBMP Implementation Plan set forth in Attachment "D" thereto.

(iii) the amendments to the Judgment set forth in Attachments "H, I, and J" thereto.

(iv) the Second Amendment to the Peace Agreement set forth in Attachment "L" thereto.

(v) the Purchase and Sale Agreement for the Purchase of Water by Watermaster From the Overlying (Non-Agricultural) Pool as set forth in Attachment G thereto.

(b) The execution of the proposed Second Amendment to the Peace Agreement by all Parties to the Peace Agreement .

(c) Court approval of the proposed Judgment Amendments and a further order of the Court directing Watermaster to proceed in accordance with the terms of the Peace II Measures as embodied in Resolution 07-05.

ARTICLE IV
MUTUAL ACKNOWLEDGEMENT AND COVENANTS

4.1 Acknowledgment of Peace II Measures. The collective actions of Watermaster set forth in Watermaster Resolution 07-05 and the Attachments thereto (Peace II Measures) constitute further actions by Watermaster in implementing the OBMP in accordance with the grant and limitations on its discretionary authority set forth under paragraph 41 of the Judgment

4.2 Non-Opposition. No Party to this Agreement shall oppose Watermaster's adoption of Resolution 07-05 and implementation of the Peace II measures as embodied therein

including the Judgment Amendments, Amendments to the Peace Agreement, the 2007 Supplement to the OBMP Implementation Plan and Amendments to the Chino Basin Watermaster's Rules and Regulations or to Watermaster's execution of memoranda of agreement that are not materially inconsistent with the terms contained therein. Notwithstanding this covenant, no party shall be limited in their right of participation in all functions of Watermaster as they are provided in the Judgment or to preclude a Party to the Judgment from seeking judicial review of Watermaster determinations pursuant to the Judgment or as otherwise provided in this Agreement.

4.3 Consent to Amendments. Each Party expressly consents to the Judgment amendments and modifications set forth in Watermaster's Resolution 07-05.

4.4 Non-Agricultural Pool Intervention. The Parties acknowledge and agree that any Party to the Judgment shall have the right to purchase Non-Agricultural overlying property within the Basin and appurtenant water rights and to intervene in the Non-Agricultural Pool.

ARTICLE V
FUTURE DESALTERS

5.1 Purpose. Watermaster plans to coordinate and the Parties to the Judgment plan to arrange for the physical capacity and potable water use of water from the Desalters. Desalters in existence on the effective date of this Agreement will be supplemented to provide the required capacity to cumulatively produce approximately 40,000 acre-feet per year of groundwater from the Desalters by 2012.

5.2 2007 Supplement to the OBMP Implementation Plan. The OBMP Implementation Plan will be supplemented as set forth in the 2007 Supplement to the OBMP Implementation Plan to reflect that Western Municipal Water District ("WMWD"), acting independently or in its complete discretion with the City of Ontario ("Ontario") or the Jurupa Community Services District ("Jurupa") or both, will exercise good faith and reasonable best efforts to arrange for the design, planning, and construction of Future Desalters in accordance with the 2007 Supplement to the OBMP Implementation Plan, to obtain Hydraulic Control, further Re-Operation and support the Future Desalters.

5.3 Implementation. WMWD, acting independently or in its complete discretion with Ontario, Jurupa, or both, will exercise good faith and reasonable best efforts to arrange for the design, planning, and construction of Future Desalters in accordance with the 2007 Supplement to the OBMP Implementation Plan, to account for Hydraulic Control, Re-Operation and Future Desalters.

(a) WMWD, acting independently or in its complete discretion with Ontario or Jurupa or both, will exercise good faith and reasonable best efforts to proceed in accordance with the timeline for the completion of design, permitting, finance and construction as attached hereto as Exhibit "2"

(b) WMWD, acting independently or in its complete discretion with the City of Ontario or the Jurupa Community Services District or both, will provide quarterly progress reports to Watermaster and the Court.

5.4 Project Description. The Future Desalters will add up to 9 mgd to existing Desalters. This will include production capacity from new groundwater wells that will be located in the Southerly end of the Basin, as depicted in Exhibit "3" attached hereto and incorporated herein by this reference. The final design and construction of Future Desalters *may* depend on the terms and conditions that may be freely arrived at by fair bargaining among WMWD and the Chino Basin Desalter Authority ("CDA") or whether it is required to build stand-alone facilities or both. There are material yield benefits to the Parties to the Judgment that are achieved by obtaining Hydraulic Control through Basin Re-Operation. The extent of these benefits is somewhat dependent upon the final location of new production facilities within the southerly end of the Basin. Accordingly, Watermaster will ensure that the location of Future Desalter groundwater production facilities will achieve both Hydraulic Control and maximize yield enhancement by their location emphasizing groundwater production from the Southerly end of the Basin.

5.5 Implementing Agreements. Within twenty-four (24) months of the effective date, WMWD, acting independently or in its complete discretion with the City of Ontario or the Jurupa Community Services District or both, will exercise good faith and reasonable best efforts to complete final binding agreement(s) regarding Future Desalters that includes the following key terms:

(a) Arrangements for WMWD's purchase of product water from CDA;

(b) Arrangements with CDA, Jurupa and other Chino Basin parties for the common use of existing facilities, if any;

(c) Arrangement with the owners of the SARI line;

(d) Arrangements with the Appropriative Pool regarding the apportionment of any groundwater produced as controlled overdraft in accordance with the Physical Solution between Desalters I, Desalters II on the one hand and the Future Desalters on the other hand;

(e) WMWD's payment to Watermaster to reimburse Parties to the Judgment for their historical contributions towards the OBMP, if any;

(f) The schedule for approvals and project completion.

5.6 Reservation of Discretion. Nothing herein shall be construed as committing WMWD, or any members of CDA to take any specific action(s) to accommodate the needs or requests of the other, Watermaster, or any Party to the Judgment, whatever the request may be.

5.7 Condition Subsequent. WMWD's obligation to execute a binding purchase agreement with CDA or to independently develop the Future Desalters is subject to the express condition subsequent that the total price per acre-foot of water delivered must not be projected to exceed the sum of the following: (i) the full MWD Tier II Rate; (ii) the MWD Treatment Surcharge calculated in terms of an annual average acre-foot charge; and (iii) $150 (in 2006 dollars) per acre-foot of water delivered to account for water supply reliability.

(a) The full acre-foot cost to Western for Capital and O&M (assuming the priority allocation of controlled overdraft), includes:

(i) the delivery of the desalted water to its Mockingbird Reservoir or directly to the City of Norco,

(ii) any applicable ongoing Watermaster assessments, payments to CDA and JCSD and for SARI utilization.

(b) Provided that if third-party funding, grants and a MWD subsidy under the Local Resources Program or otherwise should reduce Western's costs to an amount which is $75 (in 2006 dollars) below the cap described in paragraph 5.5, Western will transmit an amount equal to fifty (50) percent of the amount less than the computed price cap less $75 (in 2006 dollars) to Watermaster.

(c) Western may elect to exercise its right of withdrawal under this paragraph 5.7 within 120 days following the later of: (1) completion of preliminary design; or (2) the certification of whatever CEQA document is prepared for the project, but not later than sixty (60) days thereafter and in no event after a binding water purchase agreement has been executed.

5.8 Limitations. The operation of the Future Desalters will be subject to the following limitations:

(a) Well Location. New groundwater production facilities for the Future Desalters will be located in the southern end of the Basin to achieve the dual purpose of obtaining Hydraulic Control and increasing Basin yield.

(i) New wells will be constructed in the shallow aquifer system among Desalter I wells No. 1 through 4 and west of Desalter I.

(ii) So long as these wells produce at least one-half of the Future Desalter groundwater, the Future Desalters shall be entitled to first priority for the allocation of the 400,000 acre-feet of controlled overdraft authorized by the Judgment Amendments to Exhibit I.

(b) Export. The export of groundwater from the Basin must be minimized. WMWD will present a plan for export minimization to the Watermaster for review and approval prior to operation of the Future Desalters.

(i) Watermaster will account for water imported and exported by WMWD.

(ii) Watermaster will prepare an initial reconciliation of WMWD's imports and exports at the end of the first ten (10) years of operation and every year thereafter to determine whether a "net export" occurred.

(iii) WMWD will pay an assessment, if any, on all "net exports" in accordance with Judgment Exhibit "H," paragraph 7(b) after the initial reconciliation is completed at the end of the first ten (10) years of operation.

ARTICLE VI
GROUNDWATER PRODUCTION BY AND REPLENISHMENT FOR DESALTERS

6.1 Acknowledgment. The Parties acknowledge that the hierarchy for providing Replenishment Water for the Desalters is set forth in Article VII, paragraph 7.5 of the Peace Agreement, and that this section controls the sources of water that will be offered to offset Desalter Production.

6.2 Peace II Desalter Production Offsets. To facilitate Hydraulic Control through Basin Re-Operation, in accordance with the 2007 Supplement to the OBMP Implementation Plan and the amended Exhibits G and I to the Judgment, additional sources of water will be made available for purposes of Desalter Production and thereby some or all of a Replenishment obligation. With these available sources, the Replenishment obligation attributable to Desalter production in any year will be determined by Watermaster as follows:

(a) Watermaster will calculate the total Desalter Production for the preceding year and then apply a credit against the total quantity from:

(i) the Kaiser account (Peace Agreement Section 7.5(a).);

(ii) dedication of water from the Overlying (Non-Agricultural) Pool Storage Account or from any contribution arising from an annual authorized Physical Solution Transfer in accordance with amended Exhibit G to the Judgment;

(iii) New Yield (other than Stormwater (Peace Agreement Section 7.5(b));

(iv) any declared losses from storage in excess of actual losses enforced as a "Leave Behind";

(v) Safe Yield that may be contributed by the parties (Peace Agreement Section 7.5(c));

(vi) any Production of groundwater attributable to the controlled overdraft authorized pursuant to amended Exhibit I to the Judgment.

(b) To the extent available credits are insufficient to fully offset the quantity of groundwater production attributable to the Desalters, Watermaster will use water or revenue obtained by levying the following assessments among the members of the Overlying (Non-Agricultural) Pool and the Appropriative Pool to meet any remaining replenishment obligation as follows.

(i) A Special OBMP Assessment against the Overlying (Non-Agricultural) Pool as more specifically authorized and described in amendment to Exhibit "G" paragraph 8(c) to the Judgment will be dedicated by Watermaster to further off-set replenishment of the Desalters. However, to the extent there is no remaining replenishment obligation attributable to the Desalters in any year after applying the off-sets set forth in 6.2(a), the OBMP Special Assessment levied by Watermaster will be distributed as provided in Section 9.2 below. The Special OBMP Assessment will be assessed pro-rata on each member's share of Safe Yield, followed by

(ii) A Replenishment Assessment against the Appropriative Pool, pro-rata based on each Producer's combined total share of Operating Safe Yield and the previous year's actual production. Desalter Production is excluded from this calculation. However, if there is a material reduction in the net cost of Desalter product water to the purchasers of product water, Watermaster may re-evaluate whether to continue the exclusion of Desalter Production but only after giving due regard to the contractual commitment of the parties.

(iii) The quantification of any Party's share of Operating Safe Yield does not include the result of any land use conversions.

(c) The rights and obligations of the parties, whatever they may be, regarding Replenishment Assessments attributable to all Desalters and Future Desalters in any renewal term of the Peace Agreement are expressly reserved and not altered by this Agreement.

ARTICLE VII
YIELD ACCOUNTING

7.1 New Yield Attributable to Desalters. Watermaster will make an annual finding as to the quantity of New Yield that is made available by Basin Re-Operation including that portion that is specifically attributable to the Existing and Future Desalters. Any subsequent recalculation of New Yield as Safe Yield by Watermaster will not change the priorities set forth above for offsetting Desalter production as set forth in Article VII, Section 7.5 of the Peace Agreement. For the initial term of the Peace Agreement, neither Watermaster nor the Parties will request that Safe Yield be recalculated in a manner that incorporates New Yield *attributable to the Desalters* into the determination of Safe Yield so that this source of supply will be available for Desalter Production rather than for use by individual parties to the Judgment.

7.2 Apportionment of Controlled Overdraft. Within twelve (12) months of the court approval and no later than December 1, 2008, with facilitation by Watermaster, WMWD and the Appropriative Pool will establish by mutual agreement the portion of the 400,000 acre-feet of the controlled overdraft authorized by the amendment to Exhibit "I" to the Judgment that will be allocated among the Desalters and pursuant to a proposed schedule.

(a) To the extent the groundwater wells for the Future Desalters pump at least fifty (50) percent groundwater from the southern end of the Basin as set forth in Exhibit "3" the *Future Desalters* will be entitled to first priority to the controlled overdraft authorized by the amendment to Exhibit "I" to the Judgment.

(b) WMWD and the Appropriative Pool will exercise good faith and reasonable best efforts to arrive at a fair apportionment. Relevant considerations in establishing the apportionment include, but are not limited to: (i) the nexus between the proposed expansion and achieving Hydraulic Control;(ii) the nexus between the project and obtaining increased yield; (iii) the identified capital costs; (iv) operating and maintenance expenses; and (iv) the availability of third-party funding.

(c) The parties will present any proposed agreement regarding apportionment to Watermaster. Watermaster will provide due regard to any agreement between WMWD and the Appropriative Pool and approve it so long as the proposal phases the Re-Operation over a reasonable period of time to secure the physical condition of Hydraulic Control and will achieve the identified yield benefits while at the same time avoiding Material Physical Injury or an inefficient use of basin resources.

(d) If WMWD and the Appropriative Pool do not reach agreement on apportionment of controlled overdraft to Future Desalters, then no later than August 31, 2009, the members of the Appropriative Pool will submit a plan to Watermaster that achieves the identified goals of increasing the physical capacity of the Desalters and potable water use of approximately 40,000 acre-feet of groundwater production from the Desalters from the Basin no later than 2012. The Appropriative Pool proposal must demonstrate how it has provided first priority to the Future Desalters if the conditions of paragraph 7.2(a) are met.

(e) Watermaster will have discretion to apportion the controlled overdraft under a schedule that reflects the needs of the parties and the need for economic certainty and the factors set forth in Paragraph 7.2(a) above. Watermaster may exercise its discretion to establish a schedule for Basin Re-Operation that best meets the needs of the Parties to the Judgment and the physical conditions of the Basin, including but not limited to such methods as "ramping up," "ramping down," or "straight-lining."

(i) An initial schedule will be approved by Watermaster and submitted to the Court concurrent with Watermaster Resolution 07-05.

(ii) Watermaster may approve and request Court approval of revisions to the initial schedule if Watermaster's approval and request are supported by a technical report demonstrating the continued need for access to controlled overdraft, subject to the limitations set forth in amended Exhibit "I" to the Judgment and the justification for the amendment.

7.3 Suspension. An evaluation of Watermaster's achievement of Basin outflow conditions, achievement of Hydraulic Control and compliance with Regional Board orders will be completed annually by Watermaster. Re-Operation and Watermaster's apportionment of controlled overdraft will not be suspended in the event that Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been produced so long as: (i) Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures to avoid Material Physical Injury and that equitably distributes the cost of any mitigation attributable to the identified contingencies, and (ii) Watermaster is in substantial compliance with a Court approved Recharge Master Plan as set forth in Paragraph 8.1 below.

7.4 Storage: Uniform Losses. The Parties acknowledge that Watermaster has assessed a two (2)-percent loss on all groundwater presently held in storage to reflect the current hydrologic condition. As provided in the Peace Agreement, Watermaster will continue to maintain a minimum 2 (two) percent loss until substantial evidence exists to warrant the imposition of another loss factor. However, the Parties further acknowledge and agree that losses have been substantially reduced through the OBMP Implementation Plan and the operation of Desalters I and II and that once Hydraulic Control is achieved outflow and losses from the Basin will have been limited to de minimis quantities. Therefore, Watermaster may establish uniform losses for all water held in storage based on whether the Party has substantially contributed to Watermaster reducing losses and ultimately securing and maintaining Hydraulic Control.

(a) Pre-Implementation of the Peace Agreement. The uniform annual loss (leave behind) of six (6) percent will be applied to all storage accounts to address actual losses, management and equitable considerations arising from the implementation of the Peace Agreement, the OBMP Implementation Plan, the 2007 Supplement to the OBMP Implementation Plan, including but not limited to the Desalters and Hydraulic Control unless the Party holding the storage account: (i) has previously contributed to the implementation of the OBMP as a Party to the Judgment, is in compliance with their continuing covenants under the Peace Agreement or in lieu thereof they have paid or delivered to Watermaster "financial equivalent" consideration to offset the cost of past performance prior to the implementation of the OBMP and (ii) promised continued future compliance with Watermaster Rules and Regulations. In the event that a Party satisfies 7.4(a)(i) and7.4(a)(ii) they will be assessed a minimum loss of two (2) percent against all water held in storage to reflect actual estimated losses. Watermaster's evaluation of the sufficiency of any consideration or financial equivalency may take into account the fact that one or more Parties to the Judgment are not similarly situated.

(b) Post-Hydraulic Control. Following Watermaster's determination that it has achieved Hydraulic Control and for so long as Watermaster continues to sustain losses from the Basin to the Santa Ana River at a de minimis level (less than one (1) percent), any Party to the Judgment (agency, entity or person) may qualify for the Post-Hydraulic Control uniform loss percentage of less than 1 percent if they meet the criteria of 7.4(a)(i) and 7.4(a)(ii) above.

7.5 Allocation of Losses. Any losses from storage assessed as a Leave Behind in excess of actual losses ("dedication quantity") will be dedicated by Watermaster towards groundwater Production by the Desalters to thereby avoid a Desalter replenishment obligation that may then exist *in the year* of recovery. Any dedication quantity which is not required to offset Desalter Production in the year in which the loss is assessed, will be made available to the members of the Appropriative Pool. The dedication quantity will be pro-rated among the members of the Appropriative Pool in accordance with each Producer's combined total share of Operating Safe Yield and the previous year's actual production. However, before any member of the Appropriative Pool may receive a distribution of any dedication quantity, they must be in full compliance with the 2007 Supplement to the OBMP Implementation Plan and current in all applicable Watermaster assessments.

ARTICLE VIII
RECHARGE

8.1 Update to the Recharge Master Plan. Watermaster will update and obtain Court approval of its update to the Recharge Master Plan to address how the Basin will be contemporaneously managed to secure and maintain Hydraulic Control and subsequently operated at a new equilibrium at the conclusion of the period of Re-Operation. The Recharge Master Plan will be jointly approved by IEUA and Watermaster and shall contain recharge estimations and summaries of the projected water supply availability as well as the physical means to accomplish the recharge projections. Specifically, the Plan will reflect an appropriate schedule for planning, design, and physical improvements as may be required to provide reasonable assurance that following the full beneficial use of the groundwater withdrawn in accordance with the Basin Re-Operation and authorized controlled overdraft, that sufficient Replenishment capability exists to meet the reasonable projections of Desalter Replenishment obligations. With the concurrence of IEUA and Watermaster, the Recharge Master Plan will be updated and amended as frequently as necessary with Court approval and not less than every five (5) years. Costs incurred in the design, permitting, operation and maintenance of recharge improvements will be apportioned in accordance with the following principles.

a. Operations and Maintenance. All future operations and maintenance costs attributable to all recharge facilities utilized for recharge of recycled water in whole or in part unfunded from third party sources, will be paid by the Inland Empire Utilities Agency ("IEUA") and Watermaster. The contribution by IEUA will be determined annually on the basis of the relative proportion of recycled water recharged bears to the total recharge from all sources in the prior year. For example, if 35 percent of total recharge in a single year is from recycled water, then IEUA will bear 35 percent of the operations and maintenance costs. All remaining unfunded costs attributable to the facilities used by Watermaster will be paid by Watermaster.

i. IEUA reserves discretion as to how it assesses its share of costs.

ii. Watermaster will apportion its costs among the members of the stakeholders in accordance with Production, excluding Desalter Production.

iii. The operations and maintenance costs of water recharged by aquifer storage and recovery will not be considered in the calculation other than by express agreement.

b. Capital. Mutually approved capital improvements for recharge basins that do or can receive recycled water constructed pursuant to the Court approved Recharge Master Plan, if any, will be financed through the use of third party grants and contributions if available, with any unfunded balance being apportioned 50 percent each to IEUA and Watermaster. The Watermaster contribution shall be allocated according to shares of Operating Safe Yield. All remaining unfunded costs attributable to the facilities used by Watermaster will be paid by Watermaster.

8.2 Coordination. The members of the Appropriative Pool will coordinate the development of their respective Urban Water Management Plans and Water Supply Master Plans with Watermaster as follows.

(a) Each Appropriator that prepares an Urban Water Management Plan and Water Supply Plans will provide Watermaster with copies of their existing and proposed plans.

(b) Watermaster will use the Plans in evaluating the adequacy of the Recharge Master Plan and other OBMP Implementation Plan program elements.

(c) Each Appropriator will provide Watermaster with a draft in advance of adopting any proposed changes to their Urban Water Management Plans and in advance of adopting any material changes to their Water Supply Master Plans respectively in accordance with the customary notification routinely provided to other third parties to offer Watermaster a reasonable opportunity to provide informal input and informal comment on the proposed changes.

(d) Any party that experiences the loss or the imminent threatened loss of a material water supply source will provide reasonable notice to Watermaster of the condition and the expected impact, if any, on the projected groundwater use.

8.3 Continuing Covenant. To ameliorate any long-term risks attributable to reliance upon un-replenished groundwater production by the Desalters, the annual availability of any portion of the 400,000 acre-feet set aside as controlled overdraft as a component of the Physical Solution, is expressly subject to Watermaster making an annual finding about whether it is in substantial compliance with the revised Watermaster Recharge Master Plan pursuant to Paragraphs 7.3 and 8.1 above.

8.4 Acknowledgment re 6,500 Acre-Foot Supplemental Recharge. The Parties make the following acknowledgments regarding the 6,500 Acre-Foot Supplemental Recharge:

(a) A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To promote the goal of equal access to groundwater within all areas and sub-areas of the Chino Basin, Watermaster has committed to use its best efforts to direct recharge relative to production in each area and sub-area of the Basin and to achieve long-term balance between total recharge and discharge. The Parties acknowledge that to assist Watermaster in providing for recharge, the Peace Agreement sets forth a requirement for Appropriative Pool purchase of 6,500 acre-feet per year of Supplemental Water for recharge in Management Zone 1 (MZ1). The purchases have been credited as an addition to Appropriative Pool storage accounts. The water recharged under this program has not been accounted for as Replenishment water.

(b) Watermaster was required to evaluate the continuance of this requirement in 2005 by taking into account provisions of the Judgment, Peace Agreement and OBMP, among all other relevant factors. It has been determined that other obligations in the Judgment and Peace Agreement, including the requirement of hydrologic balance and projected replenishment obligations, will provide for sufficient wet-water recharge to make the separate commitment of Appropriative Pool purchase of 6,500 acre-feet unnecessary. Therefore, because the recharge target as described in the Peace Agreement has been achieved, further purchases under the program will cease and Watermaster will proceed with operations in accordance with the provisions of paragraphs (c), (d) and (e) below.

(c) The parties acknowledge that, regardless of Replenishment obligations, Watermaster will independently determine whether to require wet-water recharge within MZ1 to maintain hydrologic balance and to provide equal access to groundwater in accordance with the provisions of this Section 8.4 and in a manner consistent with the Peace Agreement, OBMP and the Long Term Plan for Subsidence.". Watermaster will conduct its recharge in a manner to provide hydrologic balance within, and will emphasize recharge in MZ1. Accordingly, the Parties acknowledge and agree that each year Watermaster shall continue to be guided in the exercise of its discretion concerning recharge by the principles of hydrologic balance.

(d) Consistent with its overall obligations to manage the Chino Basin to ensure hydrologic balance within each management zone, for the duration of the Peace Agreement (until June of 2030), Watermaster will ensure that a minimum of 6,500 acre-feet of wet water recharge occurs within MZ1 on an annual basis. However, to the extent that water is unavailable for recharge or there is no replenishment obligation in any year, the obligation to recharge 6,500 acre-feet will accrue and be satisfied in subsequent years.

(1) Watermaster will implement this measure in a coordinated manner so as to

facilitate compliance with other agreements among the parties, including but not limited to the Dry-Year Yield Agreements.

(2) In preparation of the Recharge Master Plan, Watermaster will consider whether existing groundwater production facilities owned or controlled by producers within MZ1 may be used in connection with an aquifer storage and recovery ("ASR") project so as to further enhance recharge in specific locations and to otherwise meet the objectives of the Recharge Master Plan.

(e) Five years from the effective date of the Peace II Measures, Watermaster will cause an evaluation of the minimum recharge quantity for MZ1. After consideration of the information developed in accordance with the studies conducted pursuant to paragraph 3 below, the observed experiences in complying with the Dry Year Yield Agreements as well as any other pertinent information, Watermaster may increase the minimum requirement for MZ1 to quantities greater than 6,500 acre-feet per year. In no circumstance will the commitment to recharge 6,500 acre-feet be reduced for the duration of the Peace Agreement.

ARTICLE IX

9.1 Basin Management Assistance. Three Valleys Municipal Water District ("TVMWD") shall assist in the management of the Basin through a financial contribution of $300,000 to study the feasibility of developing a water supply program within Management Zone 1 of the Basin or in connection with the evaluation of Future Desalters. The study will emphasize assisting Watermaster in meeting its OBMP Implementation Plan objectives of concurrently securing Hydraulic Control through Re-Operation while attaining Management Zone 1 subsidence management goals. Further, TVMWD has expressed an interest in participating in future projects in the Basin that benefit TVMWD. If TVMWD wishes to construct or participate in such future projects, TVMWD shall negotiate with Watermaster in good faith concerning a possible "buy-in" payment.

9.2 Allocation of Non-Agricultural Pool OBMP Special Assessment

a. For a period of ten years from the effective date of the Peace II Measures, any water (or financial equivalent) that may be contributed from the Overlying (Non-Agricultural) Pool in accordance with paragraph 8(c) of Exhibit G to the Judgment (as amended) will be apportioned among the members of the Appropriative Pool in each year as follows:

(i)	City of Ontario.	80 af
(ii)	City of Upland	161 af
(iii)	Monte Vista Water District	213 af
(iv)	City of Pomona	220 af
(v)	Marygold Mutual Water Co	16 af
(vi)	West Valley Water District	15 af

(vii)	Santa Ana River Water Co.	31 af

b. In the eleventh year from the effective date of the Peace II Measures and in each year thereafter in which water may be available from the Overlying (Non-Agricultural) Pool in excess of identified Desalter replenishment obligations as determined in accordance with Section 6.2 above, any excess water (or financial equivalent) will be distributed pro rata among the members of the Appropriative Pool based upon each Producer's combined total share of Operating Safe Yield and the previous year's actual production.

ARTICLE X
SETTLEMENT AND RELEASE

10.1 Settlement. By its execution of this Agreement, the Parties mutually and irrevocably, fully settle their respective claims, rights and obligations, whatever they may be, regarding the design, funding, construction and operation of Future Desalters as set forth in and arising from Article VII of the Peace Agreement.

10.2 Satisfaction of Peace Agreement Obligation Regarding Future Desalters. The Parties' individual and collective responsibilities arising from the Part VII of the Peace Agreement and the OBMP Implementation Plan regarding the planning, design, permitting, construction and operation of Future Desalters, whatever they may be, are unaffected by this Agreement. However, upon the completion of a 10,000 AFY (9 mgd) expansion of groundwater production and desalting from Desalter II as provided for herein, the Parties will be deemed to have satisfied all individual and collective pre-existing obligations arising from the Peace Agreement and the OBMP Implementation Plan, whatever they may be, with regard to Future Desalters as described in Part VII of the Peace Agreement and the OBMP Implementation Plan.

10.3 Satisfaction of Pomona Credit. In recognition of the ongoing benefits received by TVMWD through the City of Pomona's anion exchange project, as its sole and exclusive responsibility, TVMWD will make an annual payment to Watermaster in an amount equal to the credit due the City of Pomona under Peace Agreement Paragraph 5.4(b) ("the Pomona Credit").

(a) Within ninety (90) days of each five-year period following the Effective Date of this Agreement, in its sole discretion TVMWD shall make an election whether to continue or terminate its responsibilities under this paragraph. TVMWD shall provide written notice of such election to Watermaster.

(b) Watermaster will provide an annual invoice to TVMWD for the amount of the Pomona Credit.

(c) Further, in any renewal term of the Peace Agreement, TVMWD will continue to make an equivalent financial contribution which TVMWD consents to

Watermaster's use for the benefit of MZ1, subject to the same conditions set forth above with respect to TVMWD's payment of the "Pomona Credit".

(d) In the event TVMWD elects to terminate is obligation under this Paragraph, the Peace Agreement and the responsibility for satisfying the Pomona Credit will remain unchanged and unaffected, other than as it will be deemed satisfied for each five-year period that TVMWD has actually made the specified payment.

10.4 Release. Upon WMWD's completion of a 10,000 AFY (9 mgd) expansion of groundwater production and desalting in a manner consistent with the parameters set forth in this Agreement, each Party, for itself, its successors, assigns, and any and all persons taking by or through it, hereby releases WMWD and IEUA from any and all obligations arising from WMWD's and IEUA's responsibility for securing funding, designing, and constructing Future Desalters as set forth in or arising exclusively from Article VII of the Peace Agreement and the Program Elements 3, 6, and 7, OBMP Implementation Plan only, and each Party knowingly and voluntarily waives all rights and benefits which are provided by the terms and provisions of section 1542 of the Civil Code of the State of California, or any comparable statute or law which may exist under the laws of the State of California, in or arising from WMWD's and IEUA's responsibility for securing funding, designing, and constructing Future Desalters as set forth in or arising exclusively from Article VII of the Peace Agreement and the OBMP Implementation Plan only. The Parties hereby acknowledge that this waiver is an essential and material term of this release. The Parties, and each of them, acknowledge that Civil Code section 1542 provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR.

Each Party understands and acknowledges that the significance and consequence of this waiver of Civil Code section 1542 is the waiver of any presently unknown claims as described above, and that if any Party should eventually suffer additional damages arising out of the respective claim that Party will not be able to make any claim for those additional damages. Further, all Parties to this Agreement acknowledge that they consciously intend these consequences even as to claims for such damages that may exist as of the date of this Agreement but which are not known to exist and which, if known, would materially affect the Parties' respective decision to execute this Agreement, regardless of whether the lack of knowledge is the result of ignorance, oversight, error, negligence, or any other cause.

10.5 Assessments. In view of the substantial investments previously made and contemplated by Watermaster and the parties over the term of the Peace Agreement and in particular to implement the OBMP, the parties desire substantial certainty regarding Watermaster's principles of cost allocation. The principles set forth in the Peace Agreement and the

Peace II Measures including those stated herein, constitute a fair and reasonable allocation of responsibility among the stakeholders. Accordingly, other than in the event of an emergency condition requiring prompt action by Watermaster or to correct a manifest injustice arising from conditions not presently prevailing in the Basin and unknown to Watermaster and the parties and then only to the extent Watermaster retains discretion, Watermaster will maintain the principles of cost allocation for apportioning costs and assessments as provided in the Judgment and now implemented through the Peace Agreement and the Peace II Measures for the balance of the initial Term of the Peace Agreement. For the balance of the initial Term of the Peace Agreement, the parties to the Peace II Agreement will waive any objections to the Watermaster's principles of cost allocation other than as to issues regarding whether Watermaster has: (i) properly followed appropriate procedures; (ii) correctly computed assessments and charges; and (iii) properly reported .

10.6 Reservation of Rights. Nothing herein shall be construed as precluding any party to the Judgment from seeking judicial review of any Watermaster action on the grounds that Watermaster has failed to act in accordance with the Peace Agreement as amended, this Agreement, the Amended Judgment, the OBMP Implementation Plan as amended and applicable law.

ARTICLE XI
TERM

11.1 Commencement. This Agreement will become effective upon the satisfaction of all conditions precedent and shall expire on the Termination Date.

11.2 Termination. This Agreement is coterminous with the initial term of the Peace Agreement and will expire of its own terms and terminate on the date of the Initial Term of the Peace Agreement.

ARTICLE XIII
GENERAL PROVISIONS

12.1 Construction of this Agreement. Each Party, with the assistance of competent legal counsel, has participated in the drafting of this Agreement and any ambiguity should not be construed for or against any Party on account of such drafting.

12.2 Awareness of Contents/Legal Effect. The Parties expressly declare and represent that they have read the Agreement and that they have consulted with their respective counsel regarding the meaning of the terms and conditions contained herein. The parties further expressly declare and represent that they fully understand the content and effect of this Agreement and they approve and accept the terms and conditions contained herein, and that this Agreement is executed freely and voluntarily.

12.3 Counterparts. This Agreement may be executed in counterparts. This Agreement shall become operative as soon as one counterpart hereof has been executed by each Party. The counterparts so executed shall constitute on Agreement notwithstanding that the signatures of all Parties do not appear on the same page.

IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: Party: _____

By _____

Attachment L

ATTACHMENT "L"

SECOND AMENDMENT
TO PEACE AGREEMENT

THIS SECOND AMENDMENT TO PEACE AGREEMENT ("AGREEMENT") is dated the ____ of September 2007 regarding the Chino Groundwater Basin.

RECITALS

A. The Parties entered into that certain "Peace Agreement" dated June 29, 2000. The Peace Agreement was approved by the Court in San Bernardino Superior Court Case No. RCV 51010.

B. The Parties entered into a First Amendment to the Peace Agreement on September 2nd of 2004 regarding the deletion of Salt Credits and the Stormwater Component of New Yield.

NOW THEREFORE, in consideration of the covenants and conditions herein contained, and for other good and valuable consideration the receipt of which is hereby acknowledged, the Parties agree as follows:

AGREEMENT

Section 1. **OBMP Credits Modified.** The Peace Agreement § 5.4(d) will be amended to read:

(d) Watermaster shall adopt reasonable procedures to evaluate requests for OBMP credits against future OBMP Assessments or for reimbursement. Any Producer or party to the Judgment, including but not limited to the State of California, may make application to Watermaster for reimbursement or credit against future OBMP Assessments for any capital or operations and maintenance expenses incurred in the implementation of any project or program, including the cost of relocating groundwater Production facilities, that carries out the purposes of the OBMP and specifically relates to the prevention of subsidence in the Basin, in advance of construction or that is prospectively dedicated to service of the stated goals of the OBMP. Watermaster shall exercise reasonable discretion in making its determination, considering the importance of the project or program to the successful completion of the OBMP, the available alternative funding sources, and the professional engineering and design standards as may be applicable under the circumstances. However, Watermaster shall not approve such a request for reimbursement or credit against future OBMP Assessments under this section where the Producer or party to the Judgment was otherwise legally compelled to make the improvement.

September 21, 2007

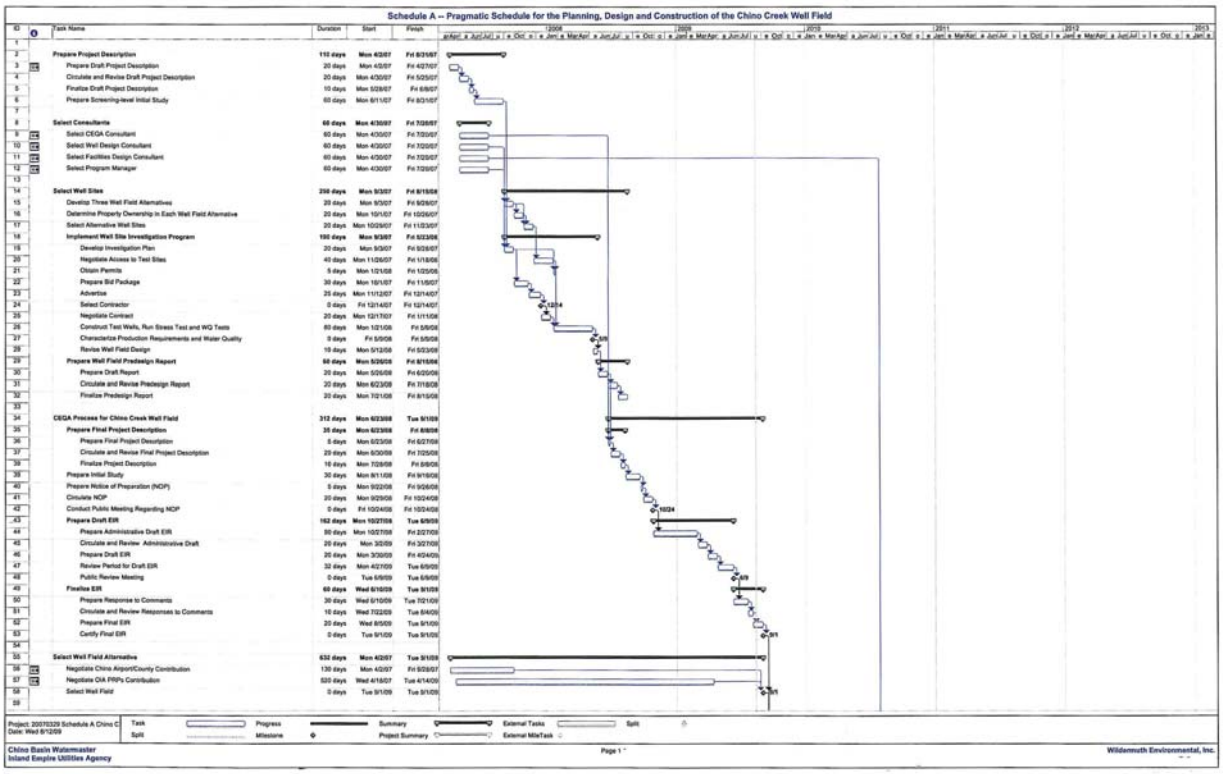
Section 2. **Increase the Limit on Storage of Local Supplemental Water** The current cap of 50,000 acre-feet of Storage of Supplemental Water described in paragraph 5.2(b)(iv) and 5.2(b)(vii) of the Peace Agreement shall be increased from 50,000 to 100,000 acre-feet. Any Party to the Judgment may make Application to Watermaster to store Supplemental Water pursuant to the terms of section 5.2(b) of the Peace Agreement except that the rebuttable presumption applicable to Local Storage Agreements described in Peace Agreement paragraph 5.2(b)(v) shall no longer be in effect with regard to such applications.

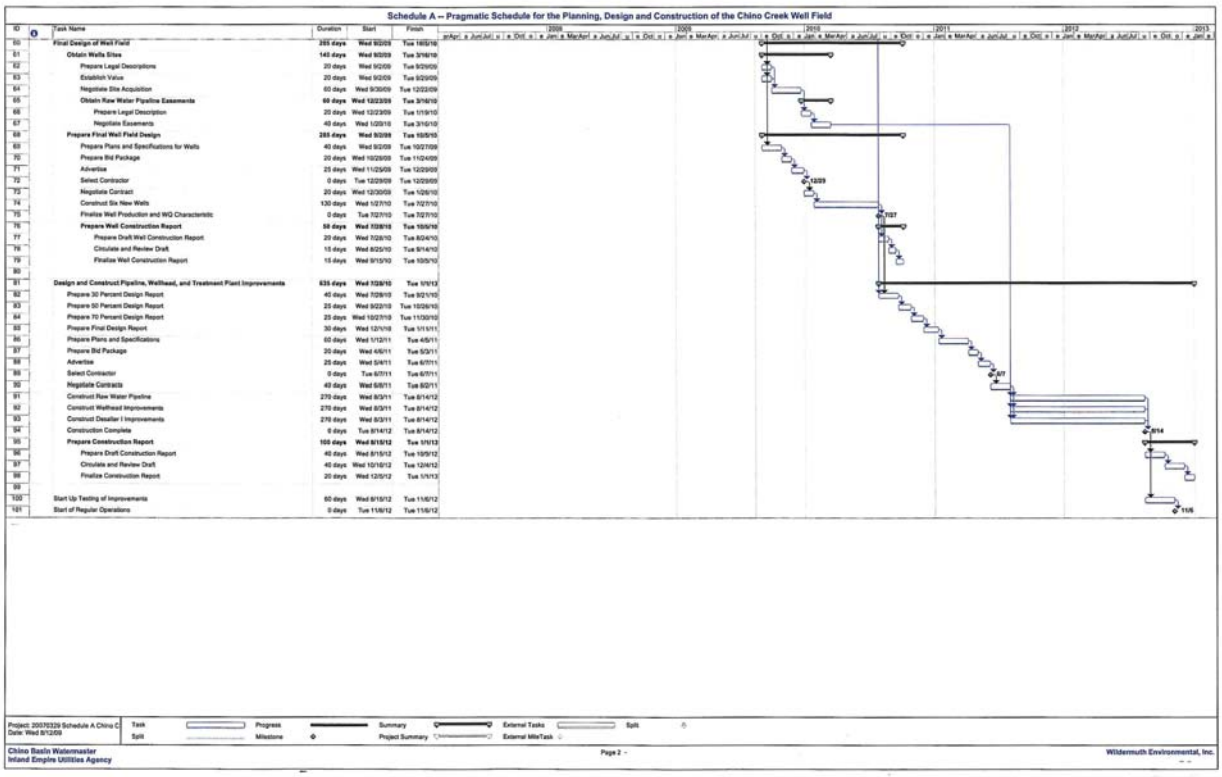
Section 3. **Effect of Amendment.** Except as amended hereby, the Peace Agreement remains in full force and effect.

IN WITNESS WHEREOF, the Parties hereto have set forth their signatures as of the date written below:

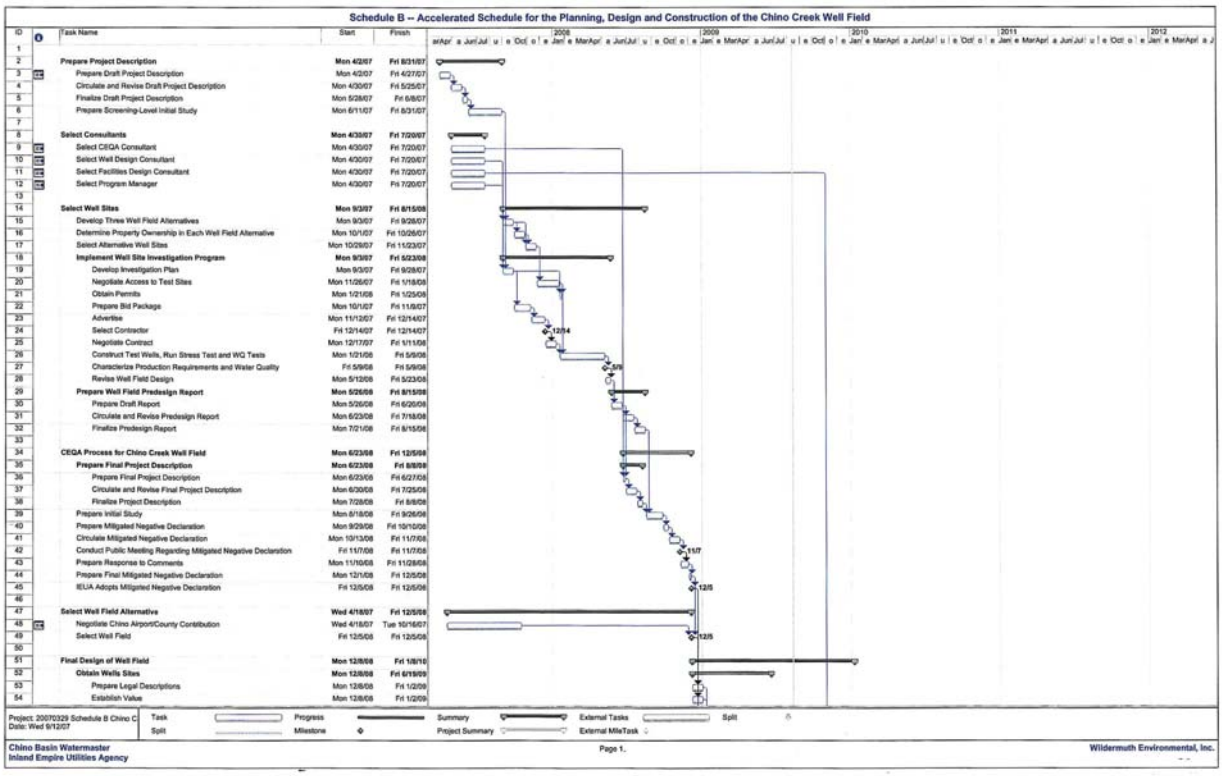
The materials included as Exhibit 1 to the Peace II Agreement are included as attachments to Resolution 07-05 and the Resolution itself

Exhibit 2


Schedule A -- Pragmatic Schedule for the Planning, Design and Construction of the Chino Creek Well Field
Project: 20070329 Schedule A Chino C
Date: Wed 8/12/09
Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External MileTask
Split
Chino Basin Watermaster
Inland Empire Utilities Agency
Page 1
Wildermuth Environmental, Inc.

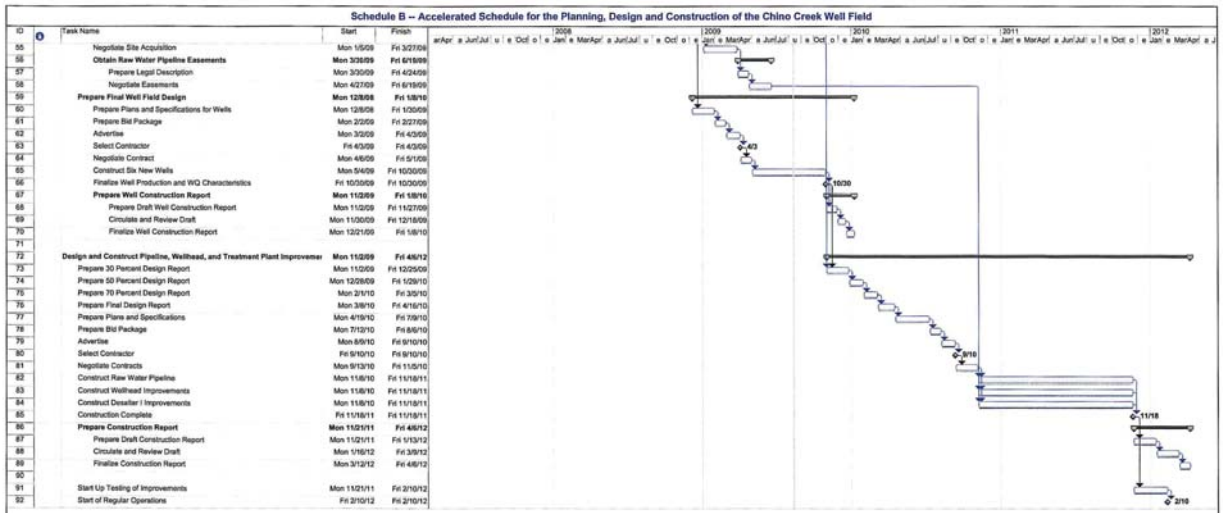

Schedule A -- Pragmatic Schedule for the Planning, Design and Construction of the Chino Creek Well Field
Project: 20070329 Schedule A Chino C
Date: Wed 8/12/09
Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External MileTask
Split
Chino Basin Watermaster
Inland Empire Utilities Agency
Page 2
Wildermuth Environmental, Inc.

Schedule B -- Accelerated Schedule for the Planning, Design and Construction of the Chino Creek Well Field



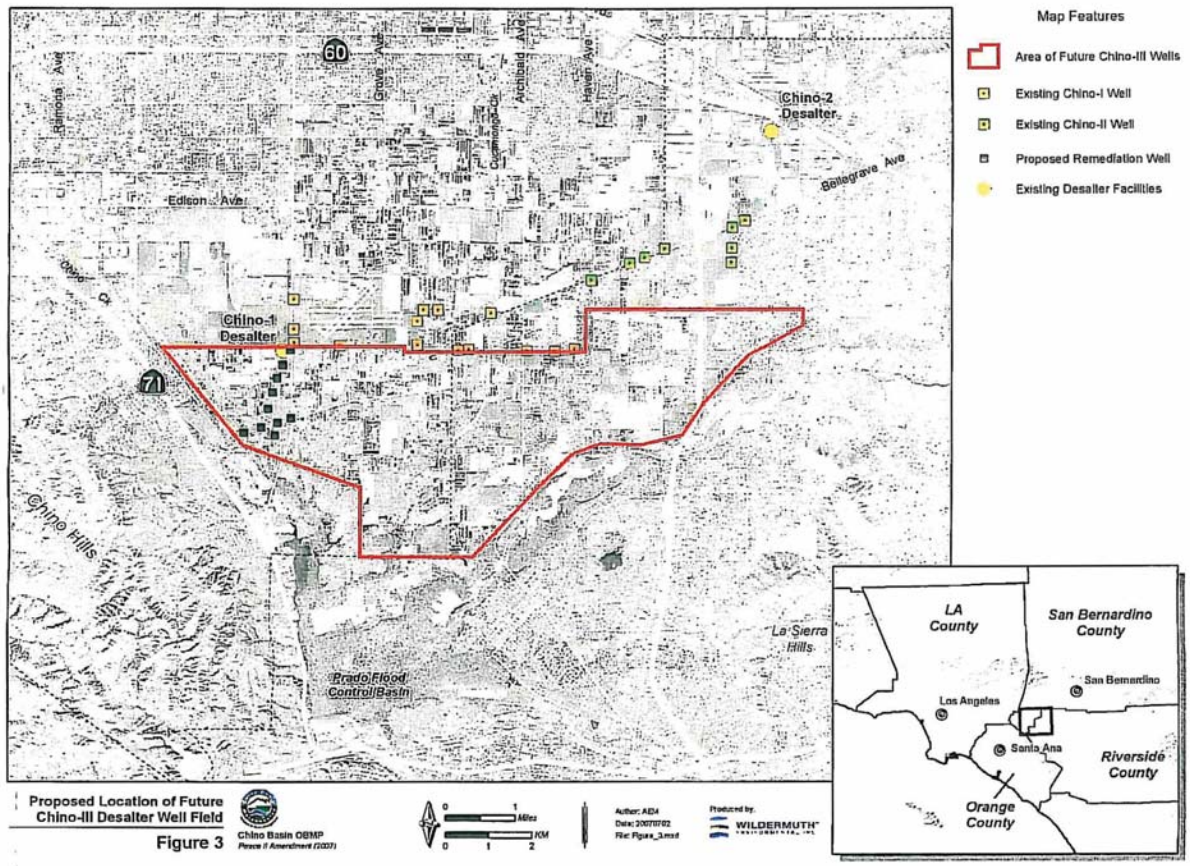
ID	Task Name	Start	Finish
1			
2	**Prepare Project Description**	**Mon 4/2/07**	**Fri 8/31/07**
3	Prepare Draft Project Description	Mon 4/2/07	Fri 4/27/07
4	Circulate and Revise Draft Project Description	Mon 4/30/07	Fri 5/25/07
5	Finalize Draft Project Description	Mon 5/28/07	Fri 6/8/07
6	Prepare Screening-Level Initial Study	Mon 6/11/07	Fri 8/31/07
7			
8	**Select Consultants**	**Mon 4/30/07**	**Fri 7/20/07**
9	Select CEQA Consultant	Mon 4/30/07	Fri 7/20/07
10	Select Well Design Consultant	Mon 4/30/07	Fri 7/20/07
11	Select Facilities Design Consultant	Mon 4/30/07	Fri 7/20/07
12	Select Program Manager	Mon 4/30/07	Fri 7/20/07
13			
14	**Select Well Sites**	**Mon 9/3/07**	**Fri 8/15/08**
15	Develop Three Well Field Alternatives	Mon 9/3/07	Fri 9/28/07
16	Determine Property Ownership in Each Well Field Alternative	Mon 10/1/07	Fri 10/26/07
17	Select Alternative Well Sites	Mon 10/29/07	Fri 11/23/07
18	**Implement Well Site Investigation Program**	**Mon 9/3/07**	**Fri 5/23/08**
19	Develop Investigation Plan	Mon 9/3/07	Fri 9/28/07
20	Negotiate Access to Test Sites	Mon 11/26/07	Fri 1/18/08
21	Obtain Permits	Mon 1/21/08	Fri 1/25/08
22	Prepare Bid Package	Mon 10/1/07	Fri 11/9/07
23	Advertise	Mon 11/12/07	Fri 12/14/07
24	Select Contractor	Fri 12/14/07	Fri 12/14/07
25	Negotiate Contract	Mon 12/17/07	Fri 1/11/08
26	Construct Test Wells, Run Stress Test and WQ Tests	Mon 1/21/08	Fri 5/9/08
27	Characterize Production Requirements and Water Quality	Fri 5/9/08	Fri 5/9/08
28	Revise Well Field Design	Mon 5/12/08	Fri 5/23/08
29	**Prepare Well Field Predesign Report**	**Mon 5/26/08**	**Fri 8/15/08**
30	Prepare Draft Report	Mon 5/26/08	Fri 6/20/08
31	Circulate and Revise Predesign Report	Mon 6/23/08	Fri 7/18/08
32	Finalize Predesign Report	Mon 7/21/08	Fri 8/15/08
33			
34	**CEQA Process for Chino Creek Well Field**	**Mon 6/23/08**	**Fri 12/5/08**
35	**Prepare Final Project Description**	**Mon 6/23/08**	**Fri 8/8/08**
36	Prepare Final Project Description	Mon 6/23/08	Fri 6/27/08
37	Circulate and Revise Final Project Description	Mon 6/30/08	Fri 7/25/08
38	Finalize Project Description	Mon 7/28/08	Fri 8/8/08
39	Prepare Initial Study	Mon 8/18/08	Fri 9/26/08
40	Prepare Mitigated Negative Declaration	Mon 9/29/08	Fri 10/10/08
41	Circulate Mitigated Negative Declaration	Mon 10/13/08	Fri 11/7/08
42	Conduct Public Meeting Regarding Mitigated Negative Declaration	Fri 11/7/08	Fri 11/7/08
43	Prepare Response to Comments	Mon 11/10/08	Fri 11/28/08
44	Prepare Final Mitigated Negative Declaration	Mon 12/1/08	Fri 12/5/08
45	IEUA Adopts Mitigated Negative Declaration	Fri 12/5/08	Fri 12/5/08
46			
47	**Select Well Field Alternative**	**Wed 4/18/07**	**Fri 12/5/08**
48	Negotiate Chino Airport/County Contribution	Wed 4/18/07	Tue 10/16/07
49	Select Well Field	Fri 12/5/08	Fri 12/5/08
50			
51	**Final Design of Well Field**	**Mon 12/8/08**	**Fri 1/8/10**
52	**Obtain Wells Sites**	**Mon 12/8/08**	**Fri 6/19/09**
53	Prepare Legal Descriptions	Mon 12/8/08	Fri 1/2/09
54	Establish Value	Mon 12/8/08	Fri 1/2/09

Schedule B -- Accelerated Schedule for the Planning, Design and Construction of the Chino Creek Well Field



ID	Task Name	Start	Finish
55	Negotiate Site Acquisition	Mon 1/5/09	Fri 3/27/09
56	**Obtain Raw Water Pipeline Easements**	**Mon 3/30/09**	**Fri 6/19/09**
57	Prepare Legal Description	Mon 3/30/09	Fri 4/24/09
58	Negotiate Easements	Mon 4/27/09	Fri 6/19/09
59	**Prepare Final Well Field Design**	**Mon 12/8/08**	**Fri 1/8/10**
60	Prepare Plans and Specifications for Wells	Mon 12/8/08	Fri 1/30/09
61	Prepare Bid Package	Mon 2/2/09	Fri 2/27/09
62	Advertise	Mon 3/2/09	Fri 4/3/09
63	Select Contractor	Fri 4/3/09	Fri 4/3/09
64	Negotiate Contract	Mon 4/6/09	Fri 5/1/09
65	Construct Six New Wells	Mon 5/4/09	Fri 10/30/09
66	Finalize Well Production and WQ Characteristics	Fri 10/30/09	Fri 10/30/09
67	**Prepare Well Construction Report**	**Mon 11/2/09**	**Fri 1/8/10**
68	Prepare Draft Well Construction Report	Mon 11/2/09	Fri 11/27/09
69	Circulate and Review Draft	Mon 11/30/09	Fri 12/18/09
70	Finalize Well Construction Report	Mon 12/21/09	Fri 1/8/10
71			
72	**Design and Construct Pipeline, Wellhead, and Treatment Plant Improvemer**	**Mon 11/2/09**	**Fri 4/6/12**
73	Prepare 30 Percent Design Report	Mon 11/2/09	Fri 12/25/09
74	Prepare 50 Percent Design Report	Mon 12/28/09	Fri 1/29/10
75	Prepare 70 Percent Design Report	Mon 2/1/10	Fri 3/5/10
76	Prepare Final Design Report	Mon 3/8/10	Fri 4/16/10
77	Prepare Plans and Specifications	Mon 4/19/10	Fri 7/9/10
78	Prepare Bid Package	Mon 7/12/10	Fri 8/6/10
79	Advertise	Mon 8/9/10	Fri 9/10/10
80	Select Contractor	Fri 9/10/10	Fri 9/10/10
81	Negotiate Contracts	Mon 9/13/10	Fri 11/5/10
82	Construct Raw Water Pipeline	Mon 11/8/10	Fri 11/18/11
83	Construct Wellhead Improvements	Mon 11/8/10	Fri 11/18/11
84	Construct Desalter I Improvements	Mon 11/8/10	Fri 11/18/11
85	Construction Complete	Fri 11/18/11	Fri 11/18/11
86	**Prepare Construction Report**	**Mon 11/21/11**	**Fri 4/6/12**
87	Prepare Draft Construction Report	Mon 11/21/11	Fri 1/13/12
88	Circulate and Review Draft	Mon 1/16/12	Fri 3/9/12
89	Finalize Construction Report	Mon 3/12/12	Fri 4/6/12
90			
91	Start Up Testing of Improvements	Mon 11/21/11	Fri 2/10/12
92	Start of Regular Operations	Fri 2/10/12	Fri 2/10/12

Exhibit 3


60
71
Ramona Ave
Grove Ave
Cucamonga Cr
Archibald Ave
Haven Ave
Edison Ave
Chino-2 Desalter
Chino-1 Desalter
Chino Hills
La Sierra Hills
Prado Flood Control Basin
Map Features
Area of Future Chino-III Wells
Existing Chino-I Well
Existing Chino-II Well
Proposed Remediation Well
Existing Desalter Facilities
LA County
San Bernardino County
Riverside County
Orange County
Los Angeles
San Bernardino
Santa Ana
Proposed Location of Future Chino-III Desalter Well Field
Figure 3
Chino Basin OBMP
Produced by:
WILDERMUTH

APPENDIX L

CUCAMONGA BASIN DECREE

COPY

Recorded April 29,1958
Book 4495, page 381,
San Bernardino County
Official Records

WALKER, WRIGHT, TYLER & WARD
210 West 7th Street, Suite 631
Los Angeles 14, California
TRinity 8936

Attorneys for Plaintiff

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF SAN BERNARDINO

SAN ANTONIO WATER COMPANY, a corporation,

Plaintiff,

-vs-

FOOTHILL IRRIGATION COMPANY, a corporation; SUNSET WATER COMPANY, a corporation; IOAMOSA WATER COMPANY, a corporation; and OLD SETTLERS WATER COMPANY, a corporation; ALTA LOMA MUTUAL WATER COMPANY, a corporation; ARMSTRONG NURSERIES, a corporation; BANYAN HEIGHTS WATER COMPANY, a corporation; CARNELIAN WATER COMPANY, a corporation; CITRUS WATER COMPANY, a corporation; CUCAMONGA DEVELOPMENT COMPANY, a corporation; CUCAMONGA WATER COMPANY, a corporation; HEDGES WELL COMPANY, a corporation; HELLMAN WATER COMPANY, a corporation; HERMOSA WATER COMPANY, a corporation; JOYA MUTUAL WATER COMPANY, a corporation; REX MUTUAL WATER COMPANY, a corporation; SAPPHIRE MUTUAL WATER COMPANY, a corporation; CHARLES SNYDER; UPLAND WATER COMPANY, a corporation; HENRY G. BODKIN and BANK OF AMERICA NATIONAL TRUST AND SAVINGS ASSOCIATION, as Executors of the last will of Giovanni Vai, deceased; WESTERN FRUIT GROWERS, a corporation; HUGH P. CRAWFORD; G. N. HAMILTON RANCH, a partnership composed of Arthur Bridge, Helen Bridge, and Grace W. Burt; JOHN DOE ONE to THIRTY inclusive, MARY ROE ONE to THIRTY inclusive, JOHN DOE COMPANY ONE to TWENTY inclusive,

Defendants.

No. 92645

DECREE

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WHEREAS, there has been filed in the above entitled action, a Stipulation for Judgment duly executed by and on the part of each and all of the following named parties to said action (who are collectively hereinafter referred to as the "stipulating parties"), to wit:

San Antonio Water Company, a corporation;

Foothill Irrigation Company, a corporation;

Ioamosa Water Company, a corporation;

Old Settlers Water Company, a corporation;

Sunset Water Company, a corporation;

Cucamonga Water Company, a corporation;

Alta Loma Mutual Water Company, a corporation;

Armstrong Nurseries, a corporation;

Banyan Heights Water Company, a corporation;

Carnelian Water Company, a corporation;

Citrus Water Company, a corporation;

Hedges Well Company, a corporation;

Hellman Water Company, a corporation;

Hermosa Water Company, a corporation;

Joya Mutual Water Company, a corporation;

Upland Water Company, a corporation;

Western Fruit Growers, a corporation;

Cucamonga Development Company, a corporation;

Sapphire Mutual Water Company, a corporation;

Charles Snyder;

Hugh P. Crawford;

Bank of America National Trust and Savings Association, a national banking association, and Henry G. Bodkin, as executors of the last Will of Giovanni Vai, deceased;

G. N. Hamilton Ranch, a partnership composed of Arthur Bridge, Helen Bridge, Grace W. Burt;

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and Rex Mutual Water Company.

and,

WHEREAS, the Court has heard and considered evidence on the part of various of the stipulating parties,

NOW, THEREFORE, IT IS HEREBY ORDERED, ADJUDGED AND DECREED by this Court that:

FIRST: As used herein, the terms listed below shall have the respective meanings next following them, viz:

(a) "Cucamonga Basin" or "Basin" shall mean that certain territory in the County of San Bernardino, State of California, which is more particularly described upon Exhibit 1, and shall also include all percolating water and underground water and water sources underlying said territory;

(b) "Imported water" shall mean water derived from a stream flow in an area outside of any water shed draining into the Cucamonga Basin. Specifically, water derived from San Antonio Canyon and/or Creek is "imported water".

(c) "Irrigation season" shall mean that portion of each year when irrigating is required by the users of the water sold by the Plaintiffs and Defendants hereto. While this period varies considerably from year to year, the irrigating season generally commences during any month in which the rainfall does not exceed two inches, and the season generally terminates after the first rainfall of two inches or more. The season usually approximates the period from May 1st to November 1st.

"Spreading season" is the balance of each year remaining after deducting the irrigation season for such year, and is usually approximately the period from November 1st of one year to May 1st of the succeeding year.

"Spread" with respect to water shall mean to conduct the same upon and sink the same into the gravels of Cucamonga Basin during a spreading season.

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(d) "Aggregate stipulated water" means the total number of acre feet of water set opposite the names of all stipulating parties in Exhibit 2.

(e) "Pro-rata" means, in each case, in the same proportion as the acre feet listed opposite the name or names of the party or respective parties in question bear to the aggregate stipulated water; and the verb "pro-rate" means to divide and share pro-rata among the stipulating parties.

(f) "Allocated water" of any stipulating party or parties in each case means the number of acre feet of water set out on Exhibit 2 opposite the name or names of such party or parties.

(g) "Ten preceding years" means the period of ten consecutive calendar years which immediately precedes or has preceded the year or event mentioned.

(h) "Five-sixths of the water users" shall mean stipulating parties having in the aggregate allocated water which is not less than five-sixths of the total allocated water of all stipulating parties.

(i) An "inch" of water or a "miner's inch" of water shall mean a flow of water equal to one-fiftieth (1/50th) of a cubic foot of water per second of time.

(j) Any party hereto the corporate name of which ends with "Water Company" or "Mutual Water Company" will be hereinafter referred to without such words. Thus "San Antonio" means herein "San Antonio Water Company" and similarly with the other parties using said words "Water Company" or "Mutual Water Company".

(k) "Canyon pipeline" shall mean the pipeline (varying in size between approximately 32 inches in inside diameter and about 18 inches) which extends Southerly from a point on the channel of Cucamonga Creek at an elevation of approximately 2350 feet above sea level (herein called "Northerly intake") to the "round weir" mentioned below.

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(l) "Round weir" shall mean that certain weir of Ioamosa marked on the map Exhibit 3 as "Round Weir"and located near the top of the bluff on the East side of Cucamonga Creek and just Northerly from the Westerly prolongation of Almond Street, said weir being the point from which (a) two ten-inch water lines marked on the map Exhibit 3 as "Ioamosa 10 inch" lead Easterly to Ioamosa's Carnelian Street Reservoir (at about elevation 2030 feet above sea level on the East side of Carnelian Street between Hillside Road and Almond Street);(b) a six-inch water line marked on the map Exhibit 3 as "Hamilton 6 inch"leads Southeasterly to the Hamilton Ranch(which lies South of Hillside Road,North of Banyan Street,East of Sapphire Street and West of Carnelian Street),and,(c) an eight-inch water line marked on the map Exhibit 3 as "Banyan 8 inch" runs Southerly down Topaz Street to connect with the water system of Banyan Heights.

(m) "Reservoir Weir" means the weir of Ioamosa located at the Carnelian Street Reservoir.

(n)"Ioamosa Southerly Intake" shall mean a line extending West across the channel of Cucamonga Creek from the existing"Canyon Weir" of Ioamosa marked on the map Exhibit 3 as "Canyon Weir",which weir is located in Cucamonga Canyon,is part of the Canyon pipeline, and is situated about midway (or somewhat Northerly thereof)between the round weir and the Northerly intake mentioned above.

(o) "Schulhof pipe-line" means that certain three-inch water pipe-line marked on the map Exhibit 3 as "Schulhof 3 inch" which connects with the Canyon pipe-line Northerly of the round weir, and which is mentioned in paragraph Second(h) of that certain decree dated April 12, 1937, in action No. 29,799 (Schulhof v. Cucamonga Development Company) in the above entitled Superior Court.

(p) The water to which Ioamosa is entitled as provided in paragraph "Third" hereof is herein called "Ioamosa gravity water", or "gravity water".

(q) "An overflow year"shall mean any calendar year for which

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the water level determined as hereinafter provided in the index well is at an elevation of 1345 feet or higher above sea level.

For the purposes of determination of elevation above sea level the United States Geological Survey bench mark on Baseline (also known as 16th Street) as it exists on the date this decree is entered, on or near the north boundary of Section 4, Township 1 South, Range 7 west, and approximately four-fifths of a mile west of Vineyard Avenue, shall be deemed to be at an elevation above sea level of 1454 feet. The elevation of the water level in such index well shall be determined by measuring the elevation of such water in such well on October 1st of each year (Provided that if any such day falls on a Sunday or a holiday, measurements shall be made on the next business day). The index well shall be the well known as Shaft No. 9-A of the San Antonio Water Company located approximately 154 feet Southerly of the Northwest corner of Lot 14 of Red Hill subdivision and shown on the map Exhibit 5. Wells No. 11 of Cucamonga Water Company and 20 and 22 of the San Antonio Water Company shall not be pumped within three days before such date of measurements, and the tunnel bulkhead adjacent to Red Hills Country Club will be kept closed for a like period before such date. If for any reason Shaft 9-A shall not be available for measurement, then the index well shall be Wells No. 11 of Cucamonga Water Company or 20 or 22 of the San Antonio Water Company, in the order herein listed. If for any reason none of said wells shall be available for such measurement, the identity and location of the index well may be determined by a written stipulation executed by five-sixths of the water users and filed in said action, or in default of said stipulation by order of the said court.

Annexed to this Decree and hereby incorporated herein are the following Exhibits:

Exhibit 1: A description of the territory under which lies the "Cucamonga Basin";

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Exhibit 2: A list of the "allocated water" of each party (Other than the stream flow mentioned in paragraph "Third");

Exhibit 3: A map of "Cucamonga Pipe Lines";

Exhibit 4: A map of "Cucamonga Spreading Works";

Exhibit 5: A map of "Well and Shaft Locations";

and said exhibits are herein respectively referred to as "Exhibit 1", "Exhibit 2", "Exhibit 3", "Exhibit 4" and "Exhibit 5".

SECOND: This paragraph deals with the right and quantity of water San Antonio may annually hereafter extract from the Cucamonga Basin as reduced by its failure to previously annually spread therein the minimum amount of water hereinafter set forth, or as increased by its previously annually spreading more imported water therein than said minimum, excepting, however, in both such situations the spreading of imported water during years in which such spread causes the Basin to overflow resulting in such year constituting an overflow year, as defined in Paragraph First, subdivision (q) thereof.

For the purpose of the computation in this Paragraph Second, it shall be assumed that San Antonio has spread in each of the ten years previous to 1957, 2,000 acre feet of imported water.

With respect to each calendar year after entry of this decree each preceding ten year period shall be divided into "included" and "Excluded" years. "Excluded years" are those calendar years which are defined as overflow years in Paragraph First, subdivision (q) thereof. All other calendar years are "included years".

If in the ten preceding years San Antonio shall have spread less than 2,000 acre feet of imported water in any of the included years, as modified by the assumption above set forth, the difference between (a) The amount of imported water which shall have been so spread in such included years, and (b) The quantity of 2,000 acre feet multiplied by the number of included years, shall be known as the "ten year deficit".

Any right of San Antonio to extract water from the Cucamonga

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Basin in any calendar year after the entry of this decree shall be reduced by the number of acre feet of water equal to the ten year deficit divided by the number of included years, if any such deficit shall have occurred, so that such right to extract water for such year shall not exceed 6,500 acre feet less the ten year deficit divided by the number of included years.

Correspondingly, with respect to each calendar year after the entry of this decree, if in the ten preceding years San Antonio shall have spread more than 2,000 acre feet of imported water in any of the included years, as modified by the assumption above set forth, the difference between (a) The amount of imported water which shall have been so spread in such included years, and (b) The quantity of 2,000 acre feet multiplied by the number of included years, shall be known as the "ten year surplus".

The right of San Antonio to extract water from the Cucamonga Basin in any calendar year after the entry of this decree, shall be increased by a number of acre feet of water equal to 95 percent of the ten year surplus divided by the number of included years, if any such surplus shall have occurred, so that there shall be added for such year to San Antonio's right to extract 6,500 acre feet of water a number of acre feet of water equal to 95 percent of the ten year surplus divided by the number of included years. Provided, however, that in no case shall such increased extraction exceed 2,000 acre feet of water for any one calendar year.

So long as the water level in the index well referred to in paragraph First, subdivision (q) herein is at an elevation below 1345 feet above sea level, and in the event San Antonio has available in any one calendar year after the year 1956 more than 2,000 acre feet of imported water, and desires to sell the same, it shall, before selling such imported water to others not parties to this Decree, annually offer to sell such imported water to the other stipulating parties hereto for spreading in the Cucamonga Basin and at a price to be fixed

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between the parties by negotiation, but in any event to be not greater than the price San Antonio can obtain from others not parties of this Decree.

In the event San Antonio and the other stipulating parties hereto do not agree by October 1st to the terms for the purchase of said imported water to be sold and spread during the next succeeding spreading season, then San Antonio is thereafter free to sell such imported water to other persons not parties hereto, or at its option, it may spread such imported water in the Cucamonga Basin and by so spreading will receive the credit for water spread as provided in this paragraph Second. If the stipulating parties and San Antonio agree to the purchase from San Antonio of any imported water, and such stipulating parties, other than San Antonio, purchase said water and the same is spread in the Cucamonga Basin, then during such year no credit shall be given to San Antonio toward estimating its ten year surplus or deficit for the amount of water so purchased and spread.

THIRD: Ioamosa and Hamilton Ranch, a partnership composed of Arthur Bridge, Helen Bridge and Grace W. Burt, are the owners of the paramount right to take and divert throughout each year at or Northerly from the Ioamosa Southerly intake all surface and subsurface flow of Cucamonga Creek, not exceeding however two hundred fifty (250) miner's inches of water, (measured at the round weir and the intake to the Schulhof pipeline), including any water which shall be supplied to the Schulhof pipeline under the terms of said decree in action No. 29,799 or otherwise. The right to said flow of Cucamonga Creek up to 250 miner's inches per year is subject to an obligation of Hamilton Ranch and Ioamosa to deliver water into the Schulhof pipeline, and the balance of said water is owned by Hamilton Ranch and Ioamosa in the following proportions:

(a) Hamilton Ranch 128/1200ths thereof;

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(b) Ioamosa 1072/1200ths thereof, subject to the right of Sapphire to the extent of one (1) inch from the weir box on Ioamosa's pipeline located approximately 1200 feet East of the "round weir".

The rights of Ioamosa to the Ioamosa gravity water are subject to the provisions hereof. Ioamosa may transport such gravity water to any location or locations whether within or without the basin, and use or deliver such water at any such location or location, provided, however, if any of the Ioamosa gravity water is used or conducted outside the Basin in any year, then the quantity of water which Ioamosa shall be entitled to develop or extract from the Basin by Paragraph Fourth and Exhibit 2 herein during the next succeeding year shall be reduced by an amount equal to the quantity of Ioamosa gravity water so used or conducted outside the Basin during such year.

The stipulating parties hereto shall within sixty (60) days after the date of this judgment, at their proportionate expense, construct in a manner which shall have been approved by San Antonio Water Company or by the above entitled Court a dividing weir located where Ioamosa now maintains the "round weir". Such dividing weir shall be so constructed that it will automatically limit to 249 inches the amount of water that will flow into the above mentioned four outgoing lines that are now connected with the round weir and are referred to in paragraph First (1) herein.

Within sixty (60) days after the date of this judgment the stipulating parties hereto shall also construct in a manner which shall have been approved by San Antonio Water Company or by the above entitled Court a dividing weir at the said Carnelian Street reservoir. The dividing weir at this point shall be so constructed as to permit Ioamosa to divert fifty inches of such Ioamosa gravity water to domestic use.

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During each spreading season, the remaining amount of Ioamosa gravity water over and above fifty (50) inches, shall be either:

(a) Used for irrigation purposes over Cucamonga Basin; or,

(b) Spread over Cucamonga Basin in the spreading grounds of Ioamosa or Banyan Heights Water Company; or

(c) Returned by Ioamosa to the channel of Cucamonga Creek.

During each spreading season all of the flow of Cucamonga Creek in excess of such 250 inches after passing through the debris basins numbered C1 to C12 inclusive on Exhibit 4 shall be spread in spreading grounds which now exist, or are now under construction, or which are proposed, as shown on Exhibit 4, including the channel or wash of Cucamonga Creek, and which overlie the Cucamonga Basin and are North of Baseline Road. Whenever such spreading grounds are all overflowing, or would overflow, the waters which do or would so overflow may be spread in the "15th St. Spreading Grounds" as shown on said map, and when the "15th St. Spreading Grounds" also do or would overflow, the waters which do or would so overflow the "15th St. Spreading Grounds" may be spread in what is known as the "8th Street Spreading Grounds", all as shown on Exhibit 4, even though all or part of such spreading grounds do not overlie the Cucamonga Basin.

Such spreading shall be done at one or more locations in said spreading grounds which shall be approved by San Antonio.

Such flow of Cucamonga Creek may be spread at other locations than above provided, and outside the area above described upon the written consent of 5/6th of the water users, as defined in paragraph First subdivision (k) of this Decree.

If any costs are incurred in such spreading by any party hereto, for which such party would not otherwise be reimbursed, such costs shall be pro-rated between the parties hereto.

FOURTH: The rights of all stipulating parties to take water from Cucamonga Basin, subject to the adjustments set forth in this decree and to the provisions of paragraphs Second and Third above,

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are hereby fixed at the quantities set forth in Exhibit 2. Such rights are correlative, and except as to quantity or as herein otherwise stated are equal. No stipulating party shall have any right to export water from the Cucamonga Basin or use water extracted from the Cucamonga Basin at any place other than over the Cucamonga Basin except as provided in paragraph Third and as follows:

(a) The following stipulating parties, or any of them, may use water which they are entitled to extract from Cucamonga Basin in any location whatsoever, namely, San Antonio, Cucamonga, Upland, Old Settlers, and Sunset.

(b) Hermosa, Foothill Irrigation Company and Alta Loma are entitled to export water from Cucamonga Basin only to the extent hereinafter set forth, and none of said parties shall ever export from the Basin more water than said "Export quantity" herein listed for it, to wit:

Party	Export Quantity
HERMOSA	343 Acre Feet
FOOTHILL IRRIGATION COMPANY	483 Acre Feet
ALTA LOMA	51 Acre Feet

and if in any year water used outside the basin which has been extracted or developed from the basin by any of said parties exceeds the "Export Quantity" above listed for such party, the quantity of water which such party shall be entitled to develop or extract from the basin in the ensuing year shall be reduced by an amount equal to such excess.

FIFTH: Within sixty (60) days after the date of this judgment, San Antonio shall, in the event it has not already done so, install, at the following locations, suitable recording and measuring devises, by means of which all spread water passing through such devices may be accurately measured and the quantity of such water recorded. Said locations are as follows:

(1) On 23rd Street at the Northeast corner of Ontario

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Colony Lot No. 170

(2) On 20th Street at the Northwest corner of Ontario Colony Lot No. 282; and

(3) On the West line of Ontario Colony Lot No. 301, 400 feet North of 19th Street.

Such measuring and recording devices shall be of such design and construction as may be agreed upon by and between San Antonio and Cucamonga, or, if they fail to agree,as may be designated by the Chief Engineer of the San Bernardino County Flood Control District, or by the above entitled Court.

All imported water which is to be spread upon Cucamonga Basin, whether spread by San Antonio to earn its entitlement under paragraph Second hereof, or is spread after the purchase thereof by the parties hereto other than San Antonio,shall be conducted through said recording and measuring devices by San Antonio,unless otherwise agreed in writing by the stipulating parties, including San Antonio,having allocated water equal to at least five-sixths (5/6ths) of the aggregate stipulated water, and no water not so conducted through such devices and measured shall be counted as water spread under the terms of such paragraph Second, unless so agreed in writing by such parties.

Said devices shall be designed and operated so that they continuously record the amount of water passing therethrough between the start and finish of each spreading season. In case of failure of measuring devices, average of the preceding and succeeding measurements shall be used. Such records shall be open to the inspection of all other stipulating parties on reasonable notice.

Each stipulating party shall have the right to inspect such recording and measuring devices at any time,and,in the event that the same shall ever be locked,each of the stipulating parties shall be furnished by San Antonio with a key thereto so as to permit inspection thereof. Further, San Antonio shall grant to the other stipulating parties hereto, insofar as it can do so without being

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required to obtain the same from others, a non-exclusive right of ingress and egress from the nearest public street to said recording measuring devices. The stipulating parties hereto shall pro-rate the expense of the original installation of said recording measuring devices, and San Antonio shall thereafter operate and maintain and bear the expense of operating and maintaining such devices.

SIXTH: As between the stipulating parties only, no extraction of water from Cucamonga Basin by any party in excess of the amount herein provided to be taken by such party, shall be deemed adverse to any other stipulating party, and each stipulating party hereby waives as against each other stipulating party the right to plead any statute of limitations or laches with respect to any extraction of water by such party in excess of such amount.

SEVENTH: Except as provided in paragraph Second, if any stipulating party in any year shall fail to take or receive from the basin or transport beyond the confines of the basin, the full quantity of water which such party is entitled hereunder to take or receive or transport beyond said confines, as the case may be, such failure shall not entitle such party to take or receive or so transport from the basin in any succeeding year any greater quantity of water than if in each prior year such party had taken, received and so transported from the basin all water which such party was entitled hereunder to so take, receive and transport, and, subject to the provisions of Paragraph Fifteen, such failure shall not affect the rights of other parties to the decree to take the stipulated amounts of water they are entitled to receive by Exhibit 2 herein.

Likewise, except as provided in said paragraph Second, as between the stipulating parties, no right adjudged hereunder of any party to thereafter take water from the Basin or to thereafter transport such water beyond the confines of the Basin shall be lost, impaired or diminished by any failure to take or so transport from the Basin all or any of the water to which such party is entitled hereunder unless and only to the entent that for a period of at least fifteen

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consecutive years such right shall not be exercised.

EIGHTH: Each stipulating party shall always maintain records of all extractions of water from the Basin by such party such that it can be determined therefrom for each year what quantity of water was taken from each well, or combination of wells,or other water source within the Basin from which such party received water.

Upon written demand of any other stipulating party,the party keeping such records shall, within 30 days after receipt of such demand, supply to the party making such demand or to the person designated by such party in such demand a written statement of the amount of water(in acre feet)so taken from each such well or combination of wells, or other source,for each year after 1957, with respect to which no such statement has previously been supplied.

Within six months hereafter as to existing wells, or upon commencement of operation as to wells first hereafter operated,each such well or combination of wells shall be so equipped with measuring devices at the expense of stipulating party who operates the same,as to show the quantity of water used or extracted.

Likewise, if any stipulating party hereafter transports water beyond the confines of the Basin,such transporting party shall thereafter maintain such measuring box,meter,weir, or other measuring device as will show readily and accurately the quantity of water at the time being transported beyond the confines of the Basin.Measurements of the quantity of water being taken at each of said points shall be made by such transporting party at least daily by weir or weekly by meter throughout the entire period water is being taken at such point. A record of such measurements and hours of operation shall always be made and maintained by such party.In case of failure of measuring device, average of the preceding and succeeding measurements shall be used.

Each stipulating party and any agent of any such party shall at all reasonable hours be entitled to inspect all such meters, boxes,

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weirs and other measuring devices, and to inspect, check, and copy any record of extractions and measurements and of all data and computations pertaining to the same in the possession or under the control of any other stipulating party or parties.

NINTH: Every provision of this Judgment in favor of or applying to any party hereto shall also apply to and inure to the benefit of, and also bind each and all of the heirs, legal representatives, successors and assigns of such party.

TENTH: The maximum quantity of water which any stipulating party shall be entitled to take from the Basin or transport beyond its confines shall not be increased or affected by the future acquisition by such party of additional lands, unless there shall be appurtenant to such lands rights to take water, which rights are in this action adjudged to exist.

Nothing in this judgment contained shall prevent any stipulating party from selling or otherwise disposing, or from purchasing or otherwise acquiring, any rights to water or to transport the same which may be adjudged to belong to any party to this action; but any such rights so acquired or so disposed shall remain subject to any limitations or restrictions herein expressed. Any transfer of the rights of any party herein shall be in writing, and notice thereof shall be given to San Antonio Water Company and Cucamonga Basin Protective Association, a corporation, whose address is Cucamonga, California, before the transferee may exercise such transferred rights.

ELEVENTH: The stipulating parties shall pro-rate the expense incurred after the date of this Judgment in prosecuting this action to Judgment against any other parties to this action.

The stipulating parties will unite in opposing any new, wrongful or unlawful taking of water from the Basin hereafter made by any person or corporation other than a stipulating party or parties, and will prorate the expense of making such opposition, including any litigation or engineering expense, provided that;

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(a) The term "new taking" shall not include any water development in the Basin hereafter made for the sole purpose of maintaining but not increasing any quantity of water now being taken from the Basin by the person who may hereafter make such development.

(b) If any stipulating party does not join in prosecuting any future suit to prevent, enjoin or limit any such new, wrongful or unlawful taking, such stipulating party not so joining shall bear pro-rata the expense of such suit (including attorney's fees and engineering expense) only if final judgment is rendered in such suit preventing, enjoining or limiting such taking.

TWELFTH: Each stipulating party, and the agents and employees of each such party, is and are hereby perpetually enjoined and restrained from doing any act or thing in violation of any provision of this judgment, other than paragraph Eleventh hereof.

THIRTEENTH: No stipulating party shall be entitled to recover court costs from any other stipulating party.

FOURTEENTH: The above entitled action shall continue and may be prosecuted and tried against all defendants therein, other than the stipulating parties; and the stipulating parties shall share the expense of such prosecution pro-rata. The Court will retain jurisdiction to enter modifications of this decree pursuant to stipulations provided for hereunder.

FIFTEENTH: In the event that through inadequacy of the supply of water in the Cucamonga Basin, or by reason of adjudication in any subsequent action, the stipulating parties in the aggregate shall be unable to pump and extract from the Cucamonga Basin a quantity of water so great as the aggregate stipulated water as is set forth in Exhibit 2, the stipulating parties shall pro-rate the aggregate quantity of water available in the Basin as long as such inability shall continue.

In the event between October 1st of any year and June 15th of the succeeding calendar year, five-sixths of the water users

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shall agree in writing by a stipulation filed in said action that the supply of water in the Basin is inadequate to safely permit the stipulating parties to pump in such ensuing year the aggregate stipulated water and that the amount of water to be pumped by each stipulating party shall for such succeeding calendar year be limited to a specified percentage (uniform for all)of the allocated water, then for such succeeding calendar year, each stipulating party is hereby enjoined and restrained from pumping or extracting from the Basin more than such percentage of allocated water of such party (subject to the provisions of paragraphs Second and Third hereof).

SIXTEENTH: The listing upon Exhibit 2 of any number of acre feet for any party to this action other than a stipulating party, shall not be deemed an admission by any stipulating party that a non-stipulating party is entitled to any water whatsoever from Cucamonga Basin, nor as to the quantity which such non-stipulating party may take from said Basin, if any, but each such figure for any non-stipulating party is listed as a matter of convenience and as a possible basis of compromise only.

SEVENTEENTH: This judgment supersedes and controls all previous agreements and decrees between the stipulating parties,or any of them but only insofar as they are inconsistent herewith.

Done in open Court this 25 day of April, 1958.

CARL B. HILLIARD

Judge

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EXHIBIT 1

TERRITORY UNDER WHICH LIES THE "CUCAMONGA BASIN"

That certain territory in the County of San Bernardino, State of California, which is situated to the South of the Sierra Madre range of mountains and is bounded and described as follows, to wit:

> Beginning at the base of the hereinbefore mentioned Sierra Madre Mountains at a point situate 9000 feet due North of the Southwest corner of Lot 241, said lot being delineated on Map of Ontario Colony Lands, recorded in the Office of the County Recorder of said County in Book 11 of Maps, at page 6 thereof; thence running South to said Southwest corner of said Lot 241; thence running in a general Southeasterly direction to the Southeast corner of Lot 419, said lot being also delineated on said Map of said Ontario Colony Lands; thence continuing in a general Southeasterly direction to a point situate thirteen hundred feet North of the South line and thirteen hundred feet East of the West line of Section 4, Township 1 South, Range 7 West, S. B. B. & M., thence running in a general Easterly direction to a point situate on the East line of said Section 4, eighteen hundred feet North of the Southeast corner of said Section 4; thence running in a general Northeasterly direction to the Southeast corner of the Southwest quarter of the Northeast quarter of Section 3, Township 1 South, Range 7 West, S. B. B. & M., thence running Northeasterly to a point situate on the North line of Section 2, Township 1 South, Range 7 West, S. B. B. & M., fourteen hundred feet East of the West line of said Section 2; thence running in a general Northeasterly direction to the base of said mountains, to a point where the division line between ranges six and seven, S. B. B. & M. intersects the South base of said mountains; thence following the meandering line of the South base of said mountains, being curved northerly for canyons and southerly for ridges, in a westerly direction to the place of beginning.

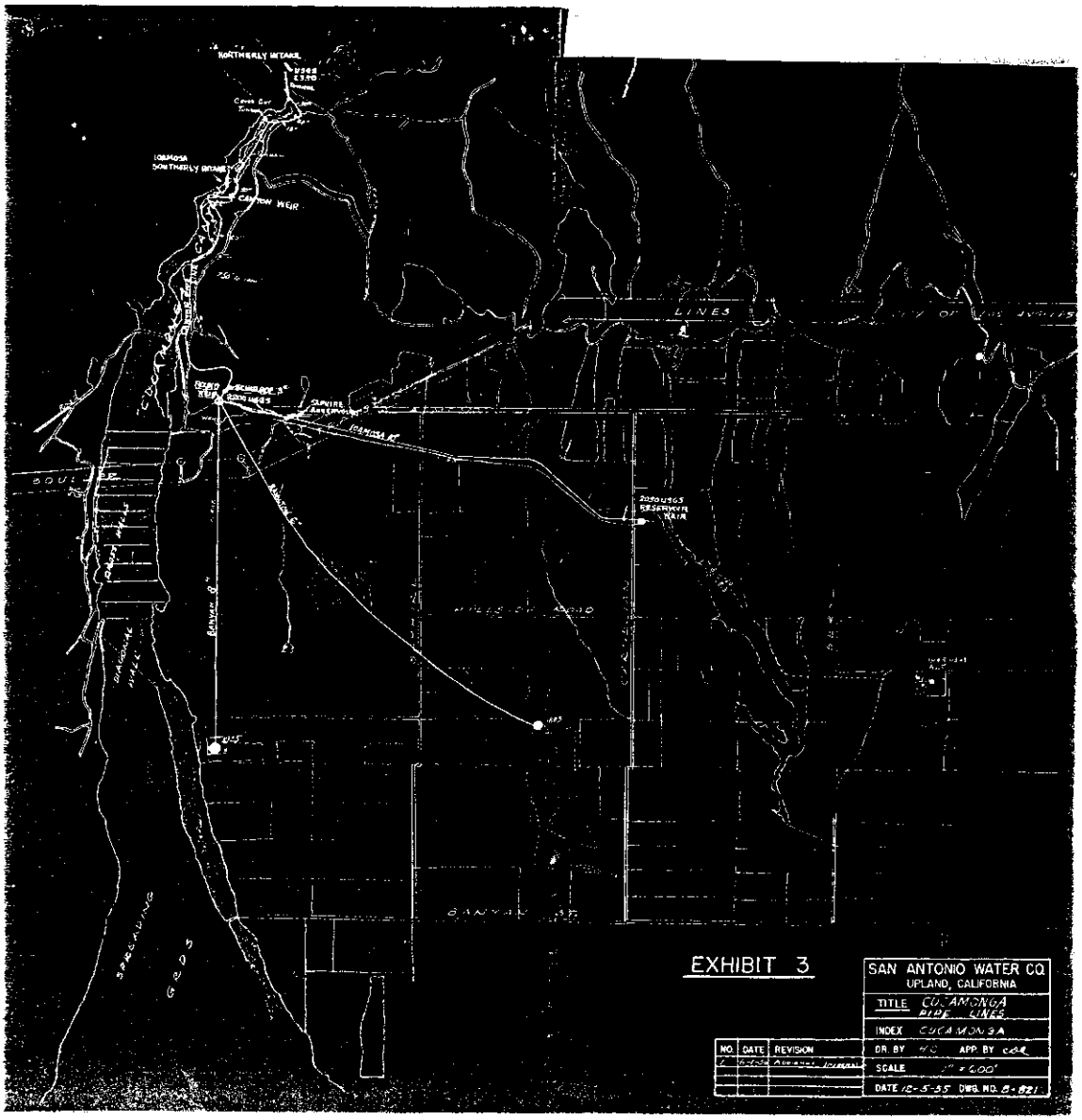
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SAN BERNARDINO, CALIFORNIA

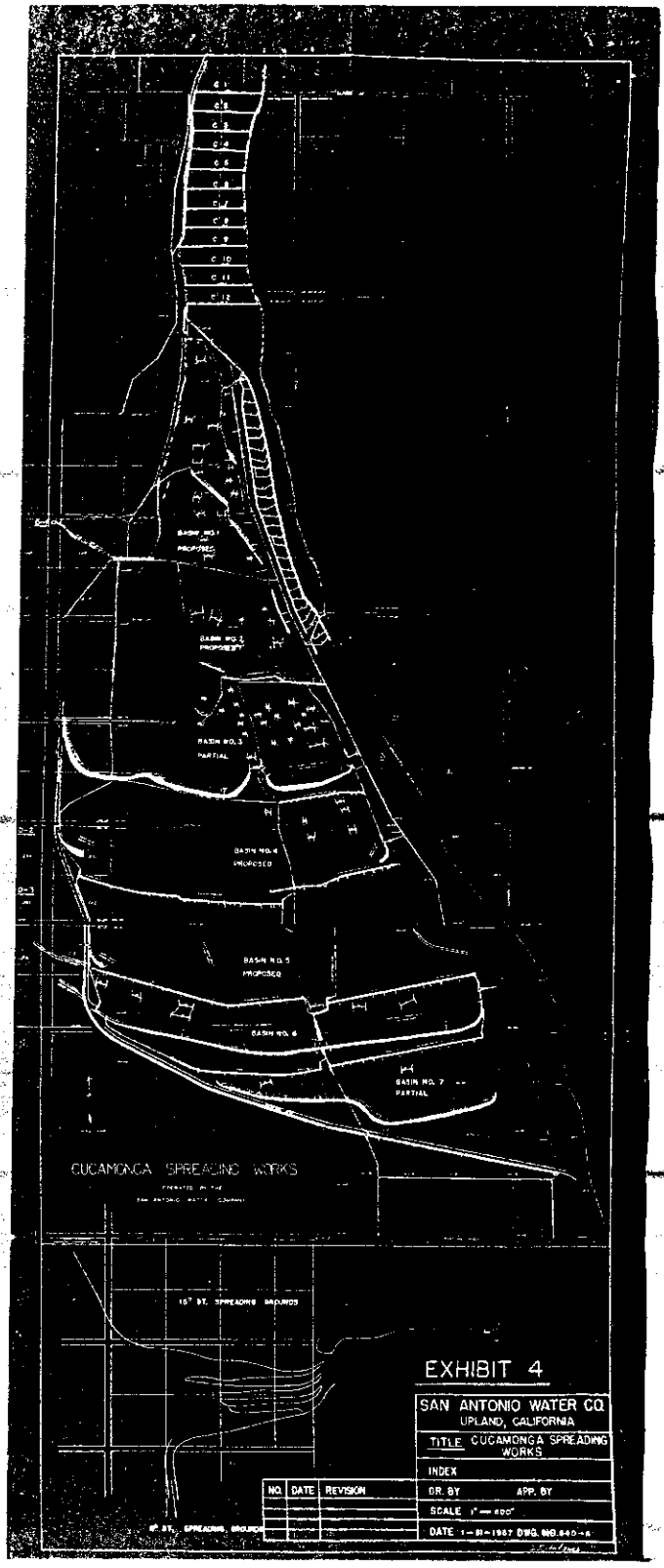
EXHIBIT 2

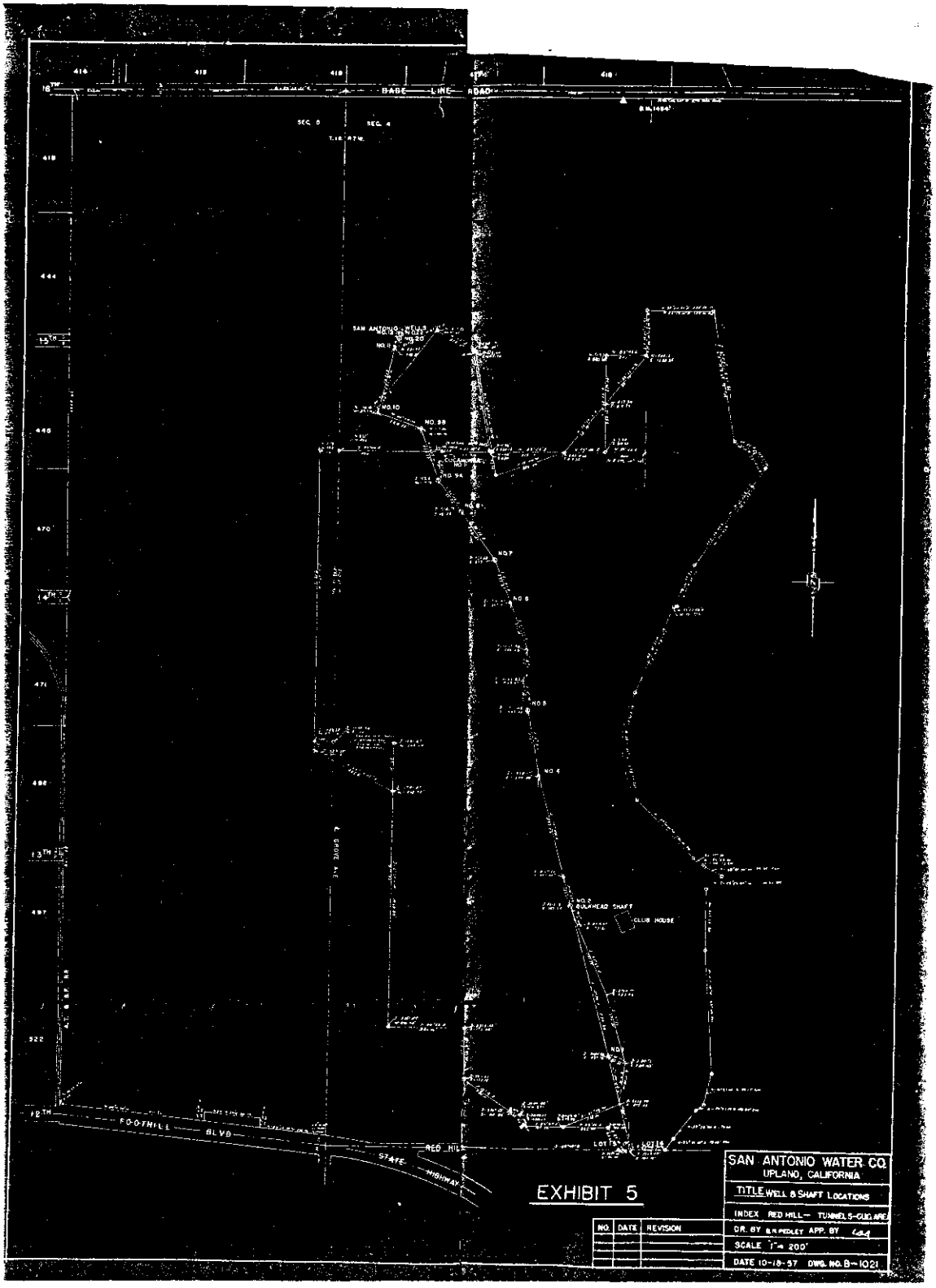
STIPULATED WATER

NAME	ACRE FEET PER YEAR
San Antonio Water Company	6500
Alta Loma Mutual Water Company	600
Armstrong Nurseries	200
Banyan Heights Water Company	625
Carnelian Water Company	600
Citrus Water Company	450
Cucamonga Water Company	6500
Cucamonga Development Company (included under Ioamosa)	None
Foothill Irrigation Company	1600
Hedges Well Company	732
Hellman Water Company (included under Ioamosa)	None
Hermosa Water Company	600
Ioamosa Water Company	920
Joya Mutual Water Company	390
Old Settlers Water Company	400
Rex Mutual Water Company	600
Charles Snyder	114
Sunset Water Company	400
Upland Water Company	750
Heirs and Devisees of Giovanni Vai, deceased	500
Hugh P. Crawford	120
Western Fruit Growers	120
Sapphire Mutual Water Company	None
G. N. Hamilton Ranch, a partnership	None
AGGREGATE STIPULATED WATER	22,721

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NORTHERLY INTAKE
LOWER SOUTHERLY INTAKE
CANYON WEIR
LINES
CITY OF LOS ANGELES
CUCAMONGA
BENCHMARK
CLAREMONT
IRONWOOD AVE.
BOULDER
RANCHO
DIAMOND
SPREADING
GROUNDS
DANIELS
EXHIBIT 3
SAN ANTONIO WATER CO
UPLAND, CALIFORNIA
TITLE CUCAMONGA BLUE LINES
INDEX CUCAMONGA-A
DR. BY HC APP. BY CAR
SCALE 1" = 400'
DATE 12-5-55 DWG. NO. B-821
NO. DATE REVISION


BASIN NO.1
PROPOSED
BASIN NO.2
PROPOSED
BASIN NO.3
PARTIAL
BASIN NO.4
PROPOSED
BASIN NO.5
PROPOSED
BASIN NO. 6
BASIN NO. 7
PARTIAL
CUCAMONGA SPREADING WORKS
15TH ST. SPREADING GROUNDS
EXHIBIT 4
SAN ANTONIO WATER CO.
UPLAND, CALIFORNIA
TITLE CUCAMONGA SPREADING WORKS
INDEX
DR. BY
APP. BY
SCALE 1" = 400'
DATE 1-31-1957 DWG. NO. 640-6
NO. DATE REVISION


BASE LINE ROAD
SEC. 5
SEC. 4
T.1S. R.7W.
SAN ANTONIO WELLS
NO. 11
NO. 10
NO. 9B
NO. 9A
NO. 7
NO. 6
NO. 5
NO. 4
NO. 3
NO. 2
NO. 1
SHAFT
CLUB HOUSE
FOOTHILL BLVD
RED HILL
STATE HIGHWAY
LOT 14
EXHIBIT 5
SAN ANTONIO WATER CO.
UPLAND, CALIFORNIA
TITLE WELL & SHAFT LOCATIONS
INDEX RED HILL — TUNNELS-GUELARE
DR. BY B.N. PEDLEY APP. BY
SCALE 1" = 200'
DATE 10-18-57 DWG. NO. B-1021
NO. DATE REVISION

WALKER, WRIGHT, TYLER & WARD
210 W. 7th Street, Suite 631
Los Angeles, 14, California,
TRinity 8936

Attorneys for Plaintiff

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF SAN BERNARDINO

SAN ANTONIO WATER COMPANY, a corporation,

Plaintiff,

vs.

FOOTHILL IRRIGATION COMPANY, a corporation; SUNSET WATER COMPANY, a corporation; IOAMOSA WATER COMPANY, a corporation; and OLD SETTLERS WATER COMPANY, a corporation; ALTA LOMA MUTUAL WATER COMPANY, a corporation; ARMSTRONG NURSERIES, a corporation; BANYAN HEIGHTS WATER COMPANY, a corporation; CARNELIAN WATER COMPANY, a corporation; CITRUS WATER COMPANY, a corporation; CUCAMONGA DEVELOPMENT COMPANY, a corporation; CUCAMONGA WATER COMPANY, a corporation; HEDGES WELL COMPANY, a corporation; HELLMAN WATER COMPANY, a corporation; HERMOSA WATER COMPANY, a corporation; JOYA MUTUAL WATER COMPANY, a corporation; REX MUTUAL WATER COMPANY, a corporation; SAPPHIRE MUTUAL WATER COMPANY, a corporation; CHARLES SNYDER; UPLAND WATER COMPANY, a corporation; HENRY G. BODKIN and BANK OF AMERICA NATIONAL TRUST AND SAVINGS ASSOCIATION, as Executors of the last will of Giovanni Vai, deceased; WESTERN FRUIT GROWERS, a corporation; HUGH P. CRAWFORD; G. N. HAMILTON RANCH, a partnership composed of Arthur Bridge, Helen Bridge, and Grace W. Burt; JOHN DOE ONE to THIRTY, inclusive, MARY ROE ONE to THIRTY inclusive, JOHN DOE COMPANY ONE TO TWENTY inclusive,

Defendants.

No.

STIPULATION REGARDING TRIAL AND JUDGMENT

IT IS HEREBY STIPULATED AND AGREED by and between plaintiff San Antonio Water Company and the undersigned defendants (said plaintiff and defendants being herein called "Stipulating parties")

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SAN BERNARDINO, CALIFORNIA

that:

FIRST: Each of the undersigned defendants hereby appears in the above entitled action. The allegations of the complaint on file in said action shall be deemed denied by the undersigned defendants, and they shall be and are deemed to have alleged in said action that they own such rights to the waters of Cucamonga Creek and of Cucamonga Basin (mentioned in said judgment) as may be supported by any evidence which may be introduced at the trial of said action.

SECOND: At any time after the filing of this stipulation said action may be tried as between the stipulating parties. Said trial may be held without notice if the undersigned counsel for the stipulating parties are present or represented at said trial, and in such case notice of said trial is hereby waived.

THIRD: The stipulating parties consent that a Decree in the form which precedes and is attached to this stipulation may be rendered and entered by the Court in said action, in the event the Court finds such judgment proper under the evidence which shall have been introduced.

FOURTH: The stipulating parties hereby waive the signing or filing of any Findings of Fact in said action in the event a decree in said form is to be rendered.

Dated: ~~November~~ April 25th, 1958.

Edgar [illegible] Notary Public ... My Commission Expires JANUARY 1, 1962

SAN ANTONIO WATER COMPANY

BY F. C. Buffington President

AND C. V. Adams Secretary

WALKER, WRIGHT, TYLER and WARD

BY Thomas S. Matthews

Attorneys for Plaintiff

FOOTHILL IRRIGATION COMPANY

BY Norman Gibson V. President

AND Frank N. Van Slyke Secretary

SURR & HELLYER
ATTORNEYS AT LAW
SAN BERNARDINO, CALIFORNIA

IOAMOSA WATER COMPANY

BY _____ President

AND _____ Secretary

OLD SETTLERS WATER COMPANY

BY _____ President

AND _____ Secretary

SUNSET WATER COMPANY

BY _____ President

AND _____ Secretary

CUCAMONGA WATER COMPANY

BY _____ President

AND _____ Secretary

ALTA LOMA MUTUAL WATER COMPANY

BY _____ President

AND _____ Secretary

ARMSTRONG NURSERIES Inc

BY _____ President

AND _____ Secretary

BANYAN HEIGHTS WATER COMPANY

BY _____ President

AND _____ Secretary

CARNELIAN WATER COMPANY

BY _____ President

AND _____ Secretary

CITRUS WATER COMPANY

BY _____ President

AND _____ Secretary

SURR & HELLYER
ATTORNEYS AT LAW
SAN BERNARDINO, CALIFORNIA

HEDGES WELL COMPANY,

BY _____ President

AND _____ Secretary

HELLMAN WATER COMPANY

BY _____ President

AND _____ Secretary

HERMOSA WATER COMPANY

BY _____ President

AND _____ Secretary

JOYA MUTUAL WATER COMPANY

BY _____ President

AND _____ Secretary

UPLAND WATER COMPANY

BY _____ President

AND _____ Secretary

WESTERN FRUIT GROWERS

BY _____ President

AND _____ Secretary

CUCAMONGA DEVELOPMENT COMPANY

BY _____ President

AND _____ Secretary

SAPPHIRE MUTUAL WATER COMPANY

BY _____ President

AND _____ Secretary

_____
(Charles Snyder)

_____
(Hugh P. Crawford)

BURR & HELLYER
ATTORNEYS AT LAW
SAN BERNARDINO, CALIFORNIA

HENRY G. BODKIN and
BANK OF AMERICA NATIONAL TRUST AND
SAVINGS ASSOCIATION,
As Executors of the Last Will of
Giovanni Vai, deceased;

BY _____
ASSISTANT TRUST OFFICER

AND _____
(Henry G. Bodkin)

G. N. HAMILTON RANCH, a partnership,

BY _____
(Arthur Bridge)

BY _____
(Helen Bridge)

BY _____
(Grace W. Burt)

Partners

REX MUTUAL WATER COMPANY

BY _____ President

AND _____ Secretary

SURR & HELLYER

BY _____
Attorneys for Ioamosa, Cucamonga, Banyan Heights, Joya Mutual, Rex Mutual, and Sapphire Water Companies, and for Hedges Well Company and Cucamonga Development Company.

SURR & HELLYER
ATTORNEYS AT LAW
SAN BERNARDINO, CALIFORNIA

APPENDIX M

MWD IMPORTED WATER RELIABILITY

SWP Reliability

This discussion provides details of the major actions Metropolitan is undertaking to improve SWP reliability.

Delta Conveyance Project – Planning for a Delta conveyance project to address declining populations of sensitive fish species and the increasingly restrictive permit conditions began decades ago. In the mid-1990s, a consortium of federal, state, and local agencies including Metropolitan entered the Bay-Delta Accord, which included hundreds of millions of dollars for ecosystem restoration in the Delta and its salmon-bearing tributaries. In 2000, a similar consortium completed the CALFED analysis of a program of ecosystem restoration and improvements to Delta conveyance and issued a Record of Decision that included dual conveyance as an alternative. In April 2006, the CALFED Program issued a 10-year Action Plan to refocus the program based on new scientific and policy information. The scientific information indicated that the current physical configuration of the Delta did not lead to a sustainable condition due to increasing risk of seismic events and sea level rise; and that population levels for Delta pelagic (open water) organisms were at record low levels and were appearing to continue to decline.

The 10-year Action Plan also indicated that several water users were considering the development of a habitat conservation plan for the Delta. This effort was the initiation of the Bay Delta Conservation Plan (BDCP), which began with the support and participation of water suppliers, including Metropolitan. One of the conservation measures included new points of diversion on the Sacramento River in the north Delta connected by a canal or two tunnels to Clifton Court Forebay (part of the SWP) in the south Delta.

In September 2006, Governor Schwarzenegger signed Executive Order S-17-06, which launched the Delta Vision process by establishing a Blue-Ribbon Task Force, a cabinet-level Delta Vision Committee, Delta Science Advisors, and a Stakeholder Coordination Group. The executive order charged the Blue-Ribbon Task Force with developing both a long-term vision for a sustainable Delta and a plan to implement that vision. The Delta Vision Committee recommended, among other things, creation of a state plan for the Delta and Suisun Marsh aimed at landscape-scale ecosystem restoration and a new Delta conveyance infrastructure to create a dual system of conveyance. On February 28, 2008, Governor Schwarzenegger, in a letter to state Senators Perata, Machado, and Steinberg, stated his intention to direct DWR to proceed with preparation of environmental review and permitting activities for the BDCP.

In 2009, in light of the Delta Vision reports and recommendations, the Legislature enacted the Sacramento-San Joaquin Delta Reform Act of 2009, which established the coequal goals for the Delta of ecosystem restoration and restoration of reliable SWP and CVP supplies, created the Delta Stewardship Council, and charged the new agency with development of a Delta Plan to further the coequal goals in a manner that protects and enhances the Delta as an evolving place. The Delta Reform Act and the first Delta Plan, adopted in 2013, called for incorporation of the BDCP into the Delta Plan if it met state and federal requirements for a habitat conservation plan and natural communities' conservation plan.

The BDCP planning process continued under Governor Brown, but in light of comments on the BDCP, DWR began analyzing three new sub-alternatives to the BDCP that involved new conveyance independent of any landscape-scale habitat restoration called the California WaterFix. At the same time, Governor Brown initiated California EcoRestore, which was aimed at restoration of 30,000 acres of fish habitat in the Delta. In July 2017, DWR approved California WaterFix. Metropolitan's Board authorized participation in California WaterFix in October 2017, and again in April and July of 2018.

In his State of the State address delivered February 12, 2019, Governor Newsom announced that he did not "support WaterFix as currently configured," but does "support a single tunnel." On April 29, 2019, Governor Newsom issued Executive Order N-10-19, directing several agencies to (among other things) "inventory and assess… [c]urrent planning to modernize conveyance through the Bay Delta with a new single tunnel project." The Governor's announcement and Executive Order led to DWR's withdrawal of all approvals and environmental compliance documentation associated with California WaterFix. The CEQA process identified in this notice for the proposed Delta Conveyance Project will, as appropriate, utilize relevant information from the past environmental planning process for California WaterFix, but the proposed project will undergo a new stand-alone environmental analysis leading to issuance of a new EIR.

On January 15, 2020, DWR issued a Notice of Preparation of an Environmental Impact Report for the DCP, stating:

> *DWR's underlying, or fundamental, purpose in proposing the project is to develop new diversion and conveyance facilities in the Delta necessary to restore and protect the reliability of State Water Project (SWP) water deliveries and, potentially, Central Valley Project (CVP) water deliveries south of the Delta, consistent with the State's Water Resilience Portfolio.*
>
> *The above stated purpose, in turn, gives rise to several project objectives. In proposing to make physical improvements to the SWP Delta conveyance system, the project objectives are:*
>
> - *To address anticipated rising sea levels and other reasonably foreseeable consequences of climate change and extreme weather events.*
> - *To minimize the potential for public health and safety impacts from reduced quantity and quality of SWP water deliveries, and potentially CVP water deliveries, south of the Delta resulting from a major earthquake that causes breaching of Delta levees and the inundation of brackish water into the areas in which the existing SWP and CVP pumping plants operate in the southern Delta.*
> - *To protect the ability of the SWP, and potentially the CVP, to deliver water when hydrologic conditions result in the availability of sufficient amounts, consistent with the requirements of state and federal law, including the California and federal Endangered Species Acts and Delta Reform Act, as well as the terms and conditions of water delivery contracts and other existing applicable agreements.*
> - *To provide operational flexibility to improve aquatic conditions in the Delta and better manage risks of further regulatory constraints on project operations*

The proposed project would construct and operate new conveyance facilities in the Delta that would add to the existing SWP infrastructure. New intake facilities as points of diversion would be located in the north Delta along the Sacramento River between Freeport and the confluence with Sutter Slough. The new conveyance facilities would include a single main tunnel to convey water from the new intakes to the existing Banks Pumping Plant and potentially the federal Jones Pumping Plant in the south Delta. The new facilities would provide an alternate location for diversion of water from the Delta and would be operated in coordination with the existing south Delta pumping facilities. The new north Delta facilities would be sized to convey up to 6,000 cfs of water from the Sacramento River to the SWP facilities in the south Delta. DWR would operate the dual conveyance system in compliance with all state and federal regulatory requirements and would not reduce DWR's current ability to meet standards in the Delta to protect biological resources and water quality for beneficial uses.

Contract Amendments – Metropolitan and other State Water Contractors have undertaken negotiations with DWR to extend their State Water Contracts. In June 2014, DWR and the State Water Contractors reached an Agreement in Principle (the "Agreement in Principle") on an amendment to the State Water Contracts to extend the contracts and to make certain changes related to financial management of the SWP in the future. DWR and 25 of the State Water Contractors, including Metropolitan, have signed the Agreement in Principle. Under the Agreement in Principle, the term of the State Water Contract for each Contractor that signs an amendment would be extended until December 31, 2085. The Agreement in Principle served as the "proposed project" for purposes of environmental review under CEQA. DWR issued a Notice of Availability of the Draft Environmental Impact Report ("EIR") for the proposed project on August 17, 2016. DWR released the Final EIR on November 16, 2018 and certified the final EIR and issued a Notice of Determination on December 11, 2018. Concurrently, Metropolitan considered the certified final EIR and approved the water supply contract extension amendment at its December 11, 2018 Board meeting. That same day, DWR filed a lawsuit seeking to validate the contract extension. In January of 2019, two groups of plaintiffs filed lawsuits challenging DWR's Final EIR and approval of the Contract Extension under CEQA, the Delta Reform Act, and public trust doctrine. Those cases have been related to the validation action and are pending before the same judge. To date, 21 of the 29 State Water Contractors have executed the amendment, achieving the DWR established threshold needed for it to be fully executed. DWR is awaiting a decision from the trial court on the validation litigation described above before moving forward with execution of the amendments with individual State Water Contractors.

In a process separate from the State Water Contract extension amendment described above, Metropolitan and other State Water Contractors undertook public negotiations with DWR to amend their State Water Contracts to clarify how costs would be allocated for the California WaterFix, as well as to clarify the criteria applicable to certain water management tools including single and multi-year water transfers and exchanges between State Water Contractors. DWR and the State Water Contractors reached an Agreement in Principle in 2018 (the "2018 AIP"), and DWR issued a Draft EIR. On April 29, 2019, Governor Newsom issued the executive order directing State agencies to develop a comprehensive statewide strategy to build a climate-resilient water system that included consideration of a single-tunnel Delta conveyance facility instead of the approved California WaterFix project. DWR removed the WaterFix cost provisions from the 2018 AIP and, on February 28, 2020, recirculated the Draft EIR for only the 2018 AIP's water management provisions. DWR certified a Final EIR for the water management tools AIP in August 2020 and finalized contract language in October 2020. Since then, all but three of the SWP contractors have approved and signed the amendments, including Metropolitan, which approved the amendments on February 9, 2021. As a result, the amendments became effective on February 28, 2021. The water management provisions allow for greater flexibility for transfers and exchanges among those public agencies with State Water Contracts. Specifically, it would confirm existing practices for exchanges, allow more flexibility for non-permanent water transfers, and allow for the transfer and exchange of certain portions of Article 56 carry over water.

In light of the shift from California WaterFix to the Delta Conveyance Project, Metropolitan and other State Water Contractors embarked on a third public process to further negotiate proposed amendments related to cost allocation for a potential new Delta Conveyance Project. In March of 2020, DWR and the State Water Contractors reached an Agreement in Principle ("Delta Conveyance AIP") for the allocation of costs and benefits for a Delta Conveyance project based on an allocation of proportionate shares. The Delta Conveyance AIP provides a mechanism that would allow for the costs related to any Delta Conveyance project to be allocated for and collected by DWR. The Delta Conveyance AIP also provides for the allocation of benefits for any Delta Conveyance project. Additionally, the Delta Conveyance AIP includes a white paper that

describes how DWR would account for and administer any Delta Conveyance project benefits and costs if a project were implemented today. Contract language is under development, and any contract approval would follow DWR completing the Delta Conveyance Project environmental review.

COA Addendum – DWR operates the SWP in coordination with the federal CVP, which is operated by USBR. Since 1986, the coordinated operations have been undertaken pursuant to a Coordinated Operations Agreement for the Central Valley Project and State Water Project (the "COA"). The COA defines how the State and federal water projects share water quality and environmental flow obligations imposed by regulatory agencies. The agreement calls for periodic review to determine whether updates are needed in light of changed conditions. After completing a joint review process, DWR and USBR agreed to amend the COA to reflect water quality regulations, Biological Opinions, and hydrology updated since the 1986 agreement was signed. On December 13, 2018, DWR and USBR executed an Addendum to the COA (the "COA Addendum"). Through the COA Addendum, DWR will adjust current SWP operations to modify pumping operations, as well as project storage withdrawals to meet in-basin uses, pursuant to revised calculations based on water year types. The COA Addendum will shift responsibilities for meeting obligations between the CVP and the SWP, resulting in a shift of approximately 120 TAF in long-term average annual exports from the SWP to the CVP. In executing the COA Addendum, DWR found the agreement to be exempt from environmental review under the California Environmental Quality Act ("CEQA") as an ongoing project and that the adjustments in operations are within the original scope of the project. On January 16, 2019, commercial fishing groups and a tribe ("petitioners") filed a lawsuit against DWR alleging that entering into the COA Addendum violated CEQA, the Delta Reform Act, and the public trust doctrine. The parties are in the process of completing the administrative record, which will form the evidentiary basis at trial, which has not been set at this time.

Ecosystem Restoration – The main objective under the EcoRestore Program is the restoration of at least 30,000 acres of Delta habitat, with the near-term goal of making significant strides toward that objective by 2020. These restoration programs include projects and actions that comply with pre-existing regulatory requirements designed to improve the overall health of the Delta. Other priority restoration projects would also be identified by the Sacramento-San Joaquin Delta Conservancy and other agencies and local governments. Funding is provided through multiple sources, including various local and federal partners, state bonds, and other state-mandated funds. SWP/CVP contractors have provided funds as part of existing regulatory obligations imposed on the SWP and CVP.

Delta Science Initiatives – Metropolitan's Bay-Delta science program supports water supply reliability and ecosystem restoration by protecting the Bay-Delta environment, driving better management decisions, and fostering effective regulations. Metropolitan is conducting a science program to ensure that regulations effectively protect aquatic species while ensuring a reliable water supply. The key elements of the science program include: (1) staff with scientific expertise to design, manage and participate in scientific investigations addressing Metropolitan's priorities; (2) funding science studies through direct funding, collaborations, staff in-kind contributions, and by pursuing external grant funding sources to leverage Metropolitan's science investments; (3) collaborations with external organizations to conduct science studies, including the State Water Contractors, Collaborative Science and Adaptive Management Program (CSAMP), Interagency Ecological Program agencies, Delta Stewardship Council Delta Science Program, and university scientists; and (4) participation in the Bay-Delta science community through communication of science study findings, participation in science conferences and publishing results of scientific studies in peer reviewed journals.

Metropolitan's Bay-Delta science efforts focus on three priority areas of water operations to protect Delta fish, Delta stressors and habitat needs of listed fish species.

- Water Operations to Protect Delta Fish. A priority focus for the science program is to develop a better understanding of the effect of water project operations on the health, abundance, and distribution of listed fish species, including Delta smelt, longfin smelt and Chinook salmon. The science program includes investigation of the mechanisms behind flow-abundance relationships observed in analysis of fish survey data for Delta smelt and longfin smelt, factors that affect adult Delta smelt, salmon and steelhead entrainment risk at the CVP and SWP export facilities, potential bias in fish survey data, and development of effective methods to study Delta smelt without collecting or harming the fish.
- Delta Stressors. Multiple stressors in the Bay-Delta ecosystem affect the health, abundance, and distribution of listed fish species; however, we have limited understanding of the impacts of various stressors and their specific role in the decline of listed species. The science program includes investigation into key stressors to develop information that can support development of effective management actions. These studies include investigation into predation impacts on salmon, toxic contaminant effects on Delta smelt and juvenile salmon, and the effects of nutrients on the food web.
- Habitat Needs for Delta Fish. Compared to the historical Delta, the modern Delta is highly altered and has a small fraction of tidal marsh habitat remaining and greatly reduced levels of primary production. Food and habitat limitation have been identified as important stressors for listed species. The science program includes investigation of salmon habitat needs, pilot studies to enhance the food web, longfin smelt habitat studies, pilot projects to benefit Delta smelt, monitoring the effectiveness of habitat improvement actions, and evaluation of land use and habitat opportunities on Metropolitan's Delta Island properties.

SWP Terminal Storage

Metropolitan has contractual rights to 65 TAF of flexible storage at Lake Perris (East Branch terminal reservoir) and 154 TAF of flexible storage at Castaic Lake (West Branch terminal reservoir). This storage provides Metropolitan with additional options for managing SWP deliveries to maximize yield from the project. Over multiple dry years, it can provide Metropolitan with 44 TAF of additional supply. In a single dry year like 1977, it can provide up to 219 TAF of additional supply to Southern California.

Yuba Dry Year Water Purchase Program

In December 2007, Metropolitan entered into an agreement with DWR providing for Metropolitan's participation in the Yuba Dry Year Water Purchase Program between Yuba Water Agency and DWR. This program provides for transfers of water from the Yuba Water Agency during dry years through 2025.

Desert Water Agency/Coachella Valley WD SWP Table A Transfer

Under the transfer agreement, Metropolitan transferred 100 TAF of its SWP Table A contractual amount to Desert Water Agency/CVWD (DWCV). Under the terms of the agreement, DWCV pays all SWP charges for this water, including capital costs associated with capacity in the California Aqueduct to transport this water to Perris Reservoir, as well as the associated variable costs. The amount of water actually delivered in any given year depends on that year's SWP allocation. Water is delivered through the existing exchange agreements between Metropolitan and DWCV, under which Metropolitan delivers Colorado River supplies to DWVC equal to the SWP supplies delivered to Metropolitan. While Metropolitan transferred 100 TAF of its Table A amount, it retained other rights, including interruptible water service; its full carryover amounts in

San Luis Reservoir; its full use of flexible storage in Castaic and Perris Reservoirs; and any rate management credits associated with the 100 TAF.

Desert Water Agency/Coachella Valley WD Exchange and Advance Delivery Program

Under this program, Metropolitan delivers Colorado River water to the Desert Water Agency and CVWD in advance of the exchange for their SWP Contract Table A allocations. In addition to their Table A supplies, Desert Water Agency and CVWD may take delivery of other SWP supplies available to SWP Contractors. By delivering enough water in advance to cover Metropolitan's future exchange obligations, Metropolitan is able to receive Desert Water Agency and CVWD's available SWP supplies without having to deliver an equivalent amount of Colorado River water. This program allows Metropolitan to maximize delivery of SWP water in wet years by enabling delivery of Colorado River supplies to storage in the Advance Delivery Program instead of to the service area. These Table A deliveries are incorporated into the estimate of SWP Deliveries under Current Programs shown in Table 3-2.

Desert Water Agency/Coachella Valley WD Other SWP Deliveries

Since 2008, Metropolitan has provided Desert Water Agency and CVWD written consent to take delivery of non-SWP supplies separately acquired by each agency from the SWP facilities. These deliveries include water acquired from the Yuba Dry Year Water Purchase Program, the Multi-Year Water Pool, the 2009 Drought Water Bank, and long-term water supplies purchased by CVWD from Rosedale Rio-Bravo Water Storage District. Metropolitan has also consented to:

- 10 TAF of exchange deliveries to CVWD for non-SWP water acquired from the San Joaquin Valley from 2008 through 2010,
- 36 TAF of exchange deliveries to Desert Water Agency for non-SWP water acquired from the San Joaquin Valley from 2008 through 2015, and
- 16.5 TAF of exchange deliveries to CVWD from groundwater storage of Kern River flood flows or SWP water delivered from Kern County Water Agency provided by Rosedale Rio Bravo Water Storage District from 2012 through 2035.

Effective in 2020, Metropolitan, Desert Water Agency and CVWD executed an amendment to the Advance Delivery Program and exchange of water. Among its provisions is the termination of Metropolitan's right to an annual option to call-back the 100,000 acre-feet Table A transfer. It also provides that Metropolitan will deliver Article 21 and non-SWP water supplies for Desert and CVWD to the extent that Metropolitan has available capacity. This agreement also includes an additional exchange of 15 TAF per year from 2020 to 2026. However, as the source of the exchange is water CVWD can call from the ID/MWD Conservation Program, which is Colorado River water, this exchange is discussed in more detail in the IID/MWD Conservation Program section.

Table 3-2 summarizes Metropolitan's SWP supply range for 2035. Appendix 3 provides a detailed discussion of the current SWP programs and programs that are under development.

Table 3-2
California Aqueduct
Program Capabilities
Year 2035
(acre-feet per year)

Hydrology	Five Year Drought (1988-1992)	Single Dry Year (1977)	Normal Year (1922-2017)
Current Programs			
MWD Table A [1]	499,000	122,000	1,108,000
DWCV Table A	51,000	12,000	113,000
San Luis Carryover [2]	57,000	283,000	283,000
Article 21 Supplies	0	0	20,000
Yuba River Accord Purchase	0	0	0
Subtotal of Current Programs	***607,000***	***417,000***	***1,524,000***
Programs Under Development			
Subtotal of Proposed Programs	***0***	***0***	***0***
Maximum Supply Capability	**607,000**	**417,000**	**1,524,000**

[1] Includes Port Hueneme lease.
[2] Includes DWCV carryover.

SWP Water Quality

Metropolitan requires a safe drinking water supply from the Bay-Delta to meet current and future regulatory requirements for public health protection. Finding cost-effective ways to reduce total organic carbon (TOC), bromide concentrations, pathogenic microbes, and other unknown contaminants from the Bay-Delta water supply is one of Metropolitan's top priorities. Metropolitan also requires a SWP supply that is consistently low in salinity - Total Dissolved Solids (TDS) - so it can blend SWP water with higher-salinity Colorado River water to achieve salinity goals for its member agencies. In addition, Metropolitan needs consistently low-salinity SWP water to increase in-basin water recycling and groundwater management programs. These programs require that blended water supplied to the member agencies meets the TDS goal adopted by Metropolitan's Board, which specifies a salinity objective of 500 mg/L for blended imported water.

Metropolitan is actively involved in DWR's Municipal Water Quality Investigations (MWQI) Program. The highly variable quality of SWP water influences the operation of Metropolitan's system and its water treatment process. Increasingly restrictive State and Federal drinking water standards, concerns over emerging contaminants such as personal care products and pharmaceuticals, algal taste and odors, and Delta ecosystem fisheries issues are critical variables. DWR's MWQI Program strives to monitor, protect, and improve drinking water quality of Delta water deliveries to the urban State Water Contractors and other users of Delta water. The program focuses on issues related to drinking water quality through regular water quality monitoring, special field and laboratory studies, the use of forecasting tools such as computer models and data management systems, and reporting. While the program has developed extensive monitoring in the Delta including real-time monitoring, increased monitoring along the California Aqueduct is the next major step.

Levee modifications at Franks Tract and other source control actions may significantly reduce ocean salinity concentrations in Delta water, which would benefit Delta water users and export interests alike. Franks Tract is an island located in the central Delta that was actively farmed until levee breaches in 1936 and 1938. Since 1938, the tract has remained a flooded island, and its levees remain in disrepair. Tidal flows in the Delta entrap saline ocean water in the flooded tract, resulting in degraded water quality for both in-Delta and export users. Computer modeling analyses by Metropolitan, DWR, and the US Geological Survey indicate that reducing this salinity intrusion by partially closing existing levee breach openings and/or building radial gate flow control structures will significantly reduce TDS and bromide [2] concentrations in water from the Delta during the summer and fall months and in drought years.

In 2016, the California Department of Fish and Wildlife (CDFW), as part of the 2016 Delta Smelt Resiliency Strategy, began a process of working with the local community, local agencies, and interested stakeholders in developing a habitat enhancement plan for Franks Tract called the Franks Tract Restoration Feasibility Study. The objective was to assess the feasibility of restoring components of the historic tidal marsh form and function to create habitat suitable for Delta Smelt, reduce the extent of aquatic weeds, decrease predation on Delta Smelt and other native fishes by lowering habitat suitability for non-native species, modify hydrology to something more similar to historical conditions, improve food webs, and improve water quality in the interior Delta, which would benefit both in-Delta diverters and SWP and CVP supplies. In its current state of shallow open water, Franks Tract facilitates salinity intrusion into the mid-Delta as a result of tidal pumping through False River. Restoration designs focus on minimizing tidal pumping from False River. In 2018, CDFW determined that it is feasible to achieve the project objectives. In response to community concerns, in July 2019, CDFW, in cooperation with the Department of Parks and Recreation, launched a second round of planning that lasted from August 2019 through September 2020. Stakeholders, advisors, and the public chose the Central Landmass as the preferred design concept as documented in the Franks Tract Futures 2020 Reimagined report published in September 2020.

The state has adopted an "equivalent level of public health protection" (ELPH) program that targets water quality actions outside the Delta. The Bay-Delta Program is coordinating a feasibility study on water quality improvement in the California Aqueduct.

Metropolitan and the Friant Water Users Authority (FWUA) have entered into a partnership to investigate the potential of enhancing the quantity and affordability of the eastern San Joaquin Valley's water supply while improving Southern California's water quality. The FWUA and Metropolitan studied projects that benefited both regions. Using Proposition 13 funds, an existing canal belonging to the Arvin-Edison Water Storage District was enlarged, enabling greater volumes of water to be exchanged between their groundwater and the California Aqueduct.

SWP System Outage and Capacity Constraints

The California Aqueduct is experiencing reduction in flow capacity in certain areas due to ongoing land subsidence. Subsidence has been observed in the San Joaquin Valley since the 1920s, and subsidence was included in the planning and design of the California Aqueduct. The DWR published a detailed study in 2017 describing the impacts of subsidence in the reduction of concrete liner freeboard and the ability to store water in certain pools, reducing operational flexibility and increasing power costs. Through 2016, no contracted deliveries had been curtailed due to subsidence, but DWR has a subsidence program aimed to proposed improvements to the California Aqueduct and restore capacity, as well as work with the Groundwater

[2] The importance of managing bromides is discussed in the Water Quality chapter.

Sustainability Agencies that cover the extension of the California Aqueduct to minimize future subsidence.

In 2015, Metropolitan, DWR, and the Los Angeles Department of Water and Power formed the Seismic Resilience Water Supply Task Force (SRWSTF). The goal of the SRWSTF is to collaborate on studies and mitigation measures aimed at improving the reliability of imported water supplies to Southern California. The SRWSTF aims to identify options to accelerate initial repairs acting as one agency and establish consensus on regional priorities for aqueduct repairs.

Because of the risk of a prolonged shutdown of the SWP caused by seismic or hydrologic events either within the Delta or along the California Aqueduct, Metropolitan has acted to ensure that Southern California has adequate emergency storage. Diamond Valley Lake (DVL) and SWP terminal reservoir storage, combined with member-agency emergency storage, are jointly capable of providing the region with a six-month supply of water if combined with a temporary 25 percent reduction in demand. Metropolitan engineering studies indicate this would provide sufficient time to repair the SWP and resume delivery.

Following the February 2017 Oroville spillways incident, DWR initiated a Comprehensive Needs Assessment (CNA). The CNA is led by DWR and technically reviewed by an Independent Review Board (IRB) composed of dam safety experts. The CNA is not investigating the causes of the February 2017 incident, but rather aims to identify actions to be taken by DWR to improve the resilience of the Oroville Dam complex. The report was released in November 2020 with a determination that Oroville is safe to operate, and no urgent repairs are needed. Several risk-reduction projects are currently being implemented and more projects are anticipated into the near future.

DWR is also investing to reduce seismic and hydrologic risk of aging SWP infrastructure critical in Southern California. A major retrofit to Perris Dam (Riverside County) was completed in April 2018, and other two major projects to improve seismic stability are currently under development with planned construction to start in a few years. Pyramid Dam and Castaic Dam (Los Angeles County) are also being studied with the planned assessment work estimated to be completed by 2022 and complete modernization work to take about 10 years to complete.

Achievements to Date

SWP Reliability

Metropolitan's Long-Term Action Plan

Besides the short- and mid-term actions described earlier in Section 1.4, Metropolitan's adopted Delta action plan in June 2007 includes a long-term Delta Plan. The long-term action plan recognizes the need for a global, comprehensive approach to the fundamental issues and conflicts in the Delta to result in a truly sustainable Delta. A piecemeal approach cannot satisfy the many stakeholders that have an interest in the Delta and will fail; there must be a holistic approach that deals with all issues simultaneously. In dealing with the basic issues of the Delta, solutions must address the physical changes required, as well as the financing and governance. There are three basic elements that must be addressed: Delta ecosystem restoration, water supply conveyance, and flood control protection and storage development. In addition, the state needs to establish governance structures and financing approaches to implement and manage the three identified elements.

Governor's Delta Vision Process

Through this enduring Delta crisis, the Legislature and the Governor initiated in 2006 a process to develop a new long-term vision for the Delta. SB 1574 (Kuehl/2006) required a cabinet

committee to present recommendations for a Delta strategic vision. The governor created a Delta Vision Blue-Ribbon Task Force to advise the Cabinet Committee. The Task Force produced an October 2008 Strategic Plan, which the Cabinet Committee largely adopted and submitted, with its recommendations, to the Legislature on January 3, 2009. Metropolitan, as a stakeholder in the process, provided input to the Task Force.

The 2009 Delta Legislation

After delivery of the Delta Vision recommendations, the Legislature held informational hearings from Delta experts, Task Force members, and the Schwarzenegger Administration, as well as the public at large, and engaged in vigorous water policy discussions. Following the informational hearings, several legislators began developing detailed legislation which culminated in pre-print proposals being issued in early August of 2009 for public review and discussion over the summer recess. The Assembly Water, Parks and Wildlife Committee and the Senate Natural Resources and Water Committee then held joint informational hearings on the pre-print proposals and received extensive public comment. Thereafter, legislative leadership appointed a conference committee, which convened and held additional public hearings, with further legislator discussions on key issues. That work continued into the 7th Extraordinary Session, which was called by the governor specifically to address the pending Delta and water issues, and culminated in the signing of a historic package of bills. One of the keystones of that package was SB X7-1, which reformed Delta policy and governance. Specifically, SB X7-1:

- Established a new legal framework for Delta management, emphasizing the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" as foundation for state decisions as to Delta management.
- Reconstituted and redefined the role of the Delta Protection Commission (DPC) to narrow membership to focus on local representation and to expand the DPC's role in economic sustainability.
- Created a new Sacramento-San Joaquin Delta Conservancy (Conservancy) to support efforts that advance environmental protection and the economic well-being of Delta residents.
- Created the Delta Stewardship Council (Council) as an independent state agency to guide actions in the Delta which furthers the coequal goals of Delta restoration and water supply reliability.
- Repealed the CALFED Bay-Delta Authority Act and transfers existing staff, contracts, etc. to the Council.
- Created the Delta Independent Science Board (Science Board) and Delta Science Program.
- Required the State Water Resources Control Board (SWRCB) to develop by August 12, 2010, new flow criteria for the Delta ecosystem necessary to protect public trust resources.
- Required the Department of Fish and Game (DFG), now the Department of Fish and Wildlife (DFW), by December 31, 2010, to develop and recommend to the SWRCB flow criteria and quantifiable biological objectives for aquatic and terrestrial species.
- Created a Delta Watermaster as the enforcement officer for the SWRCB Division of Water Rights in the Delta.
- Required the Council to develop, adopt, and commence implementation of the "Delta Plan" by January 1, 2012, with a report to the Legislature by March 31, 2012.

- Required the DPC to develop a proposal to protect, enhance, and sustain the unique cultural, historical, recreational, agricultural, and economic values of the Delta as an evolving place.
- Required the Delta Plan to further the coequal goals of Delta ecosystem restoration and a reliable water supply.
- Required the Delta Plan to promote statewide water conservation, water use efficiency, and sustainable use of water, as well as improvements to water conveyance/storage and operation of both to achieve the coequal goals.
- Required the Delta Plan to attempt to reduce risks to people, property, and state interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments.
- Announced a statewide policy to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.
- Required the Council to include the Bay Delta Conservation Plan (BDCP) in the Delta Plan and made the BDCP eligible for state funding if:
    - The BDCP complies with Natural Community Conservation Planning Act (NCCPA) and is approved as a Habitat Conservation Plan under the Federal ESA.
    - The BDCP complies with the California Environmental Quality Act and includes a full range of alternatives, including a reasonable range of flow criteria, rates of diversion, and other operational criteria.
    - DWR consults with the Council and Science Board during development of the BDCP.
    - DFW approves the BDCP as a Natural Community Conservation Plan and determines that it meets the requirements for incorporation into the Delta Plan.

SWP Water Quality

The most significant achievement for SWP water quality has been continued definition and advancement of the Delta Improvement Package. Most notably, the Franks Tract studies identified cost-effective ways to achieve significant improvements in the quality of Delta export water.

SWP System Reliability

The completion and filling of DVL marked the most important achievement with respect to protecting Southern California against an SWP system outage. Water deliveries to the reservoir commenced in November 1999, and the lake was filled by early 2003. The lake can hold up to 810 TAF which provides Southern California with emergency water supply, as well as carryover and regulatory storage. As of December 2020, the DVL storage is at 704 TAF.

Inland Feeder

The Inland Feeder is a 44-mile-long conveyance system that connects the SWP to DVL and the CRA. The Inland Feeder provides greater flexibility in managing Metropolitan's major water supplies and allows greater amounts of SWP water to be accepted during wet seasons for storage

in DVL. In addition, the Inland Feeder increases the conveyance capacity from the East Branch of the SWP by up to 1,000 cubic feet per second, allowing the East Branch to operate up to its full capacity. The project also improves the quality of the Southland's drinking water by allowing more uniform blending of lower salinity water from the SWP with Colorado River supplies, which have a higher mineral content. Construction of the Inland Feeder was completed in September 2009.

Inland Feeder-Lakeview Pipeline Intertie

The Inland Feeder-Lakeview Pipeline Intertie connects the two conveyance pipelines at the PC-1 control structure on the Inland Feeder. The project allows for delivery of water from Diamond Valley Lake to the Mills Water Treatment Plant. Completed in 2016, the project was a direct response to the extreme drought period in 2014, which saw a 5 percent allocation of Metropolitan's SWP supplies. The intertie enables the Mills Plant to withstand an extended interruption of supplies from the California Aqueduct East Branch. The intertie also provides delivery flexibility to handle any required repairs by DWR to the Santa Ana Valley Pipeline north segment.

APPENDIX N

CUCAMONGA VALLEY WATER DISTRICT'S HAZARD MITIGATION PLAN

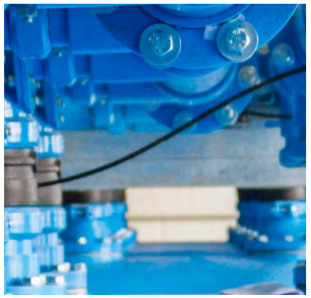
October 9, 2019 | Hazard Mitigation Plan

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Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))
A: See **Credits** below.

Q&A | ELEMENT A: PLANNING PROCESS | A1c.

Q: Does the plan identify who represented each jurisdiction? (At a minimum, it must identify the jurisdiction represented and the person's position or title and agency within the jurisdiction.) (Requirement §201.6(c)(1))
A: See **Credits** below.

Credits

Special Thanks

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Acknowledgements

Cucamonga Valley Water District – Board of Directors

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- ✓ James V. Curatalo, Jr., President
- ✓ Luis Cetina, Vice President
- ✓ Oscar Gonzalez, Director
- ✓ Randall James Reed, Director
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Mapping

The maps in this plan were provided by the Cucamonga Valley Water District, San Bernardino County, Federal Emergency Management Agency (FEMA), or were acquired from public Internet sources. Care was taken in the creation of the maps contained in this Plan, however they are

provided "as is". The Cucamonga Valley Water District (CVWD) cannot accept any responsibility for any errors, omissions or positional accuracy, and therefore, there are no warranties that accompany these products (the maps). Although information from land surveys may have been used in the creation of these products, in no way does this product represent or constitute a land survey. Users are cautioned to field verify information on this product before making any decisions.

Mandated Content

In an effort to assist the readers and reviewers of this document, the jurisdiction has inserted "markers" emphasizing mandated content as identified in the Disaster Mitigation Act of 2000 (Public Law – 390). Following is a sample marker:

EXAMPLE

Q&A | ELEMENT A: PLANNING PROCESS | A1
Q: Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))
A:

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Q&A | ELEMENT A: PLANNING PROCESS | A1b.
Q: Does the plan list the jurisdiction(s) participating in the plan that are seeking approval? (Requirement §201.6(c)(1))
A: See **Introduction** below.

Introduction

The Hazard Mitigation Plan (Mitigation Plan) was prepared in response to Disaster Mitigation Act of 2000 (DMA 2000). DMA 2000 (also known as Public Law 106-390) requires state and local governments to prepare mitigation plans to document their mitigation planning process, and identify hazards, potential losses, mitigation needs, goals, and strategies. This type of planning supplements the Cucamonga Valley Water District's comprehensive land use planning and emergency management planning programs. The District developed its first Hazard Mitigation Plan which was approved by FEMA and adopted by the Board of Directors in 2005. This is an update to that Plan.

DMA 2000 was designed to establish a national program for pre-disaster mitigation, streamline disaster relief at the federal and state levels, and control federal disaster assistance costs. Congress believed these requirements would produce the following benefits:

- ✓ Reduce loss of life and property, human suffering, economic disruption, and disaster costs.
- ✓ Prioritize hazard mitigation at the local level with increased emphasis on planning and public involvement, assessing risks, implementing loss reduction measures, and ensuring critical facilities/services survive a disaster.
- ✓ Promote education and economic incentives to form community-based partnerships and leverage non-federal resources to commit to and implement long-term hazard mitigation activities.

The following FEMA definitions are used throughout this plan (Source: FEMA, 2002, *Getting Started, Building Support for Mitigation Planning*, FEMA 386-1):

Hazard Mitigation – "Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards".

Planning – "The act or process of making or carrying out plans; specifically, the establishment of goals, policies, and procedures for a social or economic unit."

Planning Approach

The four-step planning approach outlined in the FEMA publication, *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies* (FEMA 386-3) was used to develop this plan:

- ✓ **Develop mitigation goals and objectives -** The risk assessment (hazard characteristics, inventory, and findings), along with municipal policy documents, were utilized to develop mitigation goals and objectives.

- ✓ **Identify and prioritize mitigation actions -** Based on the risk assessment, goals and objectives, existing literature/resources, and input from participating entities, mitigation activities were identified for each hazard.
- ✓ **Prepare implementation strategy -** Generally, high priority activities are recommended for implementation first. However, based on community needs and goals, project costs, and available funding, some medium or low priority activities may be implemented before some high priority items.
- ✓ **Document mitigation planning process -** The mitigation planning process is documented throughout this plan.

Hazard Land Use Policy in California

Planning for hazards should be an integral element of any local government's land use planning program. All California cities and counties have General Plans (also known as Comprehensive Plans) and the implementing ordinances that are required to comply with the statewide land use planning regulations. The CVWD is a public corporation formed under the provisions of Division 12 of the State Water Code. CVWD is a special district, which is an independent unit of local government serving the needs of the community. As a special district, the only "land use" controls pertain to properties owned by CVWD. Even in those cases, the underlying land use regulations are prepared and enforced by the controlling jurisdiction (e.g. CVWD Headquarters is located in Rancho Cucamonga).

The continuing challenge faced by local officials and state government is to keep the network of local plans effective in responding to the changing conditions and needs of California's diverse communities, particularly in light of the very active seismic region in which we live.

Planning for hazards requires a thorough understanding of the various hazards facing the CVWD service area. Additionally, it's important to take an inventory of the structures and contents of various holdings of CVWD. These inventories should include the compendium of hazards facing CVWD, the built environment at risk, the personal property that may be damaged by hazard events and most of all, the people who live in the shadow of these hazards. Such an analysis is found in this hazard mitigation plan.

State and Federal Partners in Hazard Mitigation

As mentioned above, all mitigation is local and the primary responsibility for development and implementation of risk reduction strategies and policies lies with each local jurisdiction. Local jurisdictions, however, are not alone. Partners and resources exist at the regional, state and federal levels. Numerous California state agencies have a role in hazards and hazard mitigation.

Some of the key agencies include:

- ✓ California Office of Emergency Services (Cal OES) is responsible for disaster mitigation, preparedness, response, recovery, and the administration of federal funds after a major disaster declaration;
- ✓ Southern California Earthquake Center (SCEC) gathers information about earthquakes, integrates information on earthquake phenomena, and communicates this to end-users and the general public to increase earthquake awareness, reduce economic losses, and save lives.

- ✓ California Department of Forestry and Fire Protection (CAL FIRE) is responsible for all aspects of wildland fire protection on private and state properties, and administers forest practices regulations, including landslide mitigation, on non-federal lands.
- ✓ California Division of Mines and Geology (DMG) is responsible for geologic hazard characterization, public education, and the development of partnerships aimed at reducing risk.
- ✓ California Division of Water Resources (DWR) plans, designs, constructs, operates, and maintains the State Water Project; regulates dams; provides flood protection and assists in emergency management. It also educates the public, serves local water needs by providing technical assistance
- ✓ FEMA provides hazard mitigation guidance, resource materials, and educational materials to support implementation of the capitalized DMA 2000.
- ✓ United States Census Bureau (USCB) provides demographic data on the populations affected by natural disasters.
- ✓ United States Department of Agriculture (USDA) provides data on matters pertaining to land management.

Stakeholders

A Hazard Mitigation Planning Team (Planning Team) consisting of staff from Cucamonga Valley Water District worked with Emergency Planning Consultants to create the Plan. **The Planning Team served as the primary stakeholders throughout the planning process.** Upon completion, the Planning Team provided input on the First Draft Plan.

As required by DMA 2000, the Planning Team involved "the public" in a variety of forums. The general public and external agencies were invited to contribute to the mitigation plan during the plan writing phase. An overview to the hazard mitigation planning process was provided to the secondary stakeholders (external agencies and general public) on December 12, 2018 at a 2-hour presentation. See Attachments for sign-in sheet and invitations.

The Second Draft Plan was announced and posted on the District's website from February 4-19, 2019 to invite the secondary stakeholders of the Plan's availability during the plan writing phase.

The Planning Team, general public, and external agencies all served as stakeholders with opportunity to contribute to the plan during the Plan Writing Phase of the planning process.

Hazard Mitigation Legislation

Hazard Mitigation Grant Program

In 1974, Congress enacted the Robert T. Stafford Disaster Relief and Emergency Act, commonly referred to as the Stafford Act. In 1988, Congress established the Hazard Mitigation Grant Program (HMGP) via Section 404 of the Stafford Act. Regulations regarding HMGP implementation based on the DMA 2000 were initially changed by an Interim Final Rule (44 CFR Part 206, Subpart N) published in the Federal Register on February 26, 2002. A second Interim Final Rule was issued on October 1, 2002.

The HMGP helps states and local governments implement long-term hazard mitigation measures for natural hazards by providing federal funding following a federal disaster declaration. Eligible

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applicants include state and local agencies, Indian tribes or other tribal organizations, and certain nonprofit organizations.

In California, the HMGP is administered by Cal OES. Examples of typical HMGP projects include:

- ✓ Property acquisition and relocation projects
- ✓ Structural retrofitting to minimize damages from earthquake, flood, high wind, wildfire, or other natural hazards
- ✓ Elevation of flood-prone structures
- ✓ Vegetative management programs, such as:
  - o Brush control and maintenance
  - o Fuel break lines in shrubbery
  - o Fire-resistant vegetation in potential wildland fire areas

Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation Program (PDM) was authorized by §203 of the Stafford Act, 42 United States Code, as amended by §102 of the DMA 2000. Funding is provided through the National Pre-Disaster Mitigation Fund to help state and local governments (including tribal governments) implement cost-effective hazard mitigation activities that complement a comprehensive mitigation program.

In Fiscal Year 2018, two types of grants (planning and competitive) were offered under the PDM Program. Planning grants allocate funds to each state for Mitigation Plan development. Competitive grants distribute funds to states, local governments, and federally recognized Indian tribal governments via a competitive application process. FEMA reviews and ranks the submittals based on pre-determined criteria. The minimum eligibility requirements for competitive grants include participation in good standing in the National Flood Insurance Program (NFIP) and a FEMA-approved Mitigation Plan.
(Source: http://www.fema.gov/fima/pdm.shtm)

"Floods and hurricanes happen. The hazard itself is not the disaster **– it's our habits, it's how we build** and live in those **areas…that's the disaster."**

Craig Fugate, Former FEMA Administrator

Flood Mitigation Assistance Program

The Flood Mitigation Assistance (FMA) Program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101). Financial support is provided through the National Flood Insurance Fund to help states and communities implement measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP.

Three types of grants are available under FMA: planning, project, and technical assistance. Planning grants are available to states and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for project grants to implement measures to reduce flood losses. Technical assistance grants in the amount of 10 percent of the project grant are available to the state for program administration. Communities that receive planning and/or project grants must participate in the NFIP. Examples of eligible

projects include elevation, acquisition, and relocation of NFIP-insured structures. (Source: http://www.fema.gov/fima/fma.shtm)

Q&A | ELEMENT C. MITIGATION STRATEGY | C2

Q: Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))
A: See **NFIP Participation** below.

National Flood Insurance Program

Established in 1968, the NFIP provides federally-backed flood insurance to homeowners, renters, and businesses in communities that adopt and enforce floodplain management ordinances to reduce future flood damage. CVWD does not control land use so has no floodplain management ordinance" or a floodplain administrator. Furthermore, the CVWD service area and its facilities rely on infrastructure (roads, bridges, etc.) throughout an expansive area included in many Flood Insurance Rate Maps (FIRM) that show floodways, 100-year flood zones, and 500-year flood zones.

NFIP Participation

CVWD provides water service to cities of Rancho Cucamonga and portions of Upland, Ontario, Fontana, and certain unincorporated areas of the San Bernardino County. These jurisdictions all participate in NFIP.

The FEMA FIRM maps for the project area were last updated September 26, 2014, February 18, 2015, and September 2, 2016. According to the Federal Emergency Management Agency, the majority of the District is designated as Zone "X" by the National Flood Insurance Program. Zone X is an area determined to be outside the 500-year flood zone and protected by levee from 100-year flood. The Cucamonga Valley Water District project area contains the following flood zones: Zone A, AE, AH, AO, X, and D.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B4

Q: Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))
A: See **Repetitive Loss Properties** below.

Repetitive Loss Properties

Repetitive Loss Properties (RLPs) are most susceptible to flood damages; therefore, they have been the focus of flood hazard mitigation programs. Unlike a Countywide program, the Floodplain Management Plan (FMP) for repetitive loss properties involves highly diversified property profiles, drainage issues, and property owner's interest. It also requires public involvement processes unique to each RLP area. The objective of an FMP is to provide specific potential mitigation measures and activities to best address the problems and needs of communities with repetitive loss properties. A repetitive loss property is one for which two or more claims of $1,000 or more have been paid by the National Flood Insurance Program (NFIP) within any given ten-year period. According to FEMA resources, there are no Repetitive Loss Properties (RLPs) within the Cucamonga Valley Water District.

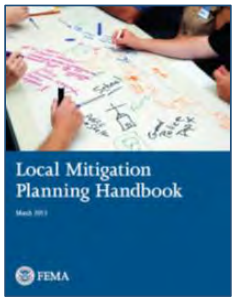
State and Federal Guidance in Hazard Mitigation

While local jurisdictions have primary responsibility for developing and implementing hazard mitigation strategies, they are not alone. Various state and federal partners and resources can help local agencies with mitigation planning.

The Mitigation Plan was prepared in accordance with the following regulations and guidance documents:



- ✓ DMA 2000 (Public Law 106-390, October 10, 2000)
- ✓ 44 CFR Parts 201 and 206, Mitigation Planning and Hazard Mitigation Grant Program, Interim Final Rule, October 1, 2002
- ✓ 44 CFR Parts 201 and 206, Mitigation Planning and Hazard Mitigation Grant Program, Interim Final Rule, February 26, 2002
- ✓ How-To Guide for Using HAZUS-MH for Risk Assessment, (FEMA 433), February 2004
- ✓ Mitigation Planning "How-to" Series (FEMA 386-1 through 9 available at: http://www.fema.gov/fima/planhowto.shtm)
- ✓ Getting Started: Building Support for Mitigation Planning (FEMA 386-1)
- ✓ Understanding Your Risks: Identifying Hazards and Estimating Losses (FEMA 386-2)
- ✓ Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies (FEMA 386-3)



- ✓ Bringing the Plan to Life: Implementing the Mitigation Plan (FEMA 386-4)
- ✓ Using Benefit-Cost Review in Mitigation Planning (FEMA 386-5)
- ✓ Integrating Historic Property and Cultural Resource Considerations into Mitigation Planning (FEMA 386-6)
- ✓ Integrating Manmade Hazards into Mitigation Planning (FEMA 386-7)
- ✓ Multi-Jurisdictional Mitigation Planning (FEMA 386-8)
- ✓ Using the Mitigation Plan to Prepare Successful Mitigation Projects (FEMA 386-9)
- ✓ State and Local Plan Interim Criteria Under the DMA 2000, July 11, 2002, FEMA
- ✓ Mitigation Planning Workshop for Local Governments-Instructor Guide, July 2002, FEMA
- ✓ Report on Costs and Benefits of Natural Hazard Mitigation, Document #294, FEMA
- ✓ LHMP Development Guide – Appendix A - Resource, Document, and Tool List for Local Mitigation Planning, December 2, 2003, Cal OES
- ✓ Local Mitigation Plan Review Guide (FEMA 2011)
- ✓ Local Mitigation Planning Handbook (FEMA 2013)

How is the Plan Organized?

The structure of the plan enables the reader to use a section of interest to them and allows the District to review and update sections when new data is available. The ease of incorporating new data into the plan will result in a Mitigation Plan that remains current and relevant. Following is a description of each section of the plan:

Introduction
Describes the background and purpose of developing a mitigation plan.

Planning Process

Describes the mitigation planning process including stakeholders and integration of existing data and plans.

District Profile

Summarizes the history, geography, demographics, and socioeconomics of the District service area.

Risk Assessment

This section provides information on hazard identification, vulnerability and risk associated with hazards in the District service area.

CVWD-Specific Hazard Analysis

Describes the hazards posing a significant threat to the District service area including:

Earthquake | Flooding | Wildfire | Windstorms

Drought | Terrorism | Climate Change

Each CVWD-Specific Hazard Analysis includes information on previous occurrences, local conditions, hazard assessment, and local impacts.

Mitigation Strategies

Documents the goals, community capabilities, and priority setting methods supporting the Plan. Also highlights the Mitigation Actions Matrix: 1) goals met; 2) identification, assignment, timing, and funding of mitigation activities; 3) benefit/cost/priorities; 4) plan implementation method; and 5) activity status.

Plan Maintenance

Establishes tools and guidelines for maintaining and implementing the Mitigation Plan.

Appendices

The plan appendices are designed to provide users of the Mitigation Plan with additional information to assist them in understanding the contents of the mitigation plan, and potential resources to assist them with implementation.

General Hazard Overviews

Generalized subject matter information discussing the science and background associated with the identified hazards.

Attachments

FEMA Letter of Approval
Board of Directors Staff Report
Board of Directors Resolution
Planning Team sign-in sheets, agendas, and minutes
General Public web postings and Notices
External Agency email invitation

Plan Adoption and Approval

As per DMA 2000 and supporting Federal regulations, the Mitigation Plan is required to be adopted by the CVWD Board of Directors and approved by FEMA. See the **Planning Process Section** for details.

Who Does the Mitigation Plan Affect?

This plan provides a framework for planning for the identified hazards. The resources and background information in the plan are applicable to the entire CVWD service area. **Map: Regional Location** shows the regional proximity of the District to its adjoining communities.

Map: Regional Location
(Source: Cucamonga Valley Water District)



Planning Process

Throughout the project, the District followed its traditional approach to developing policy documents which included preparation of a First Draft Plan for review by the Planning Team who served as the primary stakeholders. As the First Draft Plan was being reviewed by the Planning Team, a Stakeholders Workshop was held to share information about hazards and mitigation planning with stakeholder agencies. Next, following necessary updates, a Second Draft Plan was shared with the general public and external agencies (special districts and adjoining jurisdictions) still during the plan writing phase. The general public and external agencies served as the secondary stakeholders. Next, the comments gathered from the secondary stakeholders were incorporated into a Third Draft Plan which was submitted to Cal OES and FEMA for review and "Approval Pending Adoption".

Next, the Planning Team completed amendments to the Plan to reflect mandated input by Cal OES and FEMA. The Final Draft Plan was posted according to noticing protocols in the District. Any comments gathered during the posting period were included in the staff report to the Board of Directors. Following adoption by the Board, proof of adoption was forwarded to FEMA along with a request for final approval. The planning process described above is portrayed below in a timeline:

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))
A: See **Plan Methodology** and **Planning Phases Timeline** below.

Q&A | ELEMENT A: PLANNING PROCESS | A3

Q: Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))
A: See **Planning Phases Timeline** below.

Figure: Planning Phases Timeline

PLANNING PHASES TIMELINE				
Plan Writing Phase (First & Second Draft Plan)	Plan Review Phase (Third & Final Draft Plan)	Plan Adoption Phase (Final Draft Plan)	Plan Approval Phase (Final Plan)	Plan Implementation Phase
• Planning Team input – research, meetings, writing, review of First Draft Plan • Incorporate input from the Planning Team into Second Draft Plan • Conduct Stakeholder Workshop for external agencies providing hazard overview and information about the HMP planning process. • Invited public and external agencies to provide input and contribute to the Second Draft Plan. • Incorporate input into the Third Draft Plan	• Third Draft Plan sent to Cal OES and FEMA for Approval Pending Adoption • Address any mandated revisions identified by Cal OES and FEMA into Final Draft Plan	• Incorporate input into the Board of Directors staff report. • Post public notice of Board of Directors meeting • Final Draft Plan distributed to Board of Directors in advance of meeting • Present Final Draft Plan to the Board of Directors for Adoption	• Submit proof of Board adoption to FEMA along with request for final approval • Incorporate FEMA Final Letter of Approval into the Final Plan	• Conduct annual Planning Team meetings • Integrate mitigation action items into budget and other funding and strategic documents • Implement Mitigation Action Items

Plan Methodology

The Planning Team discussed knowledge of natural hazards and past historical events, as well as ordinances, and recent planning decisions.

The rest of this section describes the mitigation planning process including 1) Planning Team involvement, 2) extended Planning Team support (department heads), 3) public and external agency involvement; and 4) integration of existing data and plans.

Planning Team Involvement

The Planning Team consisted of representatives from Cucamonga Valley Water District departments related to hazard mitigation processes. The Planning Team served as the primary stakeholders throughout the planning process. The general public (e.g. customers, businesses, etc.) along with external agencies served as secondary stakeholders in the planning process. The Planning Team was responsible for the following tasks:

- ✓ Confirming planning goals
- ✓ Prepare timeline for plan update
- ✓ Ensure plan meets DMA 2000 requirements
- ✓ Organize and solicit involvement of public and external agencies
- ✓ Analyze existing data and reports
- ✓ Update hazard information
- ✓ Review HAZUS loss projection estimates
- ✓ Create mitigation action items
- ✓ Participate in Planning Team meetings and Board of Directors public meeting
- ✓ Provide existing resources including maps and data

As mentioned earlier, the planning effort began back in 2012. Since that time, the makeup of the Planning Team has changed considerably. The current Planning Team is listed in the **Credits**.

Following is a brief description of each of the Planning Team meetings:

Meeting #1: June 26, 2018 – *Kick-Off Meeting*

The Kick-Off meeting with the Planning Team was made up of key departmental representatives. The purpose of the Kick-Off Meeting was to review project expectations and timeline, gather pertinent documents, role and membership of Planning Team, review updates to DMA 2000 regulations, discuss availability of mapping resources, and discuss opportunities for public involvement. The meeting included a presentation on the purpose and history of DMA 2000 and the major disasters impacting the United States. Also, reviewed hazard information pertaining to CVWD since the writing of the existing draft Mitigation Plan.

Meeting #2: August 1, 2018 – *Developing Mitigation Actions Matrix*

The Planning Team viewed a PowerPoint on examples of mitigation actions – those activities aimed at minimizing or eliminating threats associated with hazards. The Mitigation Actions Matrix from the existing draft HMP was reviewed along with sample action items from other HMPs.

Meeting #3: October 2, 2018 – *Developing Mitigation Actions Matrix*
Continue to develop mitigation action items. Contributed considerable time and research to gathering all on-going and budgeted items relating to hazard mitigation activities. The Planning Team was very committed to seizing the opportunity to create one document where all mitigation efforts could be documented.

Meeting #4: December 12, 2018 – *Review First Draft Plan*
In advance of the meeting, EPC sent the First Draft Plan to the Planning Team Chair for distribution to the Team. EPC facilitated a discussion with the Team for any questions, corrections, or comments in need of attention.

Q&A | ELEMENT A: PLANNING PROCESS | A1a.

Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))
A: See **Table: Planning Level of Participation** and **Table: Planning Team Timeline** below.

Table: Planning Team Level of Participation

Name	Research and Writing of Plan	Planning Team Meeting 6/26/2018	Planning Team Meeting 8/1/108	Planning Team Meeting 10/2/2018	Planning Team Meeting 12/12/2018	Planning Team Comment on First Draft Plan	Gather input from public, and external agencies of the Second Draft Plan	Third Draft Plan to Cal OES/FEMA for Approval Pending Adoption	Present Final Draft Plan to Board at Public Meeting for Plan Adoption	Submit Proof of Adoption to FEMA	Incorporate FEMA Approval into Final Plan
Cucamonga Valley Water District											
Nikolas Baykal		X	X	X	X	X					
Tuan Truong		X	X			X					
JR Roberts		X	X		X	X					
Robert Koczko		X	X	X		X					
Kristeen Farlow		X	X	X	X	X					
Agnes Boros		X	X	X	X	X					
Chad Brantley		X	X			X					
Rossana Ammari, Chair		X	X		X	X	X	X			
Roberta M. Perez			X	X	X	X					

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Name	Research and Writing of Plan	Planning Team Meeting 6/26/2018	Planning Team Meeting 8/1/108	Planning Team Meeting 10/2/2018	Planning Team Meeting 12/12/2018	Planning Team Comment on First Draft Plan	Gather input from public, and external agencies of the Second Draft Plan	Third Draft Plan to Cal OES/FEMA for Approval Pending Adoption	Present Final Draft Plan to Board at Public Meeting for Plan Adoption	Submit Proof of Adoption to FEMA	Incorporate FEMA Approval into Final Plan
Russel Silva			X	X		X					
Eduardo Espinoza				X		X					
Robbie Victorino						X					
Erin Morales					X	X					
Mike Maestas					X	X					
Emergency Planning Consultants											
Carolyn J. Harshman	X	X	X	X	X		X	X			

Table: Planning Team Timeline

	June 2018	July	August	September	October	November	December	January 2019	February	March	April	May	June	July
Research and Writing of First Draft Plan	X													
Planning Team Meetings	X		X		X		X							
Planning Team Review and Comment on First Draft Plan							X							
Conduct Stakeholder Workshop for external agencies							X							
Input from public and external agencies on the Second Draft Plan									X					
Third Draft Plan to Cal OES/FEMA for Approval Pending Adoption											X			
Receive FEMA Approval Pending Adoption														
Post Final Draft Plan for review by public and external agencies along with posting of Board of Directors meeting.														
Present Final Draft Plan to Board of Directors at Public Meeting														
Submit Proof of Adoption to FEMA														
Incorporate FEMA Approval into Final Plan														

Q&A | ELEMENT A: PLANNING PROCESS | A2a.

Q: Does the plan document an opportunity for neighboring communities, local, and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, as well as other interested parties to be involved in the planning process? (Requirement §201.6(b)(2))
A: See **Secondary Stakeholder Involvement** below.

Q&A | ELEMENT A: PLANNING PROCESS | A2b.

Q: Does the plan document an opportunity for neighboring communities, local, and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, as well as other interested parties to be involved in the planning process? (Requirement §201.6(b)(2))
A: See **Secondary Stakeholder Involvement** below.

Q&A | ELEMENT A: PLANNING PROCESS | A3

Q: Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))
A: See **Secondary Stakeholder Involvement** below.

Secondary Stakeholder Involvement

In addition to the Planning Team, the secondary stakeholders also provided information, expertise, and other resources during plan writing phase. The secondary stakeholders included: general public (customers) and external agencies (special districts, and adjoining jurisdictions).

Customers were informed of the HMP update planning process through the District's website and The Pipeline Newsletter. In addition to announcing the upcoming availability of the Second Draft Plan, customers were encouraged to implement hazard mitigation techniques in their own homes and businesses. On November 8, 2018, the District's website included posting of mitigation flyers for earthquake, flooding, wildfire, and FEMA Mitigation Fact Sheet (See Attachments: Homeowner Mitigation Flyers). Additionally, posting notices, hard copies of the Second Draft Plan, and input forms were provided to public libraries in Fontana, Ontario, and Rancho Cucamonga.

External agencies were mailed an invitation to attend the December 12, 2018 Community Partner Meeting. In addition, they were invited via email to provide input to the Second Draft Plan with an electronic link to the District's website. See Attachments for the letter template mailed along with solicitation for input.

Following is the list of External Agencies invited to attend the Community Partner Meeting and encouraged to provide input to the Second Draft Plan.

Figure: External Agencies Invited to Community Partner Meeting

External Agency	First Name	Last Name	Position Title
City of Rancho Cucamonga	Lori	Sassoon	Deputy City Manager/Administrative Services
City of Rancho Cucamonga	Elisa	Cox	Deputy City Manager/Civic & Cultural Services
City of Rancho Cucamonga	Ivan	Rojer	Fire Chief
City of Rancho Cucamonga	Donny	Mahoney	Chief of Police
City of Rancho Cucamonga	Jennifer	Camacho-Curtis	Communications Coordinator
City of Upland	Jeannette	Vagnozzi	City Manager
County of San Bernardino, First District	Robert	Lovingood	County Supervisor
County of San Bernardino, Third District	James	Ramos	County Supervisor
County of San Bernardino, Fourth District	Curt	Hagman	County Supervisor
County of San Bernardino, Fifth District	Josie	Gonzales	County Supervisor
County of San Bernardino, Second District	Janice	Rutherford	County Supervisor
County of San Bernardino, Second District	Phil	Paule	Chief of Staff
County of San Bernardino, Second District	Mark	Taylor	Deputy Chief of Staff
County of San Bernardino, Second District	Scott	Vanhorne	Communications Director
Cucamonga School District	Janet	Temkin	Superintendent
Etiwanda School District	Shawn	Judson	Superintendent
Fontana Water Company	Josh	Swift	General Manager
Fontana Water Company	Seth	Zielke	Water Resource Manager
Inland Empire Utilities Agency	Michael	Camacho	Vice President
Inland Empire Utilities Agency	Paul	Hofer	Director
Inland Empire Utilities Agency	Steve	Elie	President
Inland Empire Utilities Agency	Jasmin A.	Hall	Secretary/Treasurer
Inland Empire Utilities Agency	Kati	Parker	Director
Inland Empire Utilities Agency	Halla	Razak	General Manager
Inland Empire Utilities Agency	Chris	Berch	Executive Manager of Engineering/Assistant General Manager
Inland Empire Utilities Agency	Kathy	Besser	Executive Manager of External Affairs
Inland Empire Utilities Agency	Andrea	Carruthers	External Affairs Specialist
Inland Empire Utilities Agency	Randy	Lee	Executive Manager of Operations/Assistant General Manager
Inland Valley Business Alliance	Norm	Mackenzie	President/CEO

External Agency	First Name	Last Name	Position Title
Inland Valley Daily Bulletin	Beau	Yarbrough	Rancho Cucamonga
Jurupa Community Services District	Alison	Loukeh	Community Affairs Supervisor
Lewis Group of Companies	Randall	Lewis	Executive Vice President
Lewis Group of Companies	Richard	Lewis	President
Lewis Group of Companies	David	Linden	Vice President, Director of Asset Management
Local Agency Formation Commission	Samuel	Martinez	Executive Officer
Milk Producers Council	Kevin	Abernathy	General Manager
Rancho Cucamonga Chamber of Commerce	Ernie	Braunwalder	Immediate Past President Chair
Rancho Cucamonga Chamber of Commerce	Ruby	Huey	President/Chair
Rancho Cucamonga Chamber of Commerce	Derek	Woolf	President Chair-Elect
Rancho Cucamonga Chamber of Commerce	Dr. Henry	Shannon	Vice Chair Public & Legislative Affairs
San Antonio Water Company	Brian	Lee	General Manager
Three Valleys Municipal Water District	Bob	Kuhn	President
Water Resources Institute	Suzie	Earp	Collections Manager/Water Historian
Water Resources Institute	Steven	Keough	Admin. Support Manager/Business Manager
Water Resources Institute	Julie	Lappin	Program Manager
Water Resources Institute	Boykin	Witherspoon III	Director of Programs
Alta Loma Riding Club	Joe	Cowan	President
Nestle/ Arrowhead	Larry	Lawrence	Natural Resource Manager
Victoria Gardens	Christine	Pham	Senior General Manager
Rancho Cucamonga Library	Julie	Sowles	Director
Frito Lay	Kanan	Hawk	Superintendent
Chaffey Joint Union High School District	Mat	Holton	Superintendent
Alta Loma School District	James	Moore	Superintendent
Central School District	Donna	Libutti	Superintendent
Chaffey College	Dr. Henry D.	Shannon	President

No input was received from any Customers or External Agencies.

Q&A | ELEMENT C. MITIGATION STRATEGY | C1a.

Q: Does the plan document each jurisdiction's existing authorities, policies, programs and resources? (Requirement §201.6(c)(3))
A: See **Capability Assessment – Existing Processes and Programs** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C1b.

Q: Does the plan document each jurisdiction's ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))c
A: See **Capability Assessment – Existing Processes and Programs** below.

Capability Assessment – Existing Processes and Programs

The District will incorporate mitigation planning as an integral component of daily operations. This will be accomplished by the Planning Team members working with their respective departments to integrate mitigation strategies into existing local agencies, public policies, funding sources, individuals, and other resources that can support hazard mitigation activities in District. The hazard mitigation actions build off of the existing success of these resources and leverage their capabilities to support improved resiliency in the project area. The capabilities assessment looked at the following types of resources:

- Personnel resources: District staff and volunteers, and staff and volunteers at other agencies.
- Plan resource: Advisory or enforceable plans adopted by the City or other agencies.
- Policy resources: Policies adopted and implemented by the City or other agencies.
- Technical resource: Data and tools available to the District

Table: Capability Assessment

Resource Type	Resource Name	Description and Capacity to Support Mitigation
Personnel	Executive Department - General Manager / CEO	The General Manager/CEO is the liaison to the Board of Directors and oversees the day to day operations of the District. The General Manager/CEO provides leadership and initiates strategic planning to implement the goals and the vision of the Board of Directors. The Foundational Principles provide guidance in establishing long-term organizational goals, and the General Manager/CEO utilizes the talent and skills of the entire staff to fulfill the organizational objectives. The General Manager/CEO also serves as President of the Fontana Union Water Company, a mutual water company managed by the District, and is the President of the Frontier Project Foundation, a non-profit corporation that seeks grant funding to conduct educational outreach programs. The General Manager/CEO is appointed by the Board to oversee the daily operations of the District. The General Manager/CEO will be instrumental in supporting the development, maintenance, and implementation of the Hazard Mitigation Plan, including the mitigation actions. Support will include providing funding and staff.

Personnel	Department of Administrative Services - Human Resources & Risk Management Division	Human Resources (HR) is responsible for ensuring that the District initiates and facilitates strategies for building a workforce which supports and enhances the organizational objectives and values. In addition to workforce development, the division is responsible for overseeing employee benefits, classification and compensation, policies and procedures, employee relations, administrative support, and employee development. Risk Management promotes and provides a safe and secure work environment for employees. The risk management program includes employee safety and training programs, workers compensation, emergency management and disaster preparedness, loss prevention, and general auto and property liability insurance for the District. Identified as coordinating agency for several mitigation actions that relate to staff training may be implemented through the Human Resources & Risk Management Division.
Personnel	Communications & Outreach Division	Communications & Outreach oversee the strategic communications, community outreach, water conservation outreach, special events, school education programs, and media relations for the District. A number of communication methods are used to disseminate information to internal and external customers and strengthen the CVWD brand within the community and throughout the water industry. These include the customer newsletter the Pipeline, website management, social media outreach, community workshops and tours, community marketing, videos and commercials, and signage on vehicles and billboards. Each of these elements plays a critical role in promoting the District's strategic vision, mission, and values. Mitigation actions related to the private construction of new structures or retrofits or improvements to existing structures may be supported with public education and other efforts of the Communications & Outreach Division. Identified as coordinating agency for several mitigation action items.
Personnel	Information Technology Division	Information Technology (IT) provides comprehensive technology planning, development, integration, operation, maintenance, and support to all areas of the District to maximize efficiency. The division's primary responsibilities include day-to-day network center operation and the provision of a safe and secure network environment for centralized data libraries and equipment. Extended responsibilities include access control systems, audiovisual systems, data storage, database systems, disaster recovery, mobile devices, network intrusion prevention, printers, scanners, multifunction copiers, servers, workstations, software development, software implementation, telecommunications, telephone system, video surveillance security systems, WI-FI, and Internet. Identified as coordinating agency for several mitigation action items.

Personnel	Engineering – Administration Division	This department and its staff. With the support of the AGM, the Director of Engineering Services oversees the management of capital improvement projects, water resource management, the District's Master Plans for water, sewer, recycled water, and water supplies, and all engineering and planning work. The AGM and Director actively participate in regional water and wastewater planning committees. The AGM also oversees the Operations Department and therefore allocates his efforts evenly between the Engineering and the Operations Departments, respectively. The Engineering-Administration Division will actively support numerous mitigation action items that identify the Engineering Department as the coordinating agency. This support will come in the form of funding and staffing.
Personnel	Engineering - Water Resource Division	This division falls primarily under the purview of the AGM and Director of Engineering Services with the general support of department staff. The division conducts water supply analysis and makes projections of future water supply needs based on estimates of development activities and other factors; develops and recommends short- and long-term plans and strategies for meeting expected demand. This division helps develop and coordinate a variety of water conservation programs and activities, including but not limited to, use of recycled water, groundwater basin management, maximizing the efficiency of groundwater recharge facilities and similar efforts, and planning and conducting research projects associated with water resources and water conservation. Maintains and runs the District's water and sewer hydraulic models in InfoWater/InfoSewer for the purposes of planning and design. The Engineering – Water Resources Division is identified as the coordinating agency for several mitigation action items.
Personnel	Engineering - Design Division	This division prioritizes and establishes schedules and methods for the design and construction of District capital improvement projects. This division monitors and oversees engineering design activities, including those prepared by consultants; prepares or reviews engineering plans, cost estimates, labor proposals, agreements, public works contracts, and project specifications. This division implements construction management methods to manage contractors that are building the District's capital improvements projects in the field. The Engineering -Design & Construction Division is identified as the coordinating agency for several mitigation action items.
Personnel	Engineering - Geographic Information Systems Division	This division is responsible for coordination and participation in database management for both the Geographic Information System (GIS) and AutoCAD applications. This division updates and maintains GIS and AutoCAD databases for water, recycled water, and wastewater facilities from construction drawings to as-built information; performs data capturing and conversion, data entry, and graphic editing activities; develops user friendly file management systems and completes geographic data analyses. This division utilizes professional Global Positioning System (GPS) equipment to collect geographical information

		in the field; locates District assets, resolves accuracy issues using GPS and integrates GPS data into GIS database. GIS viewing application provides accurate, accessible, and functional data to both the desktop and mobile devices within the District. GIS also functions as a helpful reporting tool and has asset management capabilities. Although the division is not specifically identified in the mitigation actions, the staff will be involved in implementing many of the mitigation action items.
Personnel	Engineering - Development Division	This division enforces and gains compliance of applicable District, local, regional, state and federal rules and best practices related to water, sewer and recycled water from residential, commercial and industrial developers. This is done by an application and plan check process for all new development projects and tenant improvements of existing developments. The Engineering - Development Division is identified as the coordinating agency for several mitigation action items.
Personnel	Engineering - Inspection Division	This division conducts construction inspections of water, recycled water, and sewer systems for a variety of District or developer-built projects. The Engineering – Inspection Division is identified as the coordinating agency for several mitigation action items.
Personnel	Operations - Water Treatment Division	Water Treatment responsibilities include District-wide water quality monitoring, state and federal drinking water regulatory compliance, and the operation and maintenance of three surface water treatment facilities: the Lloyd W. Michael Treatment Plant, a 60 million gallon per day (MGD) enhanced-conventional treatment facility; the Royer-Nesbit Treatment Plant, an 11-MGD conventional treatment facility; and the Arthur H. Bridge Treatment Plant, a 3-MGD dual-stage pressure filtration treatment facility. Water sources include local ground water, local surface water, and imported surface water. The Operations – Water Treatment Division is identified as the coordinating agency for several mitigation action items.
Personnel	Operations - Production & Telemetry Division	Production's responsibilities include water supply and operations. In addition, the division is responsible for daily monitoring, maintenance, and repair of the District's 28 groundwater wells, 69 boosters, 35 reservoirs, 9 chlorination stations, and 52 control valves. Telemetry's responsibilities include industrial electrical, communications, and controls for the District's Water Treatment, Water Production, and Sewer Lift Stations. Such responsibilities consist of electrical design, implementation, and maintenance of electrical equipment ranging from marginal voltage direct current to 480 volts alternating current. Communications include Ethernet and serial networks utilizing wire, fiber optics, and wireless media. Controls focuses on the design, integration, development and implementation of controls systems which leverage technology to facilitate more effective and efficient operational strategies.

		The Operations – Production & Telemetry Division is identified as the coordinating agency for several mitigation action items.
Personnel	Operations – Maintenance: Facilities Division	Facilities' responsibilities include the maintenance, repair, and general upkeep of the District's buildings and building equipment. The Facilities Division is also responsible for logistical set-up for all District events, including the District's bi-monthly Board of Director's and committee meetings. The Operations – Maintenance: Facilities Division is identified as the coordinating agency for several mitigation action items.
Personnel	Operations - Fleet Maintenance Division	Fleet Maintenance's responsibilities include the maintenance and repair of the District's vehicles and heavy equipment. The Operations – Fleet Maintenance Division is identified as the coordinating agency for several mitigation action items.
Personnel	Operations - Water Maintenance Division	Water Maintenance's responsibilities include the maintenance and repair of the District's water system infrastructure which includes mains, hydrants, valves, services, and implementation of preventative maintenance programs. The division strives to provide prompt turnaround times on all customer requests, exceptional customer service and responds 24 hours a day, 365 days a year to all water emergencies. The Operations – Water Maintenance Division is identified as the coordinating agency for several mitigation action items.
Personnel	Operations - Wastewater Maintenance Division	Wastewater Maintenance's responsibilities include the maintenance and repair of the District's sewer collection system infrastructure which includes sewer mains, sewer laterals, lift stations, and inverted siphons. This division implements the preventative maintenance programs to monitor wastewater flows and clean the system. The division's mission is to ensure the entire collection system is clean and free-flowing at all times while providing protection to the environment and public health. The division provides 24- hour emergency response to sewer emergency calls. The Operations – Wastewater Maintenance Division is identified as the coordinating agency for several mitigation action items.
Personnel	Hazard Mitigation Planning Team	Hazard Mitigation Planning Team is made up of representatives from various departments and divisions that are assigned mitigation action items in the Hazard Mitigation Plan. In addition to responsibility to prepare each of the 5-year plan updates as required by FEMA, the Planning Team is responsible for implementing, monitoring, and evaluating the plan during its quarterly meetings. The Planning Team is assigned several mitigation action items and plays a pivotal role in implementing and funding the overall Hazard Mitigation Plan.
Plan	Emergency Response Plan	Emergency Response Plan is a reference and guidebook to operations during a major emergency impacting the District. The Plan includes a discussion on a wide range of hazards, organization and staffing of the

		Emergency Operations Center, and connectivity with field responders and external agencies.
Plan	Urban Water Management Plan	The Urban Water Management Plan was last updated in 2018. This plan outlines the water infrastructure needs until the District reaches build-out.
Plan	Long-Term Financial Master Plan	The District completed a long-term financial master plan during FY 2018.

Q&A | ELEMENT A: PLANNING PROCESS | A4

Q: Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))
A: See **Use of Existing Data** below.

Use of Existing Data

The Planning Team gathered and reviewed existing data and plans during plan writing and specifically noted as "sources". Numerous electronic and hard copy documents were used to support the planning process:

Cucamonga Valley Water Urban Water Management Plan & Budget
www.cvwdwater.com
Applicable Incorporation: District Profile section – history, geography, environmental, population, and demographic data.

San Bernardino County Multi-Jurisdictional Hazard Mitigation Plan (2017)
www.cms.sbcounty.gov
Applicable Incorporation: Information about hazards in the County contributed to the hazard-specific sections in the District's Mitigation Plan.

California State Hazard Mitigation Plan (2018)
http://www.caloes.ca.gov/
Applicable Incorporation: Used to identify hazards posing greatest hazard to State.

HAZUS maps and reports
Created by Emergency Planning Consultants
Applicable Incorporation: Numerous HAZUS results have been included for earthquake scenarios to determine specific risk to Cucamonga Valley Water District.

California Department of Finance
www.dof.ca.gov/
Applicable Incorporation: Community Profile section – demographic and population data

FEMA "How To" Mitigation Series (386-1 to 386-9)
www.fema.gov/media
Applicable Incorporation: Mitigation Measures Categories and 4-Step Planning Process are quoted in the Executive Summary.

National Flood Insurance Program
www.fema.gov/national-flood-insurance-program
Applicable Incorporation: Used to confirm there are no repetitive loss properties within the District

Local Flood Insurance Rate Maps
www.msc.fema.gov
Applicable Incorporation: Provided by FEMA and included in Flood Hazard section.

California Department of Conservation
www.conservation.ca.gov/cgs
Applicable Incorporation: Seismic hazards mapping

U.S. Geological Survey (USGS)
www.usgs.gov
Applicable Incorporation: Earthquake records and statistics

Q&A | ELEMENT E: PLAN ADOPTION | E1

Q: Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))
A: See **Plan Adoption Process** below.

Plan Approval

FEMA issued an Approval Pending Adoption on July 16, 2019. Upon receipt of the District's adoption, FEMA issued a Final Letter of Approval on September 13, 2019. A copy of the FEMA Final Letter of Approval is in the **Attachments**.

Plan Adoption Process

Adoption of the plan by the local governing body demonstrates the District's commitment to meeting mitigation goals and objectives. Governing body approval legitimizes the plan and authorizes responsible agencies to execute their responsibilities.

The Cucamonga Valley Water District Board of Directors must adopt the Mitigation Plan before the Plan can receive final approval from FEMA.

In preparation for the public meeting with the Board of Directors, the Planning Team prepared a Staff Report including an overview of the planning process, risk assessment, mitigation goals, and mitigation actions. The staff presentation concluded with a summary of the input received during the public review of the document. The meeting participants were encouraged to present their views and make suggestions on possible mitigation actions.

The Cucamonga Valley Water District Board of Directors heard the item on September 10, 2019. The Board voted unanimously to adopt the Mitigation Plan. The minutes showing adoption by the Board of Directors are in the **Attachments**.

District Profile

Geography and History

According to the CVWD Urban Water Management Plan (2010), the District serves a 47 square mile area which includes portions of the cities of Rancho Cucamonga, Upland, Ontario and Fontana, and some unincorporated areas of San Bernardino County as shown on **Map: CVWD Boundary**.

Since as early as 1830, water has always been an issue for the region. With the increase of citrus groves and vineyards in the area, numerous independent water companies were created by the individual land owners. By 1954, no fewer than 31 companies of associations existed. In 1954 a group of visionaries proposed to create a single water district to manage the water distribution. Cucamonga County Water District (CCWD), a public corporation, was formed in 1955 by local voters under the provisions of Division 12 of the County Water District Section of the State Water Code. In 2004, the agency name was changed to Cucamonga Valley Water District (CVWD).

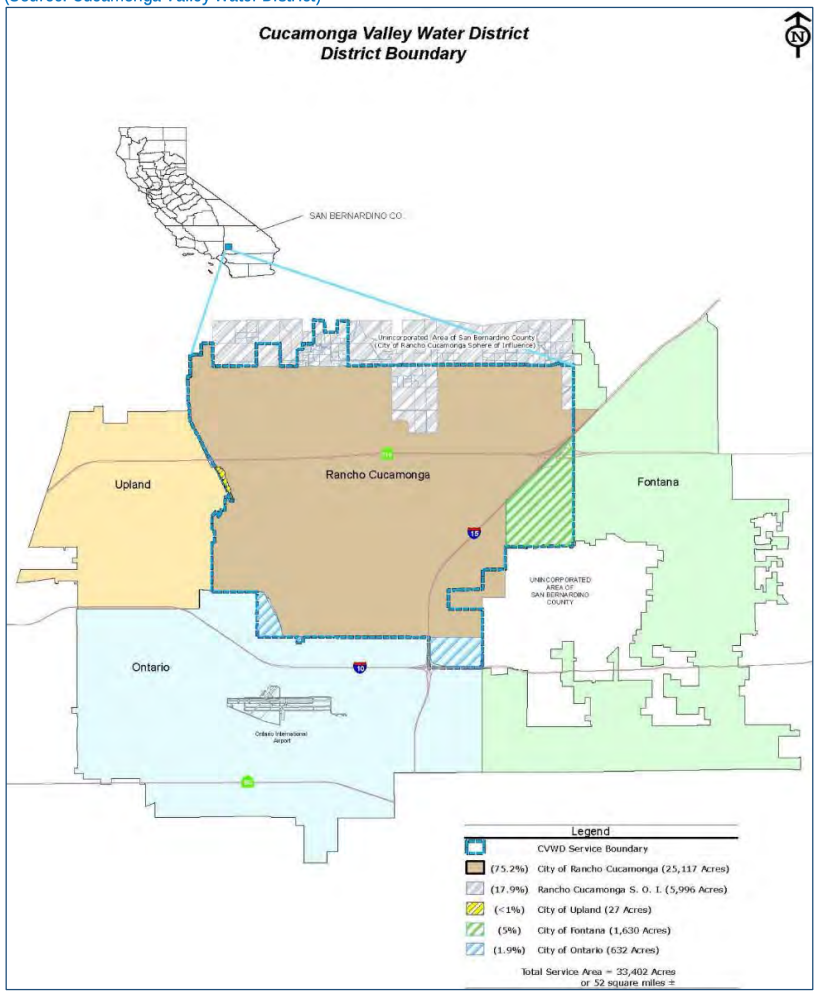
Climate

The average temperatures in the City of Rancho Cucamonga range from 50ºF in the winter months to 95ºF in the summer months. It is important to note that temperatures can vary over a wide range, particularly when the Santa Ana winds blow, bringing in higher temperatures with very low humidity.

As the State of California and San Bernardino County has undergone a recent several-year drought, rainfall has been much lower in the District. However, rainfall totals have been on the rise since the start of 2017 due to El Niño weather conditions.

Furthermore, actual rainfall in the Southern California region tends to fall in large amounts during sporadic and often heavy storms rather than consistently over storms at somewhat regular intervals. In short, rainfall in Southern California might be characterized as feast or famine within a single year.

Map: CVWD Boundary
(Source: Cucamonga Valley Water District)



Service Area Demographics & Residential Market

DEMOGRAPHICS	
Population:	190,000
Median Age:	36.1
Average Household Income	$96,707
Household Incomes Over $100,000	37.7%
Total Employment:	83,178
High School Graduates:	91.1%

RESIDENTIAL MARKET	
Housing Units	58,322
Single Family:	36,510 (62.6%)
Multifamily:	21,812 (37.4%)
Median Home Price:	$512,500

SERVICE AREA STATISTICS	
# Water Connections	48,767
# Sewer Connections	37,712
Average Daily Demand	47 MGD
# Treatment Plants	3 capable of treating 74MGD
# Reservoirs	35 with 94 million gallons of storage
# Wells	29 wells – 12 in Chino Basin, 17 in Cucamonga Basin
# Miles of Water Pipeline	707 miles
# Miles of Sewer Pipeline	418 miles
# Recycled Water Customers	123 Recycled water connections
# Pressure Zones	15

Q&A | ELEMENT D. MITIGATION STRATEGY | D1
Q: Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))
A: See **Changes in Development** below.

Changes in Development
Since the District's first HMP written in 2005, there have been no significant changes in development within the project area.

Risk Assessment

What is a Risk Assessment?

Conducting a risk assessment can provide information regarding: the location of hazards; the value of existing land and property in hazard locations; and an analysis of risk to life, property, and the environment that may result from natural hazard events. Specifically, the five levels of a risk assessment are as follows:

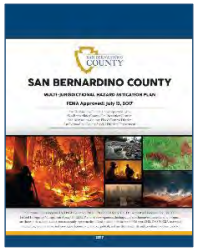
1. *Hazard Identification*
2. *Profiling Hazard Events*
3. *Vulnerability Assessment/Inventory of Existing Assets*
4. *Risk Analysis*
5. *Assessing Vulnerability/Analyzing Development Trends*

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.
Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Hazard Identification** below.

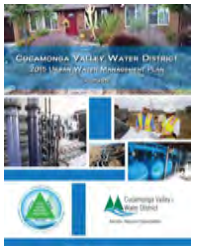
Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1b.
Q: Does the plan provide rationale for the omission of any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area? (Requirement §201.6(c)(2)(i))
A: See **Hazard Identification** below.

1) Hazard Identification

This section is the description of the geographic extent, potential intensity, and the probability of occurrence of a given hazard. Maps are used in this plan to display hazard identification data. ***The Cucamonga Valley Water District utilized the categorization of hazards as identified in California's 2018 State Hazard Mitigation Plan, including: Earthquakes, Floods, Levee Failures, Wildfires, Landslides and Earth Movements, Tsunami, Climate-related Hazards (including Drought), Volcanoes, and Other Hazards. The District also considered the hazards identified in the San Bernardino County Multi-Jurisdictional Mitigation Plan (2017) which addressed Earthquakes, Floods, Wildfires, Drought, Terrorism, and Climate Change.***







The geographic extent of each of the identified hazards was identified by the Planning Team utilizing maps and data contained in the above referenced plans. Utilizing the Calculated Priority Risk Index (CPRI) ranking technique, the Planning Team concluded the following hazards posed a significant threat against the District:

Earthquake | Flooding | Wildfire | Windstorms | Drought | Terrorism | Climate Change

The hazard ranking system is described in **Table: Calculated Priority Risk Index**, while the actual ranking is shown in **Table: Calculated Priority Risk Index Ranking for Cucamonga Valley Water District**.

Table: Calculated Priority Risk Index
(Source: Federal Emergency Management Agency)

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Extremely rare with no documented history of occurrences or events. Annual probability of less than 1 in 1,000 years.	1	45%
	Possibly	Rare occurrences. Annual probability of between 1 in 100 years and 1 in 1,000 years.	2	
	Likely	Occasional occurrences with at least 2 or more documented historic events. Annual probability of between 1 in 10 years and 1 in 100 years.	3	
	Highly Likely	Frequent events with a well-documented history of occurrence. Annual probability of greater than 1 every year.	4	
Magnitude/ Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure. Injuries or illnesses are treatable with first aid and there are no deaths. Negligible loss of quality of life. Shut down of critical public facilities for less than 24 hours.	1	30%
	Limited	Slight property damage (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). Injuries or illnesses do not result in permanent disability, and there are no deaths. Moderate loss of quality of life. Shut down of critical public facilities for more than 1 day and less than 1 week.	2	
	Critical	Moderate property damage (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). Injuries or illnesses result in permanent disability and at least 1 death. Shut down of critical public facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	Severe property damage (greater than 50% of critical and non-critical facilities and infrastructure). Injuries and illnesses result in permanent disability and multiple deaths. Shut down of critical public facilities for more than 1 month.	4	
Warning Time	> 24 hours	Population will receive greater than 24 hours of warning.	1	15%
	12–24 hours	Population will receive between 12-24 hours of warning.	2	
	6-12 hours	Population will receive between 6-12 hours of warning.	3	
	< 6 hours	Population will receive less than 6 hours of warning.	4	
Duration	< 6 hours	Disaster event will last less than 6 hours	1	10%
	< 24 hours	Disaster event will last less than 6-24 hours	2	
	< 1 week	Disaster event will last between 24 hours and 1 week.	3	
	> 1 week	Disaster event will last more than 1 week	4	

Table: Calculated Priority Risk Index Ranking for Cucamonga Valley Water District

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Total
Earthquake – San Andreas M8.0	3	1.35	4	1.2	4	0.6	1	0.1	3.25
Earthquake – Puente Hills M7.5	3	1.35	3	0.9	4	0.6	1	0.1	2.95
Earthquake – San Jacinto M7.0	2	.90	3	0.9	4	0.6	1	0.1	2.50
Flooding	3	1.35	2	0.6	1	0.15	3	0.3	2.40
Wildfire	4	1.80	2	0.6	4	0.6	1	0.1	3.25
Windstorms	2	0.9	1	0.3	1	0.15	1	0.1	1.45
Drought	2	0.9	4	1.2	1	0.15	4	0.4	2.65
Terrorism	3	1.35	4	1.2	4	0.6	1	0.1	3.25
Climate Change	4	1.80	3	0.9	1	.15	4	0.4	3.25

2) Profiling Hazard Events

This process describes the causes and characteristics of each hazard and what part of the District's facilities, infrastructure, and environment may be vulnerable to each specific hazard. A profile of each hazard discussed in this plan is provided in the District-Specific Hazard Analysis. **Table: Vulnerability: Location, Extent, and Probability for Cucamonga Valley Water District** indicates a generalized perspective of the community's vulnerability of the various hazards according to extent (or degree), location, and probability.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1b.

Q: Does the plan provide rationale for the omission of any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability for Cucamonga Valley Water District** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1c.

Q: Does the plan include a description of the **location** for all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability for Cucamonga Valley Water District** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1d.

Q: Does the plan include a description of the **extent** for all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability for Cucamonga Valley Water District** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability for Cucamonga Valley Water District** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2b.

Q: Does the plan include information on the **probability** of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Table: Vulnerability: Location, Extent, and Probability for Cucamonga Valley Water District** below.

Table: Vulnerability: Location, Extent, and Probability for Cucamonga Valley Water District

Hazard	Location (Where)	Extent (How Big an Event)	Probability (How Often) *	Recent Occurrences
Earthquake	Entire District	The Southern California Earthquake Center (SCEC) in 2007 concluded that there is a 99.7 % probability that an earthquake of M6.7 or greater will hit California within 30 years.[1]	Likely	1992 – Landers Earthquake
Flooding	Northern Areas of the District.	Urban Flooding resulting from severe weather – extent varies on weather.	Likely	Dec 2010 – Jan 2011
Wildfire	Northern Areas of District along the foothills of the San Gabriel Mountains	Major property fire damage in the Northern portion of District and significant impact to residents within District.	Highly Likely	May 2014 - Etiwanda Fire
Windstorms	Entire District	Wind gusts 50 miles per hour or greater.	Possible	Oct 2018
Drought	Entire District	Droughts in urban areas vary considerably in scope and intensity. Likely emergency water shortage regulations would restrict such activities as watering of landscape, washing of cars, and other non-safety related activities.	Possible	None locally however state-wide mandates adopted
Terrorism	Entire District	Very difficult to predict scope and scale of such an event. Even with an isolated event, District functions could be significantly impacted for an extended period.	Likely	None
Climate Change	Entire District	The overall scope and scale are hard to predict although generally the District can expect greater swings in the weather.	Highly Likely	None

* Probability is defined as: Unlikely = 1:1,000 years, Possibly = 1:100-1:1,000 years, Likely = 1:10-1:100 years, Highly Likely = 1:1 year

[1] Uniform California Earthquake Rupture Forecast

3) Vulnerability Assessment / Inventory of Existing Assets

A Vulnerability Assessment in its simplest form is a simultaneous look at the geographical location of hazards and an inventory of the underlying land uses (populations, structures, etc.). Facilities that provide critical and essential services following a major emergency are of particular concern because these locations house staff and equipment necessary to provide important public safety, emergency response, and/or disaster recovery functions.

Critical Facilities

FEMA separates critical buildings and facilities into the five categories shown below based on their loss potential. All of the following elements are considered critical facilities:

Essential Facilities are essential to the health and welfare of the whole population and are especially important following hazard events. Essential facilities include hospitals and other medical facilities, police and fire stations, emergency operations centers and evacuation shelters, and schools.

Transportation Systems include airways – airports, heliports; highways – bridges, tunnels, roadbeds, overpasses, transfer centers; railways – trackage, tunnels, bridges, rail yards, depots; and waterways – canals, locks, seaports, ferries, harbors, drydocks, piers.

Lifeline Utility Systems such as potable water, wastewater, oil, natural gas, electric power and communication systems.

High Potential Loss Facilities are facilities that would have a high loss associated with them, such as nuclear power plants, dams, and military installations.

Hazardous Material Facilities include facilities housing industrial/hazardous materials, such as corrosives, explosives, flammable materials, radioactive materials, and toxins.

Table: Critical & Essential Facilities Vulnerable to Hazards illustrates the hazards with potential to impact critical facilities owned by or providing services to the Cucamonga Valley Water District.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Table: Critical & Essential Facilities Vulnerable to Hazards** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))
A: See **Table: Critical & Essential Facilities Vulnerable to Hazards** below.

Table: Critical and Essential Facilities Vulnerable to Hazards

Name of Facility	Earthquake	Flooding	Wildfire	Windstorm	Drought	Terrorism	Climate Change
Critical and Essential Facilities*:							
Lloyd W. Michael Treatment	X	X	X	X	X	X	X
Reservoir 1	X			X	X	X	X
Reservoir 1B-1	X			X	X	X	X
Reservoir 1B-2	X			X	X	X	X
Reservoir 1C-1	X			X	X	X	X
Reservoir 1C-2	X			X	X	X	X
Reservoir 2-1	X			X	X	X	X
Reservoir 2-2	X			X	X	X	X
Reservoir 2A	X			X	X	X	X
Reservoir 2C	X			X	X	X	X
Reservoir 3-1	X			X	X	X	X
Reservoir 3-2	X			X	X	X	X
Reservoir 3-3	X			X	X	X	X
Reservoir 3A	X	X		X	X	X	X
Reservoir 3C	X		X	X	X	X	X
Reservoir 3CII	X			X	X	X	X
Reservoir 3CIII	X			X	X	X	X
Reservoir 4-1	X	X	X	X	X	X	X
Reservoir 4-2	X	X	X	X	X	X	X
Reservoir 4B-1	X		X	X	X	X	X
Reservoir 4B-2	X		X	X	X	X	X
Reservoir 4C-1	X		X	X	X	X	X

Name of Facility	Earthquake	Flooding	Wildfire	Windstorm	Drought	Terrorism	Climate Change
Reservoir 4C-2	X		X	X	X	X	X
Reservoir 4D	X		X	X	X	X	X
Reservoir 5-1	X	X	X	X	X	X	X
Reservoir 5-2	X	X	X	X	X	X	X
Reservoir 5A	X		X	X	X	X	X
Reservoir 5B	X		X	X	X	X	X
Reservoir 5C	X		X	X	X	X	X
Reservoir 5D	X		X	X	X	X	X
Reservoir 6-1	X		X	X	X	X	X
Reservoir 6-2	X		X	X	X	X	X
Reservoir 6B	X		X	X	X	X	X
Reservoir 6C	X		X	X	X	X	X
Reservoir 7B	X		X	X	X	X	X
Reservoir 8B-1	X		X	X	X	X	X
Reservoir 8B-2	X		X	X	X	X	X
Lloyd W. Michael Water Treatment Plan	X		X	X	X	X	X
Administration Building	X			X	X	X	X
The Frontier Project	X			X	X	X	X

* Note: Because the exact location of facilities is extremely sensitive and due to increased concerns for national security, only facility names are included in this table.

4) Risk Analysis

Estimating potential losses involves assessing the damage, injuries, and financial costs likely to be sustained in a geographic area over a given period of time. This level of analysis involves using mathematical models. The two measurable components of risk analysis are magnitude of the harm that may result and the likelihood of the harm occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework in which to measure the effects of hazards on assets. For each hazard where data was available, quantitative estimates for potential losses have been included in the hazard assessment. Data was not available to make vulnerability determinations in terms of dollar losses for all of the identified hazards. The **Mitigation Actions Matrix** includes an action item to conduct such an assessment in the future.

5) Assessing Vulnerability / Analyzing Development Trends

This step provides a general description of District facilities and contents in relation to the identified hazards so that mitigation options can be considered in land use planning and future land use decisions. This Mitigation Plan provides comprehensive description of the character of the Cucamonga Valley Water District in the **District Profile**. This description includes the geography and environment, population and demographics, land use and development, housing and community development, employment and industry, and transportation and commuting patterns. Analyzing these components of the Cucamonga Valley Water District can help in identifying potential problem areas and can serve as a guide for incorporating the goals and ideas contained in this mitigation plan into other community development plans.

Hazard assessments are subject to the availability of hazard-specific data. Gathering data for a hazard assessment requires a commitment of resources on the part of participating organizations and agencies. Each hazard-specific section of the plan includes a section on hazard identification using data and information from City, County, state, or federal sources.

Regardless of the data available for hazard assessments, there are numerous strategies the District can take to reduce risk. These strategies are described in the action items detailed in the Mitigation Actions Matrix in the **Mitigation Strategies Section**. Mitigation strategies can further reduce disruption to critical services, reduce the risk to human life, and alleviate damage to personal and public property and infrastructure.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Impacts to Types of Land Uses** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))
A: See **Impacts to Types of Land Uses** below.

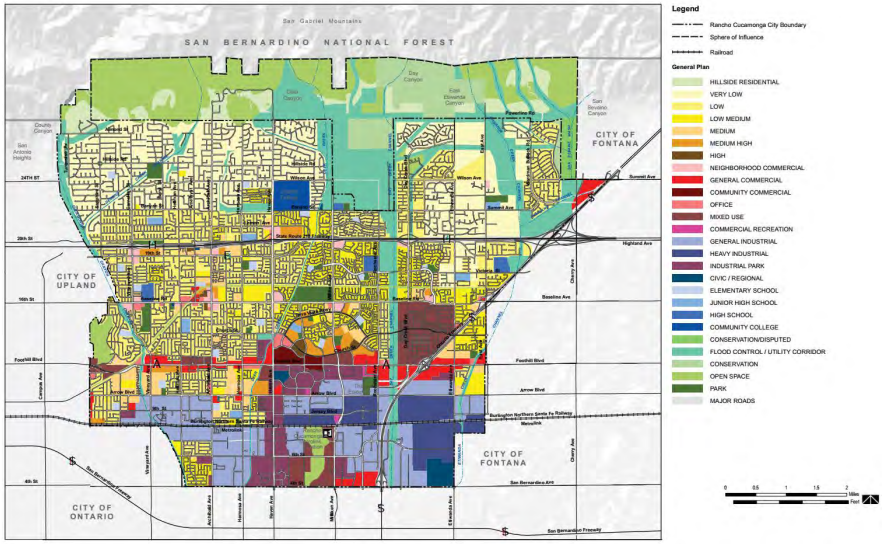
Impacts to Types of Land Uses

The majority of the District is located within the City of Rancho Cucamonga as shown on **Map: CVWD Boundary**. Therefore, the City's land use designations and mapping have been used to identify specific hazard impacts within the District itself.

Table: Impacts to Existing and Future Land Uses in the Cucamonga Valley Water District
(Source: EPC Analysis Based on City of Rancho Cucamonga – General Plan Land Use Element)

Category of Land Use Designation	Acres (Area)	Acres (%)	Earthquake	Flooding	Wildfire	Windstorms	Drought	Terrorism	Climate Change
Residential	11,336	46%	X	X	X	X	X	X	X
Commercial	941	4%	X	X	X	X	X	X	X
Mixed Use	863	4%	X	X	X	X	X	X	X
Industrial	3,775	15%	X	X	X	X	X	X	X
Public Facilities	1,146	5%	X	X	X	X	X	X	X
Open Space	2,409	10%	X	X	X	X	X	X	X
Arterials/Freeway	4,063	16%	X	X	X	X	X	X	X

Map: Land Use Map
(Source: City of Rancho Cucamonga General Plan, 2010)



Earthquake Hazards

Previous Occurrences of Earthquakes in the Cucamonga Valley Water District

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Previous Occurrences of Earthquakes in the Cucamonga Valley Water District** below.

The following earthquake events significantly impacted the region surrounding the Cucamonga Valley Water District.



In 1992, the District was shaken by two events: a 7.3 magnitude earthquake originating from the desert community of Landers and a 6.4 magnitude earthquake in Big Bear. Both of these events caused significant landslides in San Bernardino County. Over 4,000 homes were damaged and 139 business were impacted. Fortunately, no major damage was reported within the District.

Although there have been smaller incidents, the District has never been severely impacted by an earthquake.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))
A: See **Local Conditions** below.

Local Conditions

The District lies within a metropolitan area that has historically been seismically active. Faults are prevalent throughout California and are commonly classified as either "active" or "potentially active." An active fault is a break that has moved in recent geologic time (the last 11,000 years) and that is likely to move within the next approximately 100 years. Active faults are the primary focus of concern in attempting to prevent earthquake hazards. A potentially active fault is one that has shifted but not in the recent geologic period (or, between 11,000 and 3,000,000 years ago) and is therefore considered dormant or unlikely to move in the future.

Several active faults have been identified within close proximity or within the District boundaries. Earthquakes that could affect the District would most likely originate from the **San Andreas, Puente Hills, San Jacinto Faults, or Cucamonga Faults.** These faults are close enough in proximity or expected to generate strong enough shaking that could significantly impact the District.

San Andreas Fault

The San Andreas Fault Zone is located approximately 13.5 miles northeast of the Cucamonga Valley Water District. This fault zone extends from the Gulf of California northward to the Cape Mendocino area where it continues northward along the ocean floor. The total length of the San Andreas Fault Zone is approximately 750 miles. The activity of the fault has been recorded during historic events, including the 1906 (M8.0) event in San Francisco and the 1857 (M7.9) event between Cholame and San Bernardino, where at least 250 miles of surface rupture occurred. These seismic events are among the most significant earthquakes in California history. Geologic evidence suggests that the San Andreas Fault has a 50 percent chance of producing a magnitude 7.5 to 8.5 quake (comparable to the great San Francisco earthquake of 1906) within the next 30 years.

Puente Hills Fault

The Puente Hills Fault Zone is located approximately 25 miles southeast of the Cucamonga Valley Water District. Discovered in 2003, the Puente Hills fault system is comprised of three sections that run under downtown Los Angeles and into the Coyote Hills of north Orange County. According to estimates by the USGS and Southern California Earthquake Center, a massive earthquake on the Puente Hills fault could kill from 3,000 to 18,000 people and cause up to $250 billion in damage.

San Jacinto Fault

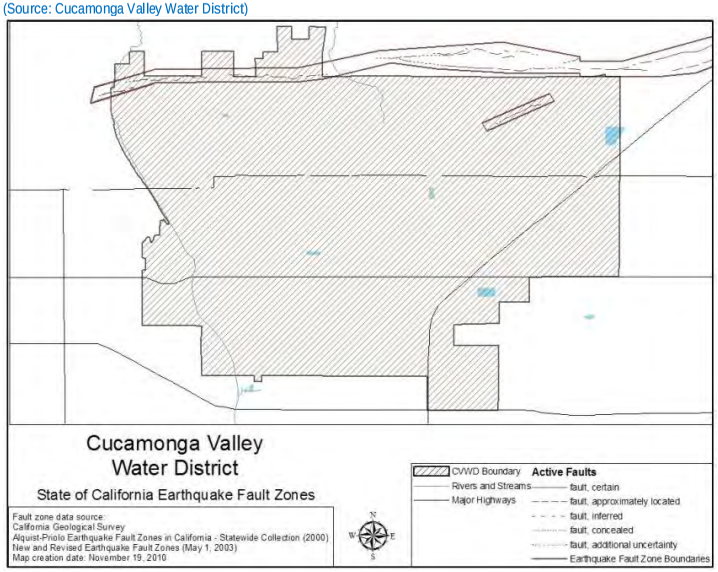
The San Jacinto Fault is located less than 5 miles northeast of the District and is one of the region's most active faults. The fault runs through populated areas such as San Bernardino, Colton, Moreno Valley, Redlands, Loma Linda, Hemet and San Jacinto, as well as near Riverside, Rialto and Fontana. The maximum credible earthquake for this fault is estimated to be magnitude a M7.5.

Cucamonga Fault

The Cucamonga Fault is located directly north of the District as shown on the following map. The Cucamonga fault zone is part of the same fault system, marking the southern boundary of the San Gabriel Mountains, as the Sierra Madre fault zone. The maximum credible earthquake for this fault is estimated to be magnitude a M7.0.

Map: Active Faults plots the various faults located closest to the Cucamonga Valley Water District.

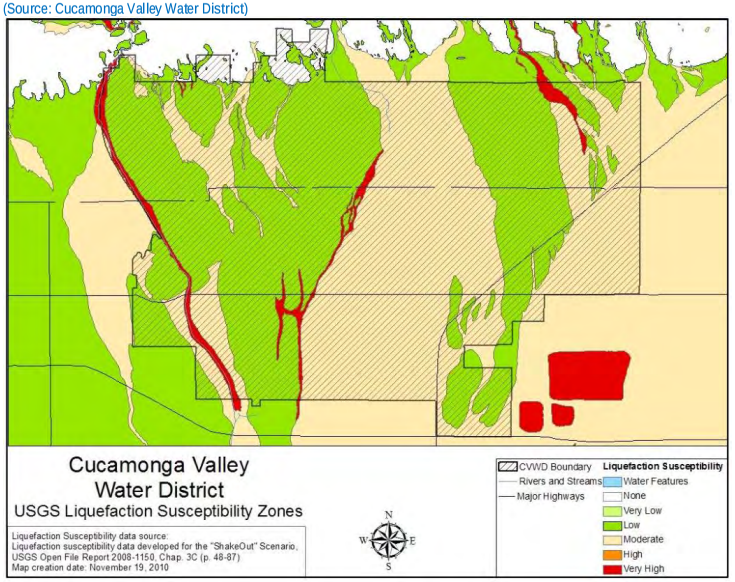
Map: Active Faults
(Source: Cucamonga Valley Water District)



Liquefaction

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other events. Liquefaction occurs in saturated soils, which are soils in which the space between individual soil particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. Because liquefaction only occurs in saturated soil, its effects are most commonly observed in low lying areas. Typically, liquefaction is associated with shallow groundwater, which is less than 50 feet beneath the earth's surface. **Map: Liquefaction Susceptibility Zones** shows vulnerable areas within the District that are most prone to liquefaction hazards.

Map: Liquefaction Susceptibility Zones
(Source: Cucamonga Valley Water District)



Exposure

The data in this section was generated using the HAZUS-MH program for earthquakes. Once the location and size of a hypothetical earthquake are identified, HAZUS-MH estimates the intensity of the ground shaking, the number of buildings damaged, the number of casualties, the amount of damage to transportation systems and utilities, the number of people displaced from their homes, and the estimated cost of repair and clean up.

Building Inventory

HAZUS estimates approximately 93% of the building stock within the Cucamonga Valley Water District is residential housing consisting of wood frame construction.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

Table: Critical Facility Inventory – HAZUS

Essential Facilities	Count
Hospitals	5
Schools	254
Fire Stations	9
Police Stations	14
Emergency Operations Facilities	0

High Potential Loss (HPL) Facilities	Count
Dams	0
Levees	0
Military Installations	0
Nuclear Power Plants	0
Hazardous Material Sites	152

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. Transportation systems include highways, railways, light rail, bus, ports, ferry and airports. Utility systems include potable water, wastewater, natural gas, crude & refined oil, electric power and communications.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows:

- ✓ **Severity Level 1:** Injuries will require medical attention but hospitalization is not needed.
- ✓ **Severity Level 2:** Injuries will require hospitalization but are not considered life-threatening
- ✓ **Severity Level 3:** Injuries will require hospitalization and can become life threatening if not promptly treated.

- ✓ **Severity Level 4:** Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Building-Related Losses

Building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

HAZUS Earthquake Event Summary Results

San Andreas Fault M8.0 Earthquake Scenario

Building Damage

Table: Expected Building Damage San Andreas M8.0

Damage Extent	None	Slight	Moderate	Extensive	Complete
Total	34,554	104,038	63,323	13,796	9,396

Transportation and Utility Lifeline Damage

Table: Expected Utility System Pipeline Damage – San Andreas M8.0

System	Total Pipelines (Length km)	Number of Leaks	Number of Breaks
Potable Water	4,865	156	39
Waste Water	2,919	17,445	4,361
Natural Gas	1,946	8,205	2,051
Oil	0	0	0

Table: Potable Water and Electric Power System Performance – San Andreas M8.0

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	248,350	0	0	0	0	0
Electric Power		45,067	26,343	10,057	1,840	67

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 9,785 households to be displaced due to the earthquake. Of these, 8,670 people (out of a total population of 875,149) will seek temporary shelter in public shelters.

Casualties

The table below represents a summary of casualties estimated for San Andreas M8.0 earthquake scenario.

Table: Casualty Estimates – San Andreas M8.0

Time	Level 1	Level 2	Level 3	Level 4
2 AM	3,171	727	86	165
2 PM	12,417	3,768	629	1,233
5 PM	7,680	2,259	367	712

*

Level 1: Injuries will require medical attention but hospitalization is not needed.
Level 2: Will require hospitalization but are not considered life-threatening.
Level 3: Will require hospitalization and can become life threatening if not promptly treated.
Level 4: Victims are killed by earthquake.

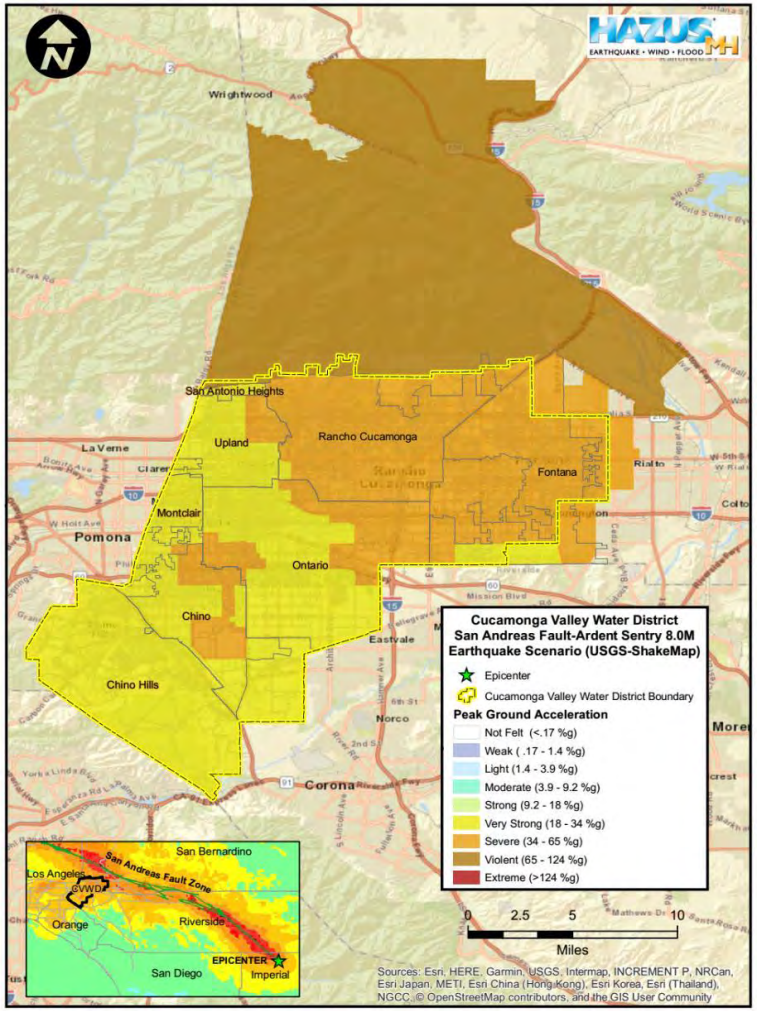
Economic Losses

The total economic loss estimated for the San Andreas M8.0 earthquake scenario is **$19.22 billion dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Economic Losses ($ Dollars) – San Andreas M8.0

Category	Estimated Loss ($)
Income	$2,813,946,600
Capital Stock	$16,015,487,900
Transportation Systems	$143,480,000
Utility Systems	$243,020,000
TOTAL	$19,215,934,500

Map: Shake Intensity Map – San Andreas Fault M8.0
(Source: Emergency Planning Consultants)



Cucamonga Valley Water District
Service Beyond Expectation

Puente Hills M7.5 Earthquake Scenario

Building Damage

Table: Expected Building Damage Puente Hills M7.5

Damage Extent	None	Slight	Moderate	Extensive	Complete
Total	174,183	41,065	7,702	1,970	186

Transportation and Utility Lifeline Damage

Table: Expected Utility System Pipeline Damage – Puente Hills M7.5

System	Total Pipelines (Length km)	Number of Leaks	Number of Breaks
Potable Water	4,865	156	39
Waste Water	2,919	17,445	4,361
Natural Gas	1,946	8,205	2,051
Oil	0	0	0

Table: Potable Water and Electric Power System Performance – Puente Hills M7.5

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	248,350	0	0	0	0	0
Electric Power		0	0	0	0	0

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 438 households to be displaced due to the earthquake. Of these, 360 people (out of a total population of 875,149) will seek temporary shelter in public shelters.

Casualties

The table below represents a summary of casualties estimated for Puente Hills M7.5 earthquake scenario.

Table: Casualty Estimates – Puente Hills M7.5

Time	Level 1	Level 2	Level 3	Level 4
2 AM	203	20	1	2
2 PM	476	74	7	14
5 PM	311	45	4	8

*
Level 1: Injuries will require medical attention but hospitalization is not needed.
Level 2: Will require hospitalization but are not considered life-threatening.
Level 3: Will require hospitalization and can become life threatening if not promptly treated.
Level 4: Victims are killed by earthquake.

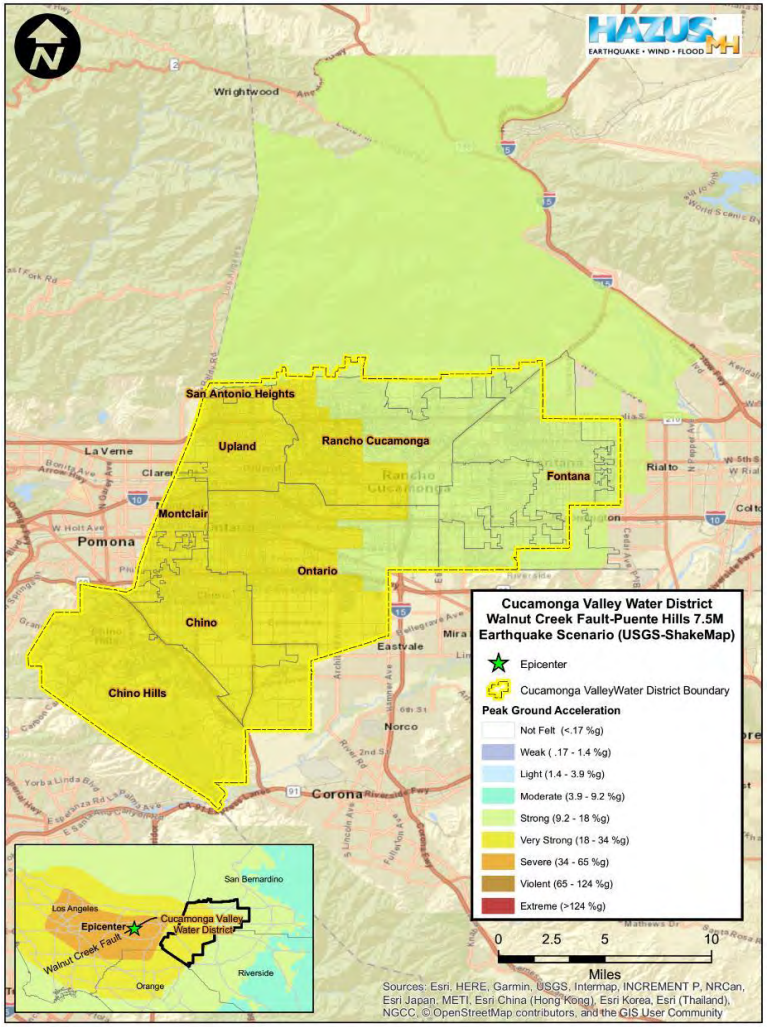
Economic Losses

The total economic loss estimated for the Puente Hills M7.5 earthquake scenario is **$2.32 billion dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Economic Losses ($ Dollars) – Puente Hills M7.5

Category	Estimated Loss ($)
Income	$295,247,100
Capital Stock	$1,832,940,400
Transportation Systems	$17,850,000
Utility Systems	$171,820,000
TOTAL	$2,317,857,500

Map: Shake Intensity Map – Puente Hills M7.5
(Source: Emergency Planning Consultants)



San Jacinto Fault M7.0 Earthquake Scenario

Building Damage

Table: Expected Building Damage San Jacinto Fault M7.0

Damage Extent	None	Slight	Moderate	Extensive	Complete
Total	211,599	12,521	957	30	0

Transportation and Utility Lifeline Damage

Table: Expected Utility System Pipeline Damage – San Jacinto Fault M7.0

System	Total Pipelines (Length km)	Number of Leaks	Number of Breaks
Potable Water	4,865	156	39
Waste Water	2,919	17,445	4,361
Natural Gas	1,946	8,205	2,051
Oil	0	0	0

Table: Potable Water and Electric Power System Performance – San Jacinto Fault M7.0

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	248,350	0	0	0	0	0
Electric Power		0	0	0	0	0

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 2 households to be displaced due to the earthquake. Of these, 2 people (out of a total population of 875,149) will seek temporary shelter in public shelters.

Casualties

The table below represents a summary of casualties estimated for San Jacinto Fault M7.0 earthquake scenario.

Table: Casualty Estimates – San Jacinto Fault M7.0

Time	Level 1	Level 2	Level 3	Level 4
2 AM	29	1	0	0
2 PM	39	2	0	0
5 PM	29	1	0	0

*
Level 1: Injuries will require medical attention but hospitalization is not needed.
Level 2: Will require hospitalization but are not considered life-threatening.
Level 3: Will require hospitalization and can become life threatening if not promptly treated.
Level 4: Victims are killed by earthquake.

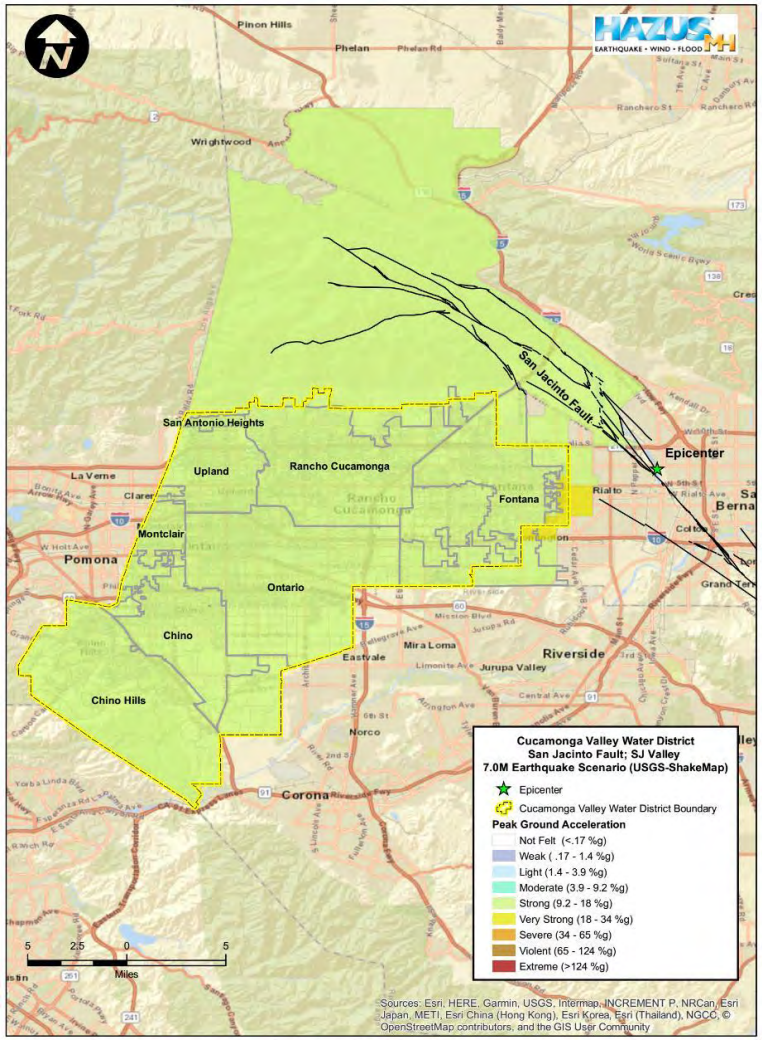
Economic Losses

The total economic loss estimated for the San Jacinto Fault M7.0 earthquake scenario is **$675 million dollars** which includes building and lifeline related losses based on the region's available inventory. The following tables provide more detailed information about these losses.

Table: Economic Losses ($ Dollars) – San Jacinto Fault M7.0

Category	Estimated Loss ($)
Income	$18,970,300
Capital Stock	$508,187,600
Transportation Systems	$9,000,000
Utility Systems	$138,860,000
TOTAL	$675,017,900

Map: Shake Intensity Map – San Jacinto Fault M7.0
(Source: Emergency Planning Consultants)



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Impact of Earthquakes in the Cucamonga Valley Water District** below.

Impact of Earthquakes in the Cucamonga Valley Water District

Based on the risk assessment, it is evident that earthquakes will continue to have potentially devastating economic impacts to certain areas of the District. Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life;
- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Secondary health hazards e.g. mold and mildew;
- ✓ Damage to roads/bridges resulting in loss of mobility;
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community;
- ✓ Negative impact on commercial and residential property values; and
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.

Flood Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Previous Occurrences of Flooding in the Cucamonga Valley Water District** below.

Previous Occurrences of Flooding in the Cucamonga Valley Water District

During the winter storms of December 2010 through January 2011, the District sustained substantial damage to canyon water intake structures as well as earthen roadways in Cucamonga Canyon and Day Canyon.

On Dec 25, 2003, the District sustained substantial damage to canyon water intake structures located in Cucamonga, Deer, Day, and East Canyons. Flash flood damage occurred as an indirect result of fire damage caused by the Grand Prix Fire of 2003, which burned and destroyed all trees and vegetation in the upper portions of the canyons.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))
A: See **Local Conditions** below.

Local Conditions

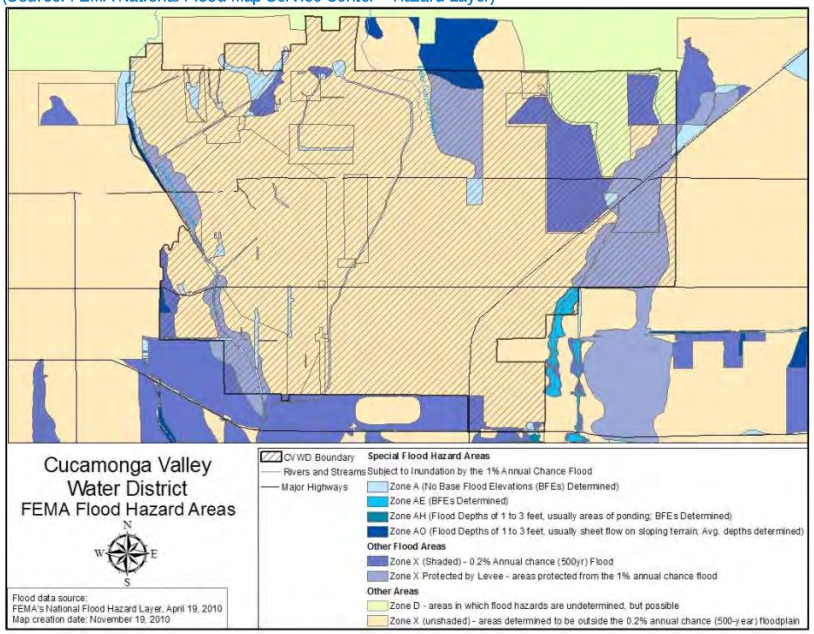
The unpredictable range in seasonal rainfall that is typical of Southern California, coupled with the location near the San Gabriel Mountains, makes the District vulnerable to flooding during the winter storm season. District facilities within the local canyon areas are particularly susceptible to flash flood damage. Given the topography of the District service area, elevation changes contribute to flash flood potential along several north/south thoroughfares in the City of Rancho Cucamonga.

National Flood Insurance Program

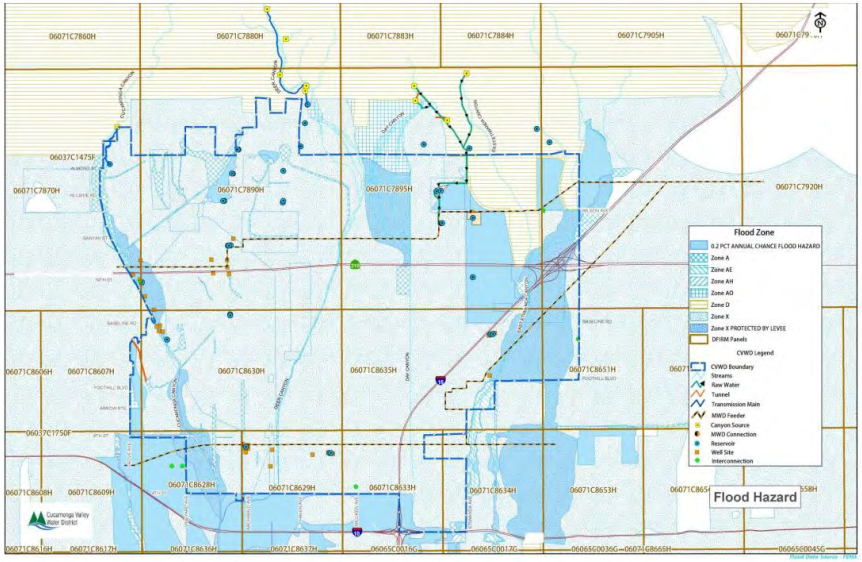
The Cities within Cucamonga Valley Water District participate in the National Flood Insurance Program (NFIP). Created by Congress in 1968, the NFIP makes flood insurance available in communities that enact minimum floodplain management rules consistent with the Code of Federal Regulations §60.3.

According to **Map: FEMA Flood Hazard Areas,** the majority of hazard areas within the District are classified as "Flood Zone X" and "Flood Zone A". Zone X is defined as the area outside the 500-year flood and protected by levee from 100-year flood. Zone A is defined as areas subject to inundation by the 1-percent-annual-chance flood event.

Map: FEMA Flood Hazard Areas
(Source: FEMA National Flood Map Service Center – Hazard Layer)



Map: Flood Hazards
(Source: Cucamonga Valley Water District)



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Impact of Flooding in the Cucamonga Valley Water District** below.

Impact of Flooding in the Cucamonga Valley Water District

Floods and their impacts vary by location and severity of any given flood event, and likely only affect certain areas of the District during specific times. Based on the risk assessment, it is evident that floods will continue to have devastating economic impact to the District.

Impact that is not quantified, but anticipated in future events includes:

- ✓ Injury and loss of life;
- ✓ Commercial and residential structural damage;
- ✓ Disruption of and damage to public infrastructure;
- ✓ Secondary health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values and
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.

Wildfire Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Previous Occurrences of Wildfire in the Cucamonga Valley Water District** below.

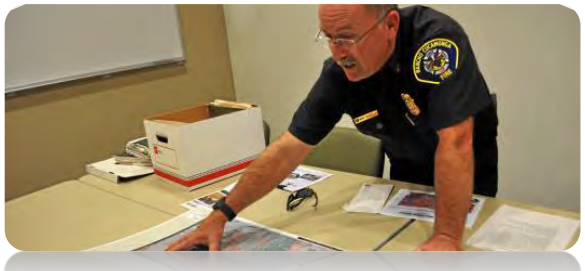
Previous Occurrences of Wildfire in the Cucamonga Valley Water District

Historically, wildfires have occurred within the northernmost jurisdiction of the District given that the District is located on the foothills of the San Gabriel Mountains

The most recent wildfire outbreak to impact the District was the Etiwanda Fire. The fire started on April 30, 2014, fueled by Santa Ana wind conditions and extreme temperatures. According to CAL FIRE, four schools and more than 1,500 homes were evacuated. The fire burned a total of 2,143 acres and was fully contained by May 10, 2014.



Another significant wildfire to impact the District was the Grand Prix Fire in 2003. The wildfire started in Fontana and pushed toward Lytle Creek and San Sevaine drainage for two days before strong Santa Ana winds drove the fire west toward the City of Rancho Cucamonga. The fire burned through the entire wild land interface area of Rancho Cucamonga over a three-day period. Fifteen homes were destroyed, and more were damaged. Thousands of homes were evacuated. The fire did not stop until it ran into burn from 2002 in La Verne.



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))
A: See **Local Conditions** below.

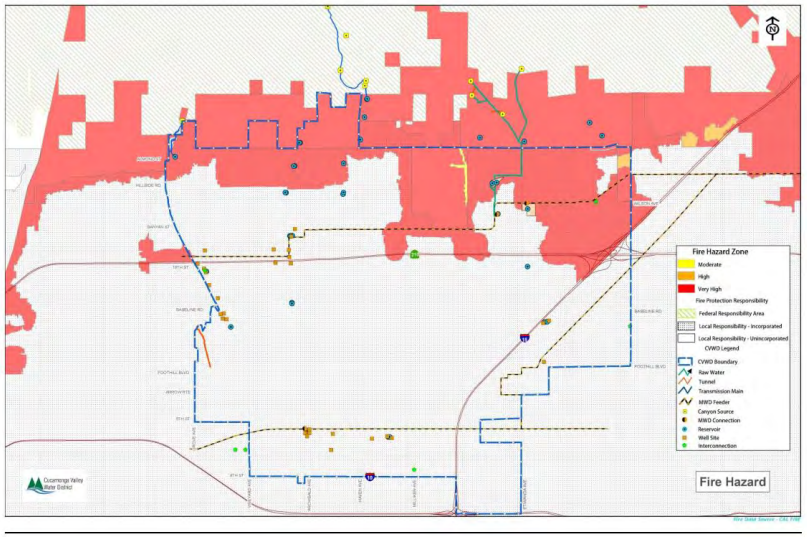
Local Conditions

Due to its weather, topography, and native vegetation, the majority of San Bernardino County is at risk from wildland fires. The extended droughts characteristic of California's Mediterranean climate result in large areas of dry vegetation that provide fuel for wildland fires. Furthermore, the native vegetation typically has a high oil content that makes it highly flammable. The area is also intermittently impacted by Santa Ana winds, the hot, dry winds that blow across Southern California in the spring and late fall.

The District's location at the base of the San Gabriel Mountains creates an urban/wildland interface that makes the region more susceptible to wildfires than other adjoining jurisdictions.

According to **Map: Fire Hazard Severity Zones** the majority of the District closest to the foothills is considered to be at special risk to wildfires. These areas are at significant risk during the summer months, extended periods of heat, and long periods of no rain.

Map: Fire Hazard Severity Zones
(Source: Cucamonga Valley Water District & CAL FIRE)



Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Impact of Wildfire in the Cucamonga Valley Water District** below.

Impact of Wildfire in the Cucamonga Valley Water District

Wildfires and their impact vary by location and severity of any given wildfire event, and will likely only affect certain areas of the District during specific times. Based on the risk assessment, it is evident that wildfires will have a potentially devastating economic impact to the District.

Impact that is not quantified, but anticipated in future events includes:

- ✓ Injury and loss of life
- ✓ Commercial and residential structural damage
- ✓ Disruption of and damage to public infrastructure
- ✓ Secondary health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed

Windstorm Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Previous Occurrences of Windstorms in the Cucamonga Valley Water District** below.

Previous Occurrences of Windstorms in the Cucamonga Valley Water District

Severe windstorms pose a significant risk to life and property in the Cucamonga Valley Water District by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds can and do occasionally cause tornado-like damage to local homes and businesses in and near the community. High winds have destructive impact, especially to trees, power lines, and utility services.



The most recent windstorm event to impact the District occurred on October 15, 2018. Fierce Santa Ana winds gusted across many parts of Southern California, cutting power to thousands, knocking down trees, and forcing school closures. There were several reports of toppled trees in Rancho Cucamonga.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))
A: See **Local Conditions** below.

Local Conditions

The District has a history of extensive windstorms, often related to Santa Ana winds. The Santa Ana winds are strong, extremely dry offshore winds that characteristically sweep through the area in late fall and early winter. High winds can also result from thunderstorm inflow and outflow or high- and low-pressure systems moving through the region. High winds have speeds reaching at least 50 miles per hour and can exceed 100 miles per hour. Wind events constitute one of the most frequent major hazards in the District.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Impact of Windstorms in the Cucamonga Valley Water District** below.

Impact of Windstorms in the Cucamonga Valley Water District

Based on the risk assessment, it is evident that Windstorms continue to have potentially devastating economic impact to the District.

Impacts that is not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life
- ✓ Commercial and residential structural damage
- ✓ Disruption of and damage to public infrastructure
- ✓ Secondary Health hazards e.g. mold and mildew
- ✓ Damage to roads/bridges resulting in loss of mobility
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.

Drought Hazards

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B2a.

Q: Does the plan include information on **previous occurrences** of hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Previous Occurrences of Drought in the Cucamonga Valley Water District** below.

Previous Occurrences of Drought in the Cucamonga Valley Water District

The local area has sustained periods of drought. On January 17, 2014, Governor Jerry Brown issued a proclamation declaring a State of Emergency due to extended drought conditions. On April 22, 2014, the Cucamonga Valley Water District Board of Directors ("Board") adopted Resolution No. 2014-4-2 urging continued outreach efforts on water efficiency in response to the statewide drought. On August 26, 2014, the Board adopted Resolution No. 2014-8-2 imposing mandatory restriction on water use in order to comply with the statewide drought regulations. The District also moved to STAGE 2 WATER WATCH Alert with additional outreach and notices to customers of the immediate water use restrictions and imposed monetary fines and penalties for future violation and noncompliance.

On April 1, 2015, Governor Jerry Brown issued Executive Orders to the State Water Resources Control Board (SCWRB) to impose the 25% Conservation Standard which mandated a 25% reduction in total water production statewide through February 2016. On May 12, 2015, the Board adopted Resolution 2015-5-1 to revise the Cucamonga Valley Water District Code ("District Code") in existing Chapter 4.20 Encouraging Water Use Efficiency and Chapter 4.24 Water Supply Shortage Contingency Plan. The District Code revisions enabled the District to implement the new SWRCB Regulation.

On May 12, 2015, the Board adopted Resolution No. 2015-5-3, which declared the District declared STAGE 6 SEVERE WATER EMERGENCY pursuant to its Water Supply Shortage Contingency Plan that mandated 35% conservation in total potable water production. This resolution was adopted in compliance with the SWRCB Regulation that implemented a mandatory statewide 32% reduction in total potable water production. During Stage 6 the District also implemented Drought Rates on a tiered structure and continued its effort to encourage customers to conserve. Failure to comply with the imposed restrictions resulted in violations with financial penalties.
On April 26, 2016, the Board adopted Resolution No. 2016-4-3 affirming its commitment to long-term water conservation management policy in California and shall make the necessary investments in build and prudently manage a diverse water supply portfolio to provide reliable water supplies during time of drought. On June 28, 2016, the Board adopted Resolution No. 2016-6-4 to rescind the Stage 6 declaration and move to Stage 1 – Encouraging Water Use Efficiency. Since the implementation of the Drought Regulations, the District implemented water conservation and efficiency programs continue its effort providing reliable water supplies during time of need.

See Attachments for District Resolutions pertaining to drought.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B1a.

Q: Does the plan include a general **description** of all natural hazards that can affect each jurisdiction? (Requirement §201.6(c)(2)(i))
A: See **Local Conditions** below.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3b.

Q: Is there a description of each identified hazard's overall **vulnerability** (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction? (Requirement §201.6(c)(2)(ii))
A: See **Local Conditions** below.

Local Conditions

According to the Cucamonga Valley Water District, the District receives its water supply from three sources: local groundwater, local canyon and surface/sub-surface flows, and imported water from northern California, which is purchased from the Metropolitan Water District of Southern California (MWD).

The District has acquired surface and subsurface water rights in four local canyon watersheds, which are situated in the San Gabriel Mountains north and adjacent to the District's service area. From west to east, the local canyon water sources include Cucamonga Canyon, Deer Canyon, Day Canyon, and East Etiwanda Canyon. Annual local canyon production is 3,361 acre-feet. Local canyon flows are perhaps one of the District's most valuable and vulnerable resources. Local surface water is valuable because it is one of the least expensive sources of water supply, but it is also the most vulnerable since it is susceptible to drought conditions. The amount of runoff available as a source of supply will vary year to year, which makes long-term supply planning difficult.

Untreated imported water from the State Water Project is available through the Metropolitan Water District of Southern California via the Inland Empire Utilities Agency and is conveyed from Lake Silverwood near Lake Arrowhead through the Foothill Feeder pipeline. There are no contractual limits to the amount of imported water that can be utilized by the District. The District currently has two connections to the State Water Project and purchases approximately 30,000 acre-feet of imported water annually. Imported water is the District's most reliable source of supply in the short-term but also the most vulnerable in the long-term. State Project Water, which is treated at the Lloyd W. Michael and the Royer-Nesbit Water Treatment Plants, is highly susceptible to statewide droughts conditions.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Impact of Drought in the Cucamonga Valley Water District** below.

Impact of Drought in the Cucamonga Valley Water District

Based on the risk assessment, it is evident that drought events continue to have potentially devastating economic impacts to the District.

Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life
- ✓ Disruption of and damage to public infrastructure
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on commercial and residential property values
- ✓ Uncontrolled fires and associated injuries and damage

Cucamonga Valley Water District
Service Beyond Expectation

Terrorism Hazards

The complexity, scope, and potential consequences of a terrorist threat or incident require that there be a rapid and decisive capability to resolve the situation. The resolution to an act of terrorism demands an extraordinary level of coordination of crisis and consequence management functions and technical expertise across all levels of government. No single Federal, State, or Local governmental agency has the capability or requisite authority to respond independently and mitigate the consequences of such a threat to national security.

The incident may affect a single location or multiple locations, each of which may be a disaster scene, a hazardous scene and/or a crime scene simultaneously.

History

On December 2, 2015, 14 people were killed, and 22 others were seriously injured in a terrorist attack consisting of a mass shooting and an attempted bombing at the Inland Regional Center in San Bernardino, California. The incident is commonly referred to as the "Waterman Terrorist Attack". The fourteen people killed that day were staff members of the County of San Bernardino Public Health Department – Environmental Health Services Division.



State of California Terrorism Guidance

The catastrophic attacks on the World Trade Center Building in New York City and the Alfred P. Murrah Federal Building in Oklahoma City shocked the nation into the reality that there are no domestic safe havens from acts of terrorism. These two apparently unrelated events punctuate our nation's vulnerability and highlight California's risk of similar attack against its public officials, private and multi-national corporations, public infrastructure, and government facilities.

Historically, California has had a long experience combating terrorist groups, both domestic and international. Domestic terrorist groups in the state have been largely issue-oriented, while the few known internationally based incidents have mostly targeted the state's emigrant communities and been related to foreign disputes. Today, however, both groups are more likely to be aligned nationally and/or internationally through electronic networking. The issues and politics of these

groups remain essentially unchanged but now include increasing expressions of hatred for existing forms of government. The World Trade Center Incident demonstrates that international terrorist groups have the potential to operate with deadly effectiveness in this country. Such groups may offer no allegiance to any particular country but seek political or personal objectives that transcend national/state boundaries.

There is appropriate concern that such attacks as witnessed in Tokyo, New York City, and Oklahoma City could occur in California. A terrorist acting alone or in concert with any of the known national or international groups could readily commit acts of terrorism in California. The open availability of basic shelf-type chemicals and mail order biological research materials, coupled with an access to even the crudest laboratory facilities, could enable the individual extremist or an organized terrorist faction to manufacture proven highly lethal substances or to fashion less sophisticated weapons of mass destruction. The use of such weapons could result in mass casualties, long term contamination, and wreak havoc to both the state and national economies.

The freedom of movement and virtually unrestricted access to government officials, buildings, and critical infrastructure afforded to California's citizens and foreign visitors, presents the terrorist with the opportunity and conditions of anonymity to deliver such devastation and its tragic consequences with only the crudest devices of nuclear, chemical, or biological content.

Terrorist incidents create a unique environment in which to manage emergency response. Local responders are typically the first on scene during an actual incident and local government has primary responsibility for protecting public health and safety. Ordinarily, the local first response will be conducted under California's Standardized Emergency Management System (SEMS) which forms the basis of California's concept of operations for managing any kind of emergency or disaster, including terrorist incidents. The local responders will manage all aspects of the incident until the FBI assumes command, by virtue of its legal authority, of the law enforcement aspects relating to identifying, apprehending, and neutralizing the terrorists and their weapons. Local and state authorities always maintain control of their response resources and continue to operate utilizing SEMS.

San Bernardino/Riverside County Terrorism Early Warning Group (TEWG)

Effective and rapid dissemination of indications and warnings to local emergency response agencies is an essential yet problematic element of terrorism management efforts. For bio-terrorist threats, such efforts must integrate ongoing real-time surveillance efforts. Terrorism Early Warning Groups are a multilateral, multidisciplinary effort to monitor open source data to identify trends and potential threats, monitor potential threat information during periods of heightened concern, assess potential targets and perform net assessments to guide decision making during actual events. TEWG provides integrated threat and net assessment from a multi-jurisdictional perspective. City and county fire departments work together with emergency management, FBI, local law enforcement agencies, Department of Health Services, as well as other state and federal offices. The formation of TEWGs supports field response in the preparation for and response to acts of terrorism.

The San Bernardino/Riverside County TEWG provides Unified Command Structure with the impact of an attack on the operational area, gauges resource needs and shortfalls, continuously monitors and assesses situational awareness and status, and acts as the point of contact for inter-agency liaison in order to develop options for courses of action for incident resolution. TEWG is

Cucamonga Valley Water District
Service Beyond Expectation

an Emerging Threat Workspace (Civil Battle Lab) for stimulating National Strategy for emerging threat issues:

- Terrorism and Infrastructure Protection
- Public Order (Riots/Disturbances)
- Civil-Military Interoperability for Urban Operations
- Civilian Police (CIVPOL) for Peace Officers
- Networked Threats and Emerging Threats
- Counterterrorism Technology Test Bed



Biological & Chemical Terrorism

The Public Health Response to Biological and Chemical Terrorism: Interim Planning Guidance for State Public Health Officials (hereafter referred to as the Planning Guidance) outlines steps for strengthening the capacity of the public health system to respond to and protect the nation against the dangers of a terrorism incident. Although the Planning Guidance focuses on the biological and chemical terrorism preparedness efforts of state-level health department personnel, it can be used as a planning tool by anyone in the response community, regardless of his or her position within that community or level of government.

The public health community at large also can use this document to improve its terrorism preparedness and develop terrorism response plans. The preparedness program outlined in this Planning Guidance, once implemented, should improve the ability of all public health agencies to respond to emergency situations arising from all sources, not just terrorism.

The Planning Guidance focuses on the capabilities that state health departments are likely to need to respond effectively to a terrorism incident. Despite the public health focus of this document, the terrorism plan ultimately should not be agency-specific. Instead, the terrorism plan should be integrated, outlining the roles and responsibilities of all agencies that participate in a response. This coordinated terrorism plan should then be annexed to the State's all-hazard Emergency Plan.

Terrorism Mitigation

Because the primary mechanism for past terrorist incidents has been bombings and because of the potential for mass casualties from a WMD terrorist event, the primary focus of the State's hazard mitigation strategy for terrorism is on mitigation measures that reduce risk from bomb blast and nuclear, biological, and chemical attacks to critical state facilities and population. Measures include:

Hardening (construction/retrofitting)
- ✓ Relocation/retrofitting of air intakes
- ✓ Ventilation system upgrade/retrofit
- ✓ Protect tower bases of bridges
- ✓ Seismic retrofitting
- ✓ Upgrade/retrofit water main system
- ✓ Blast guard window film/glazing, frames
- ✓ Egress improvements

Barriers and Fencing
- ✓ Fencing around air intakes
- ✓ Fencing around fuel supply
- ✓ Vehicle barriers, bollards, popup gates, hydraulic barriers
- ✓ Waterfront security system
- ✓ Perimeter fencing

Redundant systems
- ✓ Fire protection system
- ✓ Communications systems
- ✓ Information technology
- ✓ Utility (Gas/Heat/Water)
- ✓ Utility (Electric)

Security Measures
- ✓ Security systems/early warning systems
- ✓ Warning and alarms systems directly related to system protection/shut down
- ✓ Smart utility management systems on all critical services.

Planning/Studies
- ✓ Telecommunications plans
- ✓ IT disaster recovery plans
- ✓ Business continuity/resumption plans
- ✓ Intelligence gathering and sharing
- ✓ Threat, vulnerability, and risk assessments
- ✓ Evacuation plans
- ✓ Site security planning

Seismic Study
- ✓ Retrofitting
- ✓ Interior lighting
- ✓ Exterior lighting
- ✓ Staging areas

Surveillance
- ✓ Secure Access & Entry Points
- ✓ Card swipe system
- ✓ Magnetometer
- ✓ Metal detectors
- ✓ Surveillance cameras & closed circuit TVs
- ✓ Personnel detection equipment
- ✓ Vehicle detection equipment
- ✓ Radar systems
- ✓ Building access system
- ✓ Motion detectors
- ✓ Replacing door locks and keys

IT Systems
- ✓ Security management system
- ✓ Building access system
- ✓ Employee identification system
- ✓ Coding protocol for sensitive records.

These above-listed measures are already being used in many communities and situations and have proven effective in reducing or eliminating hazard risk. Each of these measures directly meets an objective stated in the State's Hazard Mitigation Strategy.

Q&A | ELEMENT B: HAZARD IDENTIFICATION AND RISK ASSESSMENT | B3a.

Q: Is there a description of each hazard's **impacts** on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)? (Requirement §201.6(c)(2)(ii))
A: See **Impact of Terrorism in the Cucamonga Valley Water District** below.

Impact of Terrorism in the Cucamonga Valley Water District

Based on the risk assessment, it is evident that terrorism events continue to have potentially devastating economic impacts to the District.

Impacts that are not quantified, but can be anticipated in future events, include:

- ✓ Injury and loss of life
- ✓ Disruption of and damage to District and other public infrastructure
- ✓ Significant economic impact (jobs, sales, tax revenue) upon the community
- ✓ Negative impact on property values
- ✓ Uncontrolled fires and associated injuries and damage
- ✓ Psychological effects on District employees and customers

Mitigation Strategies

Overview of Mitigation Strategy

As the cost of damage from natural disasters continues to increase nationwide, the Cucamonga Valley Water District recognizes the importance of identifying effective ways to reduce vulnerability to disasters. Mitigation Plans assist communities in reducing risk from natural hazards by identifying resources, information and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the District.

The plan provides a set of action items to reduce risk from natural hazards through education and outreach programs, and to foster the development of partnerships. Further, the plan provides for the implementation of preventative activities, including programs that restrict and control development in areas subject to damage from natural hazards.

The resources and information within the Mitigation Plan:

1. Establish a basis for coordination and collaboration among agencies and the public within the Cucamonga Valley Water District's service area;
2. Identify and prioritize future mitigation projects; and
3. Assist in meeting the requirements of federal assistance programs

The Mitigation Plan is integrated with other District plans including the Cucamonga Valley Water District Emergency Operations Plan as well as department-specific standard operating procedures.

Mitigation Measure Categories

Following is FEMA's list of mitigation categories. The activities identified by the Planning Team are consistent with the six broad categories of mitigation actions outlined in FEMA publication 386-3 *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies*.

- ✓ **Prevention:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
- ✓ **Property Protection:** Actions that involve modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- ✓ **Public Education and Awareness:** Actions to inform and educate citizens, property owners, and elected officials about hazards and potential ways to mitigate them.

  Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
- ✓ **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses preserve or restore the functions of natural systems. Examples include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- ✓ **Emergency Services:** Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.
- ✓ **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, retaining walls, and safe rooms.

Q&A | ELEMENT C. MITIGATION STRATEGY | C3

Q: Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))
A: See **Goals** below.

Goals

The 2005 CVWD Hazard Mitigation Plan established the following goals:

- ✓ Increase water system redundancy
- ✓ Reduce Fire Damage Potential
- ✓ Reduce Flood Damage Potential
- ✓ Seismic Retrofit

In 2019, during Planning Team Meeting #1, the 2005 plan goals were discussed and it was decided to change the goals to be less hazard-specific and more focused on hazard mitigation. The 2019 goals are based on the risk assessment and represent a long-term vision for hazard reduction or enhanced mitigation capabilities. They are compatible with community needs and goals expressed in other planning documents prepared by the District. Each goal is supported by mitigation action items as seen in the Mitigation Actions Matrix.

FEMA defines Goals as general guidelines that explain what you want to achieve. They are usually broad policy-type statements, long-term, and represent global visions.

The five mitigation goals and descriptions are listed below.

FEMA defines Mitigation Activities as specific actions that help you achieve your goals and objectives.

Protect Life and Property

Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural, human-caused, and technological hazards.

Improve hazard assessment information to make recommendations for avoiding new development in high hazard areas and encouraging preventative measures for existing development in areas vulnerable to natural, human-caused, and technological hazards.

Enhance Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with natural, human-caused, and technological hazards.

Provide information on tools; partnership opportunities, and funding resources to assist in implementing mitigation activities.

Preserve Natural Systems

Support management and land use planning practices with hazard mitigation to protect life.

Preserve, rehabilitate, and enhance natural systems to serve hazard mitigation functions.

Encourage Partnerships and Implementation

Strengthen communication and coordinate participation with public agencies, citizens, non-profit organizations, business, and industry to support implementation.

Encourage leadership within the District and public organizations to prioritize and implement local and regional hazard mitigation activities.

Strengthen Emergency Services

Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.

Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.

Coordinate and integrate hazard mitigation activities where appropriate, with emergency operations plans and procedures.

The Planning Team also developed hazard-specific mitigation goals, which appear in the **Mitigation Strategies Section**.

How are the Mitigation Action Items Organized?

The action items are a listing of activities in which District departments and citizens can be engaged to reduce risk. Each action item includes an estimate of the timeline for implementation.

The action items are organized within the following **Mitigation Actions Matrix**, which lists all of the multi-hazard (actions that reduce risks for more than one specific hazard) and hazard-specific action items included in the mitigation plan. Data collection and research and the public participation process resulted in the development of these action items. The Matrix includes the following information for each action item:

Funding Source

The action items can be funded through a variety of sources, possibly including: operating budget/general fund, development fees, Community Development Block Grant (CDBG), Hazard Mitigation Grant Program (HMGP), other Grants, private funding, Capital Improvement Program, and other funding opportunities.

Planning Mechanism

It's important that each action item be implemented. Perhaps the best way to ensure implementation is through integration with one or many of the District's existing "planning mechanisms" including the Capital Improvement Program, General Fund and Grants. Opportunities for integration will be simple and easy in cases where the action item is already compatible with the content of the planning mechanism.

The Capital Improvement Program, depending on the budgetary environment, is updated every 5 years. The CIP includes infrastructure projects built and owned by the District. As such, the CIP is an excellent medium for funding and implementing action items from the Mitigation Plan. The Mitigation Actions Matrix includes several items from the existing CIP. The authors of the CIP served on the Planning Team and are already looking to funding addition Mitigation Plan action items in future CIPs.

The General Fund is the budget document that guides all of the District's expenditures and is updated on an annual basis. Although primarily a funding mechanism, it also includes descriptions and details associated with tasks and projects.

Grants come from a wide variety of sources – some annually and other triggered by events like disasters. Whatever the source, the District uses the General Fund to identify successful grants as funding sources.

Buildings & Infrastructure

This addresses the issue of whether or not a particular action item results in the reduction of the effects of hazards on new and existing buildings and infrastructure.

Coordinating Organization

The Mitigation Actions Matrix assigns primary responsibility for each of the action items. The hierarchies of the assignments vary – some are positions, others are departments, and others are committees. The primary responsibility for implementing the action items falls to the entity shown as the "Coordinating Organization". The coordinating organization is the agency with regulatory responsibility to address hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. Coordinating organizations may include local, County, or regional agencies that are capable of or responsible for implementing activities and programs.

Plan Goals Addressed

The plan goals addressed by each action item are included as a way to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins.

The plan goals are organized into the following five areas:

- ✓ Protect Life and Property
- ✓ Enhance Public Awareness
- ✓ Preserve Natural Systems
- ✓ Encourage Partnerships and Implementation
- ✓ Strengthen Emergency Services

Q&A | ELEMENT C. MITIGATION STRATEGY | C5a.

Q: Does the plan explain how the mitigation actions and projects will be prioritized (including cost benefit review)? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))
A: See **Benefit/Cost Ratings** and **Priority Rating** below.

Benefit and Cost Ratings

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.

Cost ratings were defined as follows:

High: Existing jurisdictional funding will not cover the cost of the action item so other sources of revenue would be required.

Medium: The action item could be funded through existing jurisdictional funding but would require budget modifications.

Low: The action item could be funded under existing jurisdictional funding.

Benefit ratings were defined as follows:

High: The action item will provide short-term and long-term impacts on the reduction of risk exposure to life and property.

Medium: The action item will have long-term impacts on the reduction of risk exposure to life and property.

Low: The action item will have only short-term impacts on the reduction of risk exposure to life and property.

Priority Rating

The first step in rating priorities for the mitigation action items was to look again at the priorities established in the 2005 HMP. As the Planning Team reviewed the 2005 Mitigation Actions Matrix, the Team discussed any necessary changes to the priority rankings while utilizing the Priority Rating Sheet below. The Priority Rating Sheet was used to establish a "priority rating" for each of the mitigation action items. Designations of "High", "Medium", or "Low" were assigned to each action item using the following criteria:

Priority Rating Sheet

Does the Action:
- ☐ solve the problem?
- ☐ address Vulnerability Assessment?
- ☐ reduce the exposure or vulnerability to the highest priority hazard?
- ☐ address multiple hazards?
- ☐ benefits equal or exceed costs?
- ☐ implement a goal, policy, or project identified in the General Plan or Capital Improvement Plan?

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 LHMP?
- ☐ 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?
- ☐ positive or neutral impact on 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?

As mitigation action items were updated or written the Planning Team, representatives were provided worksheets for each of their assigned action items. Answers to the criteria above determined the priority according to the following scale.

- 1-6 = Low priority
- 7-12 = Medium priority

Q&A | ELEMENT C. MITIGATION STRATEGY | C4a.

Q: Does the plan identify and analyze a comprehensive range (different alternatives) of specific mitigation actions and projects to reduce the impacts from hazards? (Requirement §201.6(c)(3)(ii))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C4b.

Q: Does the plan identify mitigation actions for every hazard posing a threat to each participating jurisdiction? (Requirement §201.6(c)(3)(ii))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C4c.

Q: Do the identified mitigation actions and projects have an emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C5a.

Q: Does the plan explain how the mitigation actions and projects will be prioritized (including cost benefit review)? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C5b.

Q: Does the plan identify the position, office, department, or agency responsible for implementing and administering the action/project, potential funding sources and expected timeframes for completion? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D2

Q: Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))
A: See **Mitigation Actions Matrix** below.

Q&A | ELEMENT D. MITIGATION STRATEGY | D3

Q: Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))
A: See **Mitigation Actions Matrix** below.

Mitigation Actions Matrix

Following is **Table: Mitigation Actions Matrix** which identifies the existing and future mitigation activities developed by the Planning Team.

Table: Mitigation Actions Matrix

Mitigation Action Item	**Coordinating Agency**	**Timeline**	**Goal:** Protect Life and Property	**Goal:** Public Awareness	**Goal:** Natural Systems	**Goal:** Emergency Services	**Goal:** Partnerships and Implementation	**Buildings & Infrastructure:** Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	**Funding Source:** GF- General Fund, GR-Grant, CIP	**Planning Mechanism:** CIP, GF-General Fund, GR-Grant	**Benefit:** L-Low, M-Medium, H-High	**Cost:** L-Low, M-Medium, H-High	**Priority:** L-Low, M-Medium, H-High	**Comments:** Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
MH-1 Recycled Water Retrofits. This multiyear project will fund the conversion of customers to recycled water. Agreements will be made to receive reimbursement for the cost in the future. These funds will also be used to provide matching funds for future grant opportunities.	Engineering - Water Resource Division (WR); Design Division (D); Inspection Division (Insp)	3-5 years	X	X			X	Y	CIP	CIP	H	L	M	$100K per year, CP7878
MH-2 Construct Various Recycled Water Vales at Various Locations. Roadway	WR; D; Insp	3-5 years	X	X			X	Y	CIP	CIP	L	L	L	$50K per year, CP7876

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
improvements are made throughout the year and will require that the valves be adjusted to grade. Recycled water valves also need to be replaced before the end of their service life. Valve replacements are part of ongoing operations and maintenance to ensure reliable service.														
MH-3 Replace existing siphon at 8th Street and Vineyard Avenue. Siphons require extensive maintenance and have added risk of overflow. The District has identified several siphons that can be reasonably replaced with a	D; Operations – Water Maintenance Division (WM)	4-5 years	X	X			X	Y	CIP	CIP	H	L	H	$1.45M

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
gravity system. These siphon replacements will provide greater reliability and lower maintenance costs.														
MH-4 Construct sewer line in Vineyard Avenue from 9th to Foothill	D; Wastewater Maintenance Division (WW)	4-5 years	X	X			X	Y	CIP	CIP	H	L	H	$2.35M
MH-5 Construct sewer line in Haven Avenue from Foothill to Jersey	D; WW	3-5 years	X	X			X	Y	CIP	CIP	H	L	H	$2.8M
MH-6 Construct sewer line on Archibald Avenue from Main Street to Acacia Street	D; WW	3-5 years	X	X			X	Y	CIP	CIP	H	L	H	$781K
MH-7 Replace existing siphon at Sapphire Avenue and Banyon Street.	D; Insp	3-5 years	X	X			X	Y	CIP	CIP	H	L	H	$750K
MH-8 Relocate transmission main from Reservoir 4B to 5B.	D; Insp	4-5 years	X	X			X	Y	CIP	CIP	H	L	H	$1.4M

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
MH-9 New water line in Victoria Street from Cable Creek Court to Interstate 15.	D; Insp	5 years	X	X			X	Y	CIP	CIP	H	L	H	$220K
MH-10 Construct water line on Vineyard Avenue from Yale Street to 5th Street.	D; Insp	5 years	X	X			X	Y	CIP	CIP	H	L	H	$100K
MH-11 Construct water line on Pecan Avenue from Victoria Street to Carnesi Drive.	D; Insp	5 years	X	X			X	Y	CIP	CIP	H	L	H	$1.265M
MH-12 Construct Water line in Hampshire Street from Archibald to Helms.	D; Insp	5 years	X	X			X	Y	CIP	CIP	H	L	H	$850K
MH-13 Construct water line in Garnet Street from Robards to La Vine.	D; Insp	5 years	X	X			X	Y	CIP	CIP	H	L	H	$1.25M
MH-14 Construct waterline in Foothill Boulevard and Hellman Avenue.	D; Insp	4 years	X	X			X	Y	CIP	CIP	H	L	H	$480K

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
MH-15 Construct waterline in Central	D; Insp	4 years	X	X			X	Y	CIP	CIP	H	L	H	$1.015M
MH-16 Construct water line in Candlewood Street from Archibald to Ramona.	D; Insp	4 years	X	X			X	Y	CIP	CIP	H	L	H	$1.3M
MH-17 Construct water line in Base Line Road from Haven Avenue to Spruce Avenue.	D; Insp	5 years	X	X			X	Y	CIP	CIP	H	L	H	$920K
MH-18 Construct water line in Bale Line Road from Linden Lane to Alta Cuesta.	D; Insp	5 years	X	X			X	Y	CIP	CIP	H	L	H	$230K
MH-19 Construct water line in Baxter Avenue from 8th Street to Princeton Street.	D; Insp	4 years	X	X			X	Y	CIP	CIP	H	L	H	$1.23M
MH-20 Construct water line in Archibald Avenue from Devon to Arrow.	D; Insp	3 years	X	X			X	Y	CIP	CIP	H	L	H	$780K

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
MH-21 Construct water line on Buena Vista from Camino Norte to Alta Cuesta.	D; Insp	3 years	X	X			X	Y	CIP	CIP	H	L	H	$1.25M
MH-22 Site security improvements.	D; Insp	3 years	X	X			X	Y	CIP	CIP	M	L	M	
MH-23 Construct new reservoir 8B-3.	D; Insp	4 years	X	X			X	Y	CIP	CIP	H	L	H	$1.1M
MH-24 Construct new reservoir 5B-2.	D; Insp	3 years	X	X			X	Y	CIP	CIP	H	L	H	$4.75M
MH-25 Purchase vehicles and equipment – aggressive, pro-active maintenance programs to ensure properly maintained and operational.	Operations – Fleet	Annual					X	Y	CIP	CIP	H	L	H	
MH-26 Design and construct new fuel station on the Main Yard. Include changing from underground to above-ground tanks.	Operations - Fleet	5 years	X	X	X	X	X	Y	GR	GR	H	H	M	

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
MH-27 Purchase additional sewer inspection vehicles with CCTV to inspect all Techite sewer lines.	WW	5 years	X	X	X	X		Y	GR	GR	H	H	M	
MH-28 Design and purchase additional generators for production sites (wells). Ensure 24/7 operation of well sites, administration, and operations facilities.	Operations – Production & Telemetry Division (P&T)	5 years	X		X	X		Y	CIP	GR	H	M	H	
MH-29 Reservoir 3 – Design construction and install emergency generation system at Reservoir 3. This project will allow for onsite generation of emergency power at one of the District's critical facilities.	P&T													Completed
MH-30 Conduct system-wide new flow monitoring.	Engineering – Administration	Ongoing	X		X	X		Y	CIP, GR	CIP, GR	H	M	H	Sewer Master

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
	(Eng-Admin); WW													Plan, CP7874
MH-31 Update Sewer Model and Wastewater Plan	Eng-Admin; WW	Annual	X			X		Y	CIP, GR	CIP, GR	H	H	H	Sewer Master Plan
MH-32 Pursue grant funding for Septic System Conversion. Prepare policy or program for converting neighborhoods currently using septic tank systems to public sewer system. Consider Flood Mitigation Assistance Grant (FMA) as a resource.	D; Engineering – Geographic Information Systems Division (GIS); WW	1-5 years	X	X	X	X	X	Y	GR	GR	H	H	M	Sewer Master Plan
MH-33 Develop an inventory database to track usage and life expectancy including all system infrastructure and facilities. This includes	D; GIS													Completed

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
assessment of asbestos cement pipe, VCP, PVC and cast and ductile iron pipe. Presently using InfoMap since 2008 but want to change to Geoviewer for ease of use and accuracy.														
MH-34 Investigate 7,400 feet of reinforced plastic mortar pipe (RPVP). Confirm RPVP material is Techite, commonly installed in the 1960's and early 1970's. Techite suffers from resin degradation at its current age and can fail rapidly once the resin integrity is degraded. Need to perform CCTV inspection of all RPMP to determine	D; GIS	1-5 years	X			X	X	Y	CIP, GR	CIP, GR	H	M	M	Sewer Master Plan

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
condition and potential for structural cracking and resin failures.														
MH-35 Install monitor for surcharging potential for Sewer Shed 1 serving Archibald Avenue, Orange Avenue, and Beryl Avenue.	D; GIS; WW	1-5 years	X			X	X	Y	CIP, GR	CIP, GR	H	M	M	Sewer Master Plan
MH-36 Design and construct Sewer Shed 2 serving Haven Avenue. Proposed 12-inch to 21-inch diameter pipeline 7,700 feet in length. 670 feet of 12-inch sewer main meeting performance criteria.	D; GIS; WW	1-5 years	X			X	X	Y	CIP, GR	CIP, GR	H	M	M	Sewer Master Plan
MH-37 Design and construct Sewer Shed 3 serving Rochester Avenue. Proposed 12-inch to 15-inch	D; GIS; WW	1-5 years	X			X	X	Y	CIP, GR	CIP, GR	H	M	M	Sewer Master Plan

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
diameter pipeline 2,700 feet in length. 2,500 feet of 8-inch sewer main meet performance criteria. Portion of sewer main near 100% flow capacity. This sewer shed has the highest potential for new development, fastest historical growth rate, and least-available flow capacity remaining. Recommended to design and prepare budget immediately														
MH-38 All Sewer Sheds in the District are in need of replacement siphons (13 total).	D; GIS; WW	1-5 years	X			X	X	Y	CIP, GR	CIP, GR	H	M	M	Sewer Master Plan
MH-39 Sewer System Relining and Manhole	D; GIS; WW	Ongoing	X			X		Y	CIP	CIP	H	L	M	Sewer Master

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
Rehabilitation Projects. Over time the normal wear and tear of traffic rolling over manhole lids can cause the deterioration of the manhole concrete collar that supports the lid. Every year repairs must be made to reconstruct these collars. In addition, there are some manholes in the District that experience corrosion of the concrete wall. The manholes can be fixed with the application of a protective coating such as epoxy resins. Various locations have sections of pipe that developed sags, offset joints, or cracks over time. In lieu of costly														Plan, $150k annually, CP7875

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
replacements, these sections can be relined or repaired with more cost-effective relining, repair, and rehabilitation methods.														
MH-42 Expand/Upgrade existing mass notification system for Customers to one that incorporates "911" accessible data and information so that communications are up-to-date and not reliant on customers to update.	Human Resources & Risk Management (HR/Risk); Information Technology (IT)	3-5 years	X	X		X	X		GR	GR	H	M	M	
MH-43 Diesel Fuel Tank Description - replace existing underground diesel fuel storage tank with a larger capacity above-ground tank. This fuel tank supports the														Complete

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
operation of a fixed onsite generator powering all operations at the Lloyd W. Michael Water Treatment Plant. The increased capacity of the generator serves as both supply for the plant's generation system and as an auxiliary supply for a mobile fueling trailer utilized in the refueling of high output mobile generators used to power remote pump stations and wells in the event of a power outage. (Upsize from 800 gallons to 4,000 gallons)														
MH-44 Purchase and install mobile repeaters in commercial District trucks to	HR/Risk	3-5yrs	X	X		X	X	Y	GR	GR	H	L	M	$75K

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
expand the coverage area for the 800Mhz radio system														
MH-45 Purchase portable/trailered commodes & sanitation units for remote dispatch for field operations	WM	3-5yrs	X			X	X	Y	GR	GR	H	L	M	$50K
MH-46 Upgrade Mobile Incident Command Unit (MICU) Truck to an RV-style vehicle.	HR/Risk	3-5yrs	X	X		X	X	Y	GR	GR	H	M	M	$85K
MH-47 Purchase and Install a system like WebEOC that also allows employees to provide secured 2-way electronic communications and has an app to see existing situational status maps, and report and receive information. System should also be capable of	HR/Risk; IT	4-7yrs	X	X		X	X	Y	GR	GR	H	M	M	

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
displaying real-time GPS locations of field units and response locations for the EOC's digital mapping display and Situation/Status boards. (Ideal system would require the capability of being integrated with the software conversion to Tyler Munis Enterprise Resource Planning Software/System which is planned to be implemented in 2022)														
MH-48 Purchase & install Emergency Response Notification and/or Information System for our Emergency Operation Center that will also include visual & audible	HR/Risk; IT	3-5yrs	X	X		X	X	Y	GR	GR	H	M	M	

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
hubs/monitors throughout the "employee only" areas on campus that is capable of remotely displaying and sending audible emergency alert messaging for employees and ties in to the software similar to WebEOC.														
MH-49 Install solar panel carports and solar panels on available rooftops across main campus.	D; Operations - Facilities Maintenance (FM)	5-10 years	X		X	X	X	Y	GR	GR	H	H	M	
MH-50 Design & Build Educational & Training Facility at the main campus on Lot C	HR/Risk; IT	5-10yrs	X	X		X	X	Y	GR	GR	H	L	M	$2M+
MH-51 Design & Build a community RV dump facility to minimize illegal dumping in the sewer system	HR/Risk; IT	5-10yrs	X	X		X	X	Y	GR	GR	H	L	M	$75K

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
MH-52 Coordinate with City of Rancho Cucamonga, Inland Empire Resource Conservation District, and Nestle Waters North America to utilize the Water Quality Testing Laboratory at the Bridge Plant to allow students to test the water quality in Cucamonga Canyon. This project would include multiple field trip visits from high school students within the CVWD service area. They would assess the Canyon at multiple times throughout the year and note the changes in flow and water quality. The lab would allow students to	Communications & Outreach (C&O)	5-10 years		X	X		X		GR	GR	M	M	L	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
pull water samples from the canyon above the intake, at the intake, and after it is filtered through the treatment process. They would assess the differences in water quality specifically before and after the rainy season to assess the changes in contaminants present in the water as they relate to upstream uses, both natural and manmade. This project would include a vehicle that can be driven back to the intake at Cucamonga Canyon, in all terrain conditions, that could hold 10-15 students plus teachers and CVWD staff. (It														

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could also be more than one vehicle.)														
MH-53 Coordinate with City of Rancho Cucamonga, Inland Empire Resource Conservation District, and Nestle Waters North America to construct a new interactive Environmental Learning Center on the existing ELC site. It would include more interactive activities with integrated technology. Additionally, there would be an "escape room"-type activity where students have to engage in activities in order to move on to the next activity. This would include testing tap	C&O	5-10 years		X	X		X	Y	GR	GR	M	M	M	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
water and getting the correct results before proceeding to the next activity, possibly a microscope identification. The new ELC would be appropriate for student's grades 1-8 and some of the new more interactive activities would be targeted to higher grades- 6-12 and possibly even college students. The new ELC would also have a "sky tube" or a playground-type tunnel for students to crawl through as they learn about the flow of the CVWD water supply from the Bay-Delta all the way to customers. It could also be														

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an interactive activity of the treatment process itself. Lastly, the new ELC would have a virtual reality OR 3D theatre for students to watch how microorganisms can impact the water supply in both positive and negative ways. There would be an additional activity that is specific to identifying and preparing for natural and manmade disasters based on real-life examples of what has happened in our community in the past. This includes fires, floods and droughts. Students would learn how to prepare for these														

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emergencies ahead of time; what to do during the emergency; and how they can help their communities recover. These activities would be geared toward student's grades 5-12. The building would provide a safer pathway to get from the lower level campus where the ELC currently resides to the Treatment Plant on the upper level of this campus. All of the activities would align with California State Curriculum Standards and the Education & the Environment Initiative.														

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MH-54 A mobile hydration station – The Water Wagon – would be purchased and deployed to community events as well as used in community emergency situations to provide water for nearly 200,000 people. The Water Wagon will have up to 20-30 spouts as well as larger bottled water refill stations to allow visitors to have a sip or refill their own bottle with fresh, high quality CVWD water. The Water Wagon would be used instead of bottled water at community events, helping to improve the environment by reducing the waste	C&O	5 years		X	X		X		GR	GR	H	L	M	

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
stream. In emergency situations, as long as a hose bib has flowing water, The Water Wagon can provide water on a larger scale and be deployed to a neighborhood that needs water in the event of a fire or water quality concern. The Water Wagon is a system that chills tap water, or water from a hose bib, and then makes it available via drinking fountains. The water is CVWD tap water, affirming the message that CVWD tap water is safe to drink and tastes great. The Water Wagon would feature educational signage for														

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
visitors to learn more about tap water.														
MH-55 Work with local school districts to deploy a Mobile Environmental Learning Center to schools and community events. Many teachers are still unable to visit the CVWD Environmental Learning Center due to time and cost restrictions so the M-ELC would bring the field trip to the students. In the M-ELC, students would engage in a limited number of hands-on activities including owl pellet dissection, tap water testing and microorganism assessment. The M-ELC	C&O	5-10 years		X	X		X		GR	GR	M	M	L	New, $100k

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
would be made available for back to school nights and community events that are focused on children, students and the environment, helping young people create a direct connection to the environment around them. All activities align with California State Curriculum Standards and the Education & the Environment Initiative.														
MH-56 Install live cameras in several of the District's high-flow canyons to allow a visual capture of the flow of water as well as the way the water pathways change over time. This footage could be	C&O	5-10 years		X	X		X		GR	GR	L	L	L	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
used for internship analysis projects or connected to the Cucamonga Canyon flow analysis project and Bridge Plant Water Quality lab.														
MH-57 Purchase 2+ Units and subscribe to annual service for each CSG Mobile Command Center unit. Unit is an on-demand mobile network & call center in a box.	HR/Risk; IT	1-2 yrs followed by annual renewals	X	X		X	X	Y	CIP, GR	CIP, GR	H	H	M	New, $500k
Earthquake Mitigation Action Items														
EQ-1 Design and construct seismic upgrades for reservoirs in need (e.g. EQ valves, etc.).	D; P&T	5-10 years	X		X	X		Y	CIP	CIP	M	L	M	
EQ-2 Install earthquake control valves at reservoirs	D; P&T	5-10 years	X		X	X		Y	CIP	CIP	M	L	M	

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
lacking the capability to close reservoirs and prevent reservoir drainage and assist availability for use of water for fire protection.														
EQ-3 Pump Station 4-Manifold. Reconstruction of piping manifold at Pump Station 4 will help ensure availability of water supply during periods of high demand. This project includes the installation of flex coupling, which reduces vulnerability to failure during severe seismic activity.														Complete
EQ-4 Install Chlorine Vacuum Regulators to mitigate potential damage														Complete

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
because of seismic activity resulting in a gaseous chlorine release from the pressurized manifold.														
EQ-5 Seismic Upgrade to Reservoir 1. Construct retrofitting for Reservoir 1.	D; P&T	3-5 years	X	X		X		Y	CIP	CIP	H	H	H	Started in 2017
EQ-6 Fund and conduct Reservoir Seismic Vulnerability Study. Hire a consultant to conduct study on the structural stability of the existing reservoirs and the feasibility of retrofitting reservoir sites with flexible couplings and earthquake automatic valve controllers.	D; P&T	2-4 years	X	X		X		Y	CIP	CIP	M	L	H	Start in 2019
EQ-7 Earthquake control valves at most reservoirs to	D; P&T	5-10 years	X		X	X		Y	CIP	CIP	M	L	M	

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
close reservoirs to prevent reservoir drainage and assist availability for use of water for fire protection.														
EQ-8 Pump Station 4B and 5B – Manifold reconstruction of piping manifold at pump stations to help ensure availability of water supply during periods of high demand. This project will include the installation of flex coupling, which reduces vulnerability to failure during severe seismic activity.	D; P&T	5-10 years	X		X	X		Y	CIP	CIP	M	L	M	
Flood Mitigation Action Items														
~~FLD-1 Prepare Storm Water Prevention Protection Plan (SWPPP) for projects that~~														Deleted

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
~~involve large areas, such as a new reservoir or treatment plant or large pipelines in length of 1 mile or more.~~														
FLD-2 For projects that involve large areas, such as a new reservoir or treatment plant, or large pipelines in length of 1 mile or more, the state requires the development of a Storm Water Prevention Protection Plan (SWPPP)	D; WR	Ongoing	X	X	X	X	X	Y	CIP	CIP	H	L	H	
FLD-3 At present, CVWD owns 3 Vactor Trucks. Pursue funding for 2 additional Vactor Trucks to increase line cleaning and preventative maintenance.	WW	2-4 years	X		X	X		Y	CIP	CIP	H	M	H	

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
FLD-4 Design and engineer a permanent and safe easement/pathway to East Canyon Tunnel so employees can check and clean water source. Design must include a mechanism(s) to address fall hazards and feature(s) to avoid hillside/pathway erosion.	D; WR	2-5 years	X		X	X		Y	CIP, GR	CIP, GR	H	H	H	
Wildfire Mitigation Action Items														
WF-1 Vegetation and Brush Removal (weed abatement) to areas surrounding District facilities within wildfire hazard zones.	Eng-Admin; IT; FM	Ongoing	X	X	X	X	X	Y	GF	GF	H	L	M	
WF-2 Replace aragonite fire suppression system in the IT	Eng-Admin, IT, FM	1-3yrs	X	X		X	X	Y	GR/ CIP	GR/ CIP	H	L	M	$90K

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
server room in the Admin Bldg.														
WF-3 Retrofit/Resurface all pump buildings, roofs, reservoirs and Treatment facilities with Flame Retardant or resistant materials/coatings in fire-prone areas along the foothills	D; P&T	5-10yrs	X			X	X	Y	GR	GR	H	M	H	$1M-3M
WF-4 Retrofit with fire-resistant roofs for all pump houses.	D; P&T	3-5 years		X	X	X		Y	GR	GR	H	M	M	
Drought Mitigation Action Items														
DR-1 Reservoir 3A - Design and build Nitrate removal system treating a well field including Wells 15, 17, 31,	D; P&T	1 year	X	X	X	X	X	Y	CIP	CIP	H	H	H	New, Start 2019, complete by 2020

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
33 and 23 prior to filling Reservoir 3.														
DR-2 Construct Pump Station 7B which will serve as a second booster pump for Reservoir 7B. This will increase a redundant service capacity for Reservoir 8B. In the event of fire, flood, or earthquake this canyon flow may be rendered unusable, making the pressure zone totally reliant upon water boosted from Reservoir 7B. The construction of this second booster at Pump Station 7B ensures reliable and redundant service to the #8 Pressure zone.	D; P&T	5 years	X		X	X		Y	CIP	CIP	M	L	M	New

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
DR-3 Reservoir 6C project would provide an increase in storage capacity for pressure zone #6, while reducing the potential for water loss caused by local equipment failure. Water supplied to Reservoir 6C would be provided by the proposed construction of Pump Station 5C.														Complete
DR-4 The proposed Reservoir 4D project would provide an increase in storage capacity for Pressure Zone #4, while reducing the potential for water loss caused by local equipment failure.														Complete

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
DR-5 Day & East Canyon Intake - Redesign and upgrade canyon water influent structures and conveyance systems at East and Day Canyon.	D; Operations – Water Treatment (WT)	5 years	X	X	X	X	X	Y	GR	GR	H	H	H	
Climate Change Mitigation Action Items														
CC-1 Install protective/heat-reflective roofing (or install building) over all exposed pumps and motors for reservoirs and wells to reduce the risk of overheating and motor/pump failure	D; P&T	7-10yrs	X			X	X	Y	GR	GR	H		M	$1.5M
Terrorism Mitigation Action Items														
T-1 Upgrade older cameras and hardware for security access control and CCTV	HR/Risk; IT	3-8yrs	X			X		Y	CIP, GR	CIP, GR	H	M	H	$120K

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
T-2 Remodel & Reinforce Operations Building interior lobby & conference room with Bullet-Resistant (BR) glass and walls	D; HR/Risk	3-5yrs	X			X		Y	CIP, GR	CIP, GR	H	M	M	$200K
T-3 Replace exterior windows with BR glass in areas with public access (Phase 1 – Operations Building)	D; HR/Risk	3-5yrs	X			X		Y	CIP, GR	CIP, GR	H	M	M	$300K
T-4 Replace exterior windows with BR glass in areas with public access (Phase 2 – Administration Building)	D; HR/Risk	5-7yrs	X			X		Y	CIP, GR	CIP, GR	H	M	M	$400K
T-5 Replace exterior windows with BR glass in areas with public access on 1st Floor (Phase 3 – FP Building)	D; HR/Risk	7-10yrs	X			X		Y	CIP, GR	CIP, GR	H	M	M	$500K

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
T-6 Reinforce Board Room with security doors & BR glass and walls	D; HR/Risk	5-10yrs	X			X		Y	CIP, GR	CIP, GR	H	M	M	$200K
T-7 Identify campus blind spots & install CCTV cameras; includes the purchase of additional licenses, hardware and installation; may require additional servers to expand CCTV storage capacity	HR/Risk; IT	3-5yrs	X			X		Y	CIP	CIP	H	M	M	
T-8 Partner with the City/Police to for CCTV access/sharing. May require additional hardware to support the project.	HR/Risk; IT	3-5yrs	X			X	X	Y	CIP, GR	CIP, GR	H	H	M	
T-9 Add card readers and door locking mechanisms that can be integrated with the existing access control	HR/Risk; IT	3-5yrs	X			X		Y	CIP, GR	CIP, GR	H	M	M	$60K

Mitigation Action Item	Coordinating Agency	Timeline	Goal: Protect Life and Property	Goal: Public Awareness	Goal: Natural Systems	Goal: Emergency Services	Goal: Partnerships and Implementation	Buildings & Infrastructure: Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	Funding Source: GF- General Fund, GR-Grant, CIP	Planning Mechanism: CIP, GF-General Fund, GR-Grant	Benefit: L-Low, M-Medium, H-High	Cost: L-Low, M-Medium, H-High	Priority: L-Low, M-Medium, H-High	Comments: Completed, Deferred, Deleted, New, Revised, Cost estimates from Engineering, source documents, CP-Capital Project #
system to automatically lock doors/restrict access to areas that are public accessible. Areas include: Admin Bldg. Board Room, FP Conference Rooms.														

Plan Maintenance

The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan update every five years. This section describes how the District will integrate public participation throughout the plan maintenance process.

Q&A | ELEMENT A: PLANNING PROCESS | A6c.

Q: Does the plan identify how, when, and by whom the plan will be **updated** during the 5-year cycle? (Requirement §201.6(c)(4)(i))
A: See **Monitoring the Plan** below.

Method and Scheduling of Plan Implementation

The Planning Team that was involved in research and writing of the Plan will also be responsible for implementation. The Planning Team will be led by the Chair of the Planning Team, Rossana Ammari, Risk Management Analyst who will be referred to as the Local Mitigation Officer.

	Year 1	Year 2	Year 3	Year 4	Year 5
Monitoring	XXXX	XXXX	XXXX	XXXX	XXXX
Evaluating					X
Internal Planning Team Evaluation	X	X	X	X	X
Cal OES and FEMA Evaluation					X
Updating					X

Monitoring and Implementing the Plan

Plan Adoption

The Cucamonga Valley Water District's Board of Directors will be responsible for adopting the Mitigation Plan. This governing body has the authority to promote sound public policy regarding hazards. Once the plan has been adopted, the Local Mitigation Officer will be responsible for submitting it to the State Hazard Mitigation Officer at California Office of Emergency Services (Cal OES). Cal OES will then submit the plan to the Federal Emergency Management Agency (FEMA) for review and approval. This review will address the requirements set forth in 44 C.F.R. Section 201.6 (Local Mitigation Plans). Upon acceptance by FEMA, Cucamonga Valley Water District will gain eligibility for Hazard Mitigation Grant Program funds.

Local Mitigation Officer

Under the direction of the Local Mitigation Officer, the Planning Team will take responsibility for plan maintenance and implementation. The Local Mitigation Officer will facilitate quarterly Planning Team meetings and will assign tasks such as updating and presenting the Plan to the members of the Planning Team. Plan implementation and evaluation will be a shared responsibility among the Planning Team members. The Local Mitigation Officer will coordinate with District's leadership to ensure funding for 5-year updates to Plan as required by FEMA.

The Planning Team will be responsible for coordinating implementation of plan action items and undertaking the formal review process. The Local Mitigation Officer will be authorized to make changes in assignments to the current Planning Team.

The Planning Team will meet on a quarterly basis to review the status of the mitigation action items. Meeting dates will be scheduled once the final Planning Team has been established. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the mitigation plan.

Q&A | ELEMENT C. MITIGATION STRATEGY | C6a.

Q: Does the plan identify the local planning mechanisms where hazard mitigation information and/or actions may be incorporated? (Requirement §201.6(c)(4)(ii))
A: See **Implementation through Existing Program** below.

Q&A | ELEMENT C. MITIGATION STRATEGY | C6b.

Q: Does the plan describe each community's process to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms? (Requirement §201.6(c)(4)(ii))
A: See **Implementation through Existing Program** below.

Implementation through Existing Programs

The Cucamonga Valley Water District addresses statewide planning goals and legislative requirements through its Capital Improvement Program. The Mitigation Plan provides a series of recommendations - many of which are closely related to the goals and objectives of existing planning programs. The Cucamonga Valley Water District will implement recommended mitigation action items through existing programs and procedures.

The Cucamonga Valley Water District Engineering Department is responsible for adhering to the State of California's Building and Safety Codes. In addition, the Planning Team will work with other agencies at the state level to review, develop and ensure Building and Safety Codes are adequate to mitigate or present damage by hazards. This is to ensure that life-safety criteria are met for new construction.

Since the approval of the 2005 HMP, there were mitigation action items that were funded and completed however none of the actions had been integrated into any of the planning mechanisms. The Planning Team is committed to no longer letting the HMP sit on the shelf but rather is enthusiastic about meeting on a quarterly basis to seize funding opportunities and integration with other planning mechanisms that can bring the mitigation plan to life.

Some of the goals and action items in the 2019 Mitigation Plan will be achieved through activities recommended in the CIP or Annual Budget. Various departments develop the CIP and Annual Budget and review it on an annual basis. During those annual review periods, the Planning Team department representatives will identify areas that the Mitigation Plan action items are consistent with CIP or Annual Budget goals and integrate them where appropriate. Other opportunities for integration including public awareness publications and staff training relating to hazard information.

As indicated in the **Mitigation Actions Matrix**, several action items have been added to ensure implementation through other existing planning mechanisms. Also, the **Table: Capability Assessment** identifies the need to maintain balance and diversify the Hazard Mitigation Planning

Team to accomplish an efficient and effective implementation of the Plan. The success of the 2019 Plan will be ensured by the following:

- Diversity of Planning Team membership
- Quarterly implementation meetings and reporting
- Including Planning Team in review of development projects

Upon FEMA approval, the Planning Team will begin the process of incorporating existing planning mechanisms at the District level. The meetings of the Planning Team will provide an opportunity for Planning Team members to report back on the progress made on the integration of mitigation planning elements into planning documents and procedures.

Economic Analysis of Mitigation Projects

FEMA's approach to identify the costs and benefits associated with hazard mitigation strategies, measures, or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis.

Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later.

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating hazards can provide decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Given federal funding, the Planning Team will use a FEMA-approved benefit/cost analysis approach to identify and prioritize mitigation action items. For other projects and funding sources, the Planning Team will use other approaches to understand the costs and benefits of each action item and develop a prioritized list.

The "benefit", "cost", and overall "priority" of each mitigation action item was included in the Mitigation Actions Matrix located in Part III: Mitigation Strategies. A more technical assessment will be required in the event grant funding is pursued through the Hazard Mitigation Grant Program. FEMA Benefit-Cost Analysis Guidelines are discussed below.

FEMA Benefit-Cost Analysis Guidelines

The Stafford Act authorizes the President to establish a program to provide technical and financial assistance to state and local governments to assist in the implementation of hazard mitigation measures that are cost effective and designed to substantially reduce injuries, loss of life, hardship, or the risk of future damage and destruction of property. To evaluate proposed hazard mitigation projects prior to funding FEMA requires a Benefit-Cost Analysis (BCA) to validate cost effectiveness. BCA is the method by which the future benefits of a mitigation project are estimated and compared to its cost. The end result is a benefit-cost ratio (BCR), which is derived from a project's total net benefits divided by its total project cost. The BCR is a numerical expression of the cost effectiveness of a project. A project is considered to be cost effective when the BCR is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs.

Although the preparation of a BCA is a technical process, FEMA has developed software, written materials, and training to support the effort and assist with estimating the expected future benefits over the useful life of a retrofit project. It is imperative to conduct a BCA early in the project development process to ensure the likelihood of meeting the cost-effective eligibility requirement in the Stafford Act.

The BCA program consists of guidelines, methodologies and software modules for a range of major natural hazards including:

- ✓ Flood (Riverine, Coastal Zone A, Coastal Zone V)
- ✓ Hurricane Wind
- ✓ Hurricane Safe Room
- ✓ Damage-Frequency Assessment
- ✓ Tornado Safe Room
- ✓ Earthquake
- ✓ Wildfire

The BCA program provides up to date program data, up to date default and standard values, user manuals and training. Overall, the program makes it easier for users and evaluators to conduct and review BCAs and to address multiple buildings and hazards in a single BCA module run.

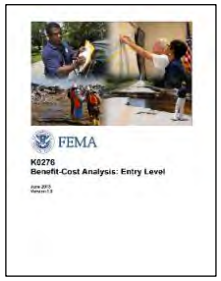
Q&A | ELEMENT A: PLANNING PROCESS | A6a.

Q: Does the plan identify how, when, and by whom the plan will be **monitored** (how will implementation be tracked) over time? (Requirement §201.6(c)(4)(i))
A: See **Monitoring the Plan** below.

Q&A | ELEMENT A: PLANNING PROCESS | A6c.

Q: Does the plan identify how, when, and by whom the plan will be **updated** during the 5-year cycle? (Requirement §201.6(c)(4)(i))
A: See **Monitoring the Plan** below.

Monitoring the Plan



Under the direction of the Local Mitigation Officer, the Planning Team will take responsibility for plan maintenance and implementation. Quarterly meetings will be established to ensure the identified mitigation action items are being accomplished. On the fifth year of the planning cycle, the Planning Team will meet to evaluate the effectiveness of the planning process and to update the overall content of the Plan. The Local Mitigation Officer will coordinate with District leadership to ensure funding for 5-year updates to Plan as required by FEMA.

The Planning Team will be responsible for coordinating implementation of plan by monitoring the progress of the mitigation action items and documenting progress notes for each item. The Local Mitigation Officer will hold quarterly meetings with the Planning Team to review the status of each mitigation action item. The monitoring meetings will take place no less than quarterly. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are

Cucamonga Valley Water District
Service Beyond Expectation

essential for the sustainability of the mitigation plan. See the **Quarterly Implementation Report** discussed below which will be a valuable tool for the Planning Team to measure the success of the Hazard Mitigation Plan.

Quarterly Implementation Report
The Quarterly Implementation Report is the same as the Mitigation Action Matrix but with a column added to track the quarterly status of each action item. Upon formal approval and adoption of the Plan, the Quarterly Implementation Report will be added to the Appendix of the Plan. Following is a sample of the Quarterly Implementation Report:

Quarterly Implementation Report																
Item Identifier	**Mitigation Action Item**	**Coordinating Agency**	**Timeline**	**Goal:** Protect Life and Property	**Goal:** Public Awareness	**Goal:** Natural Systems	**Goal:** Emergency Services	**Goal:** Partnerships and Implementation	**Buildings & Infrastructure:** Does the Action item involve New and/or Existing Buildings and/or Infrastructure? Yes (Y)	**Funding Source:** GF- General Fund, GR-Grant	**Planning Mechanism:** GP-General Plan, CIP, GF-General Fund, GR-Grant	**Benefit:** L-Low, M-Medium, H-High	**Cost:** L-Low, M-Medium, H-High	**Priority:** L-Low, M-Medium, H-High	**Quarterly Status Comments**
MULTI-HAZARD ACTION ITEMS															
MH-1	Review existing inventories of District-owned at-risk buildings and infrastructure and prioritize mitigation projects and set priorities for inspection.	Public Works and Hazard Mitigation Planning Team (Planning Team)	1-5 years	X			X	X		GF	GF	H	M	H	

An equally part of the monitoring process is the need to maintain a strategic planning process which needs to include funding and organizational support. In that light, at least one year in advance of the FEMA-mandated 5-year submission of an update, the Local Mitigation Officer will convene the Planning Team to discuss funding and timing of the update planning process.

On the fifth year of the planning cycles, the Planning Team will broaden its scope to include discussions and research on all of the sections within the Plan with particular attention given go goal achievement and public participation.

Q&A | ELEMENT A: PLANNING PROCESS | A6b.

Q: Does the plan identify how, when, and by whom the plan will be **evaluated** (assessing the effectiveness of the plan at achieving stated purpose and goals) over time? (Requirement §201.6(c)(4)(i))
A: See **Evaluating and Formal Updating the Plan** below.

Evaluating and Formal Updating the Plan

Formal Update Process

The Mitigation Plan will be monitored no less than annually to determine the effectiveness of mitigation action items and to reflect changes in land development or programs that may affect mitigation actions or their priorities. The evaluation process includes a firm schedule and timeline, and identifies the departments and divisions participating in plan evaluation. The Local Mitigation Officer or designee will be responsible for contacting the Planning Team members and organizing the annual meeting. Planning Team members will also be responsible for participating in the formal update to the Plan every fifth year of the planning cycle.

The Planning Team will review the goals and mitigation action items to determine their relevance to changing situations in the District, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The Planning Team will also review the Plan's **Risk Assessment** portion of the Plan to determine if this information should be updated or modified, given any new available data. The **coordinating organizations** responsible for the various action items will report on the status of their projects, including the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised. Amending will be made to the Mitigation Actions Matrix and other sections in the Plan as deemed necessary by the Planning Team.

Q&A | ELEMENT A: PLANNING PROCESS | A5

Q: Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))
A: See **Continued Public Involvement** below.

Continued Public Involvement

The Cucamonga Valley Water District is dedicated to involving the public directly in the continual review and updates to the Mitigation Plan. Copies of the plan will be catalogued and made available at District Headquarters. The existence and location of these copies will be publicized in the District newsletter and on the District website. This site will also contain an email address and phone number where people can direct their comments and concerns.

The Local Mitigation Officer will be responsible for using District resources to publicize the annual public meetings and maintain public involvement through the website, and news releases.

Appendix -
General Hazard Overviews

Earthquake Hazards

Measuring and Describing Earthquakes

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can further amplify ground motions. The severity of these effects is dependent on the amount of energy released from the fault or epicenter. One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. The acceleration due to gravity is often called "g". A ground motion with a peak ground acceleration of 100%g is very severe. Peak Ground Acceleration (PGA) is a measure of the strength of ground motion. PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (10%, 5%, or 2%) of being exceeded in 50 years. These ground motion values are used for reference in construction design for earthquake resistance. The ground motion values can also be used to assess relative hazard between sites, when making economic and safety decisions.

When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter.

Another tool used to describe earthquake intensity is the Magnitude Scale. The Magnitude Scale is sometimes referred to as the Richter Scale. The two are similar but not exactly the same. The Magnitude Scale was devised as a means of rating earthquake strength and is an indirect measure of seismic energy released. The Scale is logarithmic with each one-point increase corresponding to a 10-fold increase in the amplitude of the seismic shock waves generated by the earthquake. In terms of actual energy released, however, each one-point increase on the Richter scale corresponds to about a 32-fold increase in energy released. Therefore, a Magnitude 7 (M7) earthquake is 100 times (10 X 10) more powerful than a M5 earthquake and releases 1,024 times (32 X 32) the energy.

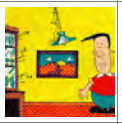
An earthquake generates different types of seismic shock waves that travel outward from the focus or point of rupture on a fault. Seismic waves that travel through the earth's crust are called body waves and are divided into primary (P) and secondary (S) waves. Because P waves move faster (1.7 times) than S waves, they arrive at the seismograph first. By measuring the time delay between arrival of the P and S waves and knowing the distance to the epicenter, seismologists can compute the magnitude for the earthquake.

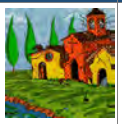
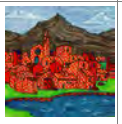
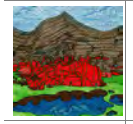
The duration of an earthquake is related to its magnitude but not in a perfectly strict sense. There are two ways to think about the duration of an earthquake. The first is the length of time it takes for the fault to rupture and the second is the length of time shaking is felt at any given point (e.g.

when someone says "I felt it shake for 10 seconds" they are making a statement about the duration of shaking). (Source: www.usgs.gov)

The Modified Mercalli Scale (MMI) is another means for rating earthquakes, but one that attempts to quantify intensity of ground shaking. Intensity under this scale is a function of distance from the epicenter (the closer to the epicenter the greater the intensity), ground acceleration, duration of ground shaking, and degree of structural damage. The Modified Mercalli Intensity Scale below rates the level of severity of an earthquake by the amount of damage and perceived shaking.

Table: Modified Mercalli Intensity Scale

	MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
	I	N/A	N/A	Not Felt
	II	N/A	N/A	Felt by persons at rest, on upper floors, or favorably placed.
	III	N/A	N/A	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
	IV	N/A	N/A	Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. In the upper range of IV, wooden walls and frame creak.
	V	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clock stop, start, change rate.
	VI	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked.

	MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
	VII	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Small slides and caving in along sand or gravel banks. Concrete irrigation ditches damaged.
	VIII	Very Strong	Moderate Damage	Steering of motorcars affected. Damage to masonry C, partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Cracks in wet ground and on steep slopes.
	IX	Violent	Heavy damage	General panic. Damage to masonry buildings ranges from collapse to serious damage unless modern design. Wood-frame structures rack, and, if not bolted, shifted off foundations. Underground pipes broken.
	X	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land.
	XI	N/A	N/A	Rails bent greatly. Underground pipelines completely out of services.
	XII	N/A	N/A	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

Earthquake Related Hazards

Ground shaking, landslides, liquefaction, and amplification are the specific hazards associated with earthquakes. The severity of these hazards depends on several factors, including soil and slope conditions, proximity to the fault, earthquake magnitude, and the type of earthquake.

Ground Shaking

Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by the earthquake. It is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault, and distance from the epicenter (where the earthquake originates). Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock.

Seismic activity along nearby or more distant fault zones are likely to cause ground shaking within the District limits.

Earthquake-Induced Landslide Potential

Generally, these types of failures consist of rock falls, disrupted soil slides, rock slides, soil lateral spreads, soil slumps, soil block slides, and soil avalanches. Areas having the potential for earthquake-induced landslides generally occur in areas of previous landslide movement, or where local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements.

Liquefaction

Liquefaction occurs when ground shaking causes wet granular soils to change from a solid state to a liquid state. This results in the loss of soil strength and the soil's ability to support weight. Buildings and their occupants are at risk when the ground can no longer support these structures. Liquefaction generally occurs during significant earthquake activity, and structures located on soils such as silt or sand may experience significant damage during an earthquake due to the instability of structural foundations and the moving earth. Many communities in Southern California are built on ancient river bottoms and have sandy soil. In some cases, the soil may be subject to liquefaction, depending on the depth of the water table.

Flood Hazards

Flood Terminology

Floodplain

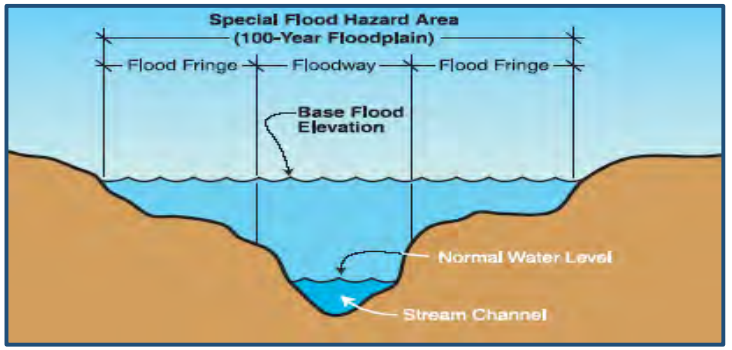
A floodplain is a land area adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. This area, if left undisturbed, acts to store excess flood water. The floodplain is made up of two sections: the floodway and the flood fringe.

100-Year Flood

The 100-year flooding event is the flood having a one percent chance of being equaled or exceeded in magnitude in any given year. Contrary to popular belief, it is not a flood occurring once every 100 years. The 100-year floodplain is the area adjoining a river, stream, or watercourse covered by water in the event of a 100-year flood. Schematic: Floodplain and Floodway shows the relationship of the floodplain and the floodway.

The 100-year flooding event is the flood having a 1% chance of being equaled or exceeded in magnitude in any given year. Contrary to popular belief, it is not a flood occurring once every 100 years.

Figure: Floodplain and Floodway
(Source: FEMA How-To-Guide Assessing Hazards)



Floodway

The floodway is one of two main sections that make up the floodplain. Floodways are defined for regulatory purposes. Unlike floodplains, floodways do not reflect a recognizable geologic feature. For NFIP purposes, floodways are defined as the channel of a river or stream, and the overbank areas adjacent to the channel. The floodway carries the bulk of the flood water downstream and is usually the area where water velocities and forces are the greatest. NFIP regulations require that the floodway be kept open and free from development or other structures that would obstruct or divert flood flows onto other properties.

Base Flood Elevation (BFE)

The term "Base Flood Elevation" refers to the elevation (normally measured in feet above sea level) that the base flood is expected to reach. Base flood elevations can be set at levels other than the 100-year flood. Some communities use higher frequency flood events as their base flood elevation for certain activities, while using lower frequency events for others. For example, for the purpose of storm water management, a 25-year flood event might serve as the base flood elevation; while the 500-year flood event serves as base flood elevation for the tie down of mobile homes. The regulations of the NFIP focus on development in the 100-year floodplain.

Types of Flooding

Two types of flooding primarily affect the Cucamonga Valley Water District: slow-rise or flash flooding. Slow-rise floods in the District may be preceded by a warning period of hours or days. Evacuation and sandbagging for slow-rise floods have often effectively lessened flood related damage. Conversely, flash floods are most difficult to prepare for, due to extremely limited, if any, advance warning and preparation time. Unlike most of California, the areas of San Bernardino County that are subject to slow-rise flooding are not associated with overflowing rivers, aqueducts, canals or lakes. Slow-rise flooding is usually the result of one or a combination of the following factors: extremely heavy rainfall, saturated soil, area recently burned in wild fires with inadequate new ground cover growth, or heavy rainfall with runoff from melting mountain snow.

Urban Flooding

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. The water moves from the clouds, to the ground, and into streams at a much faster rate in urban areas. Adding these elements to the hydrological systems can result in flood waters that rise very rapidly and peak with violent force.

The Cucamonga Valley Water District has a high concentration of impermeable surfaces that either collect water, or concentrate the flow of water in unnatural channels. During periods of urban flooding, streets can become swift moving rivers and basements can fill with water. Storm drains often back up with vegetative debris causing additional, localized flooding.

Riverine Flooding

Riverine flooding is the overbank flooding of rivers and streams. The natural processes of riverine flooding add sediment and nutrients to fertile floodplain areas. Flooding in large river systems typically results from large-scale weather systems that generate prolonged rainfall over a wide geographic area, causing flooding in hundreds of smaller streams, which then drain into the major rivers. Shallow area flooding is a special type of riverine flooding. FEMA defines shallow flood hazards as areas that are inundated by the 100-year flood with flood depths of only one to three feet. These areas are generally flooded by low velocity sheet flows of water.

Definitions of FEMA Flood Zone Designations

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

Moderate to Low Risk Areas

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

ZONE	DESCRIPTION
B and X (shaded)	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
C and X (unshaded)	Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.

High Risk Areas

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

ZONE	DESCRIPTION
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE	The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
A1-30	These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.

ZONE	DESCRIPTION
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

Undetermined Risk Areas

ZONE	DESCRIPTION
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

Wildfire Hazards

Definition

A wildfire is an uncontrolled fire spreading through vegetative fuels and exposing or possibly consuming structures. They often begin unnoticed and spread quickly. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. A wildland/urban interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

People start more than 80 percent of wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components is also a determinant of wildfire potential and behavior. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind (both short and long term) affect the severity and duration of wildfires. San Bernardino County's topography, consisting of semi-arid plains and rolling highlands, when fueled by shrub overgrowth, occasional Santa Ana winds and high temperatures, creates an ever-present threat of wildland fire. Extreme weather conditions such as high temperature, low humidity, and/or winds of extraordinary force may cause an ordinary fire to expand into one of massive proportions.



For thousands of years, fires have been a natural part of the ecosystem in Southern California. However, wildfires present a substantial hazard to life and property in communities built within or adjacent to hillsides and mountainous areas. There is a huge potential for losses due to wildland/urban interface fires in Southern California.

Wildfire Threat

In urban areas, the effectiveness of fire protection efforts is based upon several factors, including the age of structures, efficiency of circulation routes that ultimately affect response times and availability of water resources to combat fires. In wildland areas, taking the proper precautions, such as the use of fire resistant building materials, a pro-active fire Prevention inspection program, and the development of defensible space around structures where combustible vegetation is controlled, can protect developed lands from fires and, therefore, reduce the potential loss of life and property.



Other factors contribute to the severity of fires including weather and winds. Specifically, winds commonly referred to as Santa Ana winds, which occur during fire season (typically from June to the first significant rain in November) are particularly significant. Such "fire weather" is characterized by several days of hot dry weather and high winds, resulting in low fuel moisture in vegetation.

California experiences large, destructive wildland fires almost every year, and San Bernardino County is no exception. Wildland fires have occurred within the County, particularly in the fall of the year, ranging from small, localized fires to disastrous fires covering thousands of acres. The most severe fire protection problem in the area is wildland fire during Santa Ana wind conditions.

The 2003 Southern California Fires

The fall of 2003 marked the most destructive wildfire season in California history. In a ten-day period, 12 separate fires raged across Southern California in Los Angeles, Riverside, and San Bernardino, San Diego and Ventura counties. The massive "Cedar Fire" in San Diego County alone consumed 2,800 homes and burned over a quarter of a million acres.

In October 2003, Southern California experienced the most devastating wildland fire disaster in state history. According to the Governor's Blue Ribbon Panel Fire Commission Report (2004), over 739,597 acres burned; 3,631 homes, 36 commercial properties, and 1,169 outbuildings were destroyed; 246 people were injured; and 24 people died, including one firefighter. At the height of the siege, 15,631 personnel were assigned to fight the fires.



The 2007 Southern California Fires

In late October 2007, Southern California experienced an unusually severe fire weather event characterized by intense, dry, gusty Santa Ana winds. This weather event drove a series of destructive wildfires that took a devastating toll on people, property, natural resources, and infrastructure. Although some fires burned into early November, the heaviest damage occurred during the first three days of the siege when the winds were the strongest.

According to CAL FIRE, during this siege, 17 people lost their lives, ten were killed by the fires outright, three were killed while evacuating, four died from other fire siege related causes, and 140 firefighters, and an unknown number of civilians were injured. A total of 3,069 homes and other buildings were destroyed, and hundreds more were damaged. Hundreds of thousands of people were evacuated at the height of the siege. The fires burned over half a million acres, including populated areas, wildlife habitat and watershed. Portions of the electrical power distribution network, telecommunications systems, and even some community water sources were destroyed. Transportation was disrupted over a large area for several days, including numerous road closures. Both the Governor of California and the President of the United States personally toured the ongoing fires. Governor Schwarzenegger proclaimed a state of emergency

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in seven counties before the end of the first day. President Bush quickly declared a major disaster. While the total impact of the 2007 fire siege was less than the disastrous fires of 2003, it was unquestionably one of the most devastating wildfire events in the history of California.

Wildfire Characteristics

There are three categories of wildland/urban interface fire: The classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas; the mixed wildland/urban interface is characterized by isolated homes, subdivisions, and small communities situated predominantly in wildland settings. The occluded wildland/urban interface exists where islands of wildland vegetation occur inside a largely urbanized area. Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought, and development.

Southern California has two distinct areas of risk for wildland fire. The foothills and lower mountain areas are most often covered with scrub brush or chaparral. The higher elevations of mountains also have heavily forested terrain. The lower elevations covered with chaparral create one type of exposure.

The higher elevations of Southern California's mountains are typically heavily forested. The magnitude of the 2003 fires is the result of three primary factors: (1) severe drought, accompanied by a series of storms that produce thousands of lightning strikes and windy conditions; (2) an infestation of bark beetles that has killed thousands of mature trees; and (3) the effects of wildfire suppression over the past century that has led to buildup of brush and small diameter trees in the forests.

The Interface

One challenge Southern California faces regarding the wildfire hazard is from the increasing number of houses being built on the urban/wildland interface. Every year the growing population expands further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas, and the open spaces created by this expansion, produces a significant increase in threats to life and property from fires, and pushes existing fire protection systems beyond original or current design and capability. Property owners in the interface are not aware of the problems and fire hazards or risks on their own property. Furthermore, human activities increase the incidence of fire ignition and potential damage.

Fuel

Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is classified by volume and by type. Volume is described in terms of "fuel loading," or the amount of available vegetative fuel.

The type of fuel also influences wildfire. Chaparral is a primary fuel of Southern California wildfires. Chaparral habitat ranges in elevation from near sea level to over 5,000 feet in Southern California. Chaparral communities experience long dry summers and receive most of their annual precipitation from winter rains. Although chaparral is often considered as a single species, there

are two distinct types; hard chaparral and soft chaparral. Within these two types are dozens of different plants, each with its own particular characteristics.

An important element in understanding the danger of wildfire is the availability of diverse fuels in the landscape, such as natural vegetation, manmade structures and combustible materials. A house surrounded by brushy growth rather than cleared space allows for greater continuity of fuel and increases the fire's ability to spread. After decades of fire suppression "dog-hair" thickets have accumulated, which enable high intensity fires to flare and spread rapidly.

Topography

Topography influences the movement of air, thereby directing a fire course. For example, if the percentage of uphill slope doubles, the rate of spread in wildfire will likely double. Gulches and canyons can funnel air and act as chimneys, which intensify fire behavior and cause the fire to spread faster. Solar heating of dry, south-facing slopes produces up slope drafts that can complicate fire behavior. Unfortunately, hillsides with hazardous topographic characteristics are also desirable residential areas in many communities. This underscores the need for wildfire hazard mitigation and increased education and outreach to homeowners living in interface areas.

Weather

Weather patterns combined with certain geographic locations can create a favorable climate for wildfire activity. Areas where annual precipitation is less than 30 inches per year are extremely fire susceptible. High-risk areas in Southern California share a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. The so-called "Santa Ana" winds, which are heated by compression as they flow down to Southern California from Utah, create a particularly high risk, as they can rapidly spread what might otherwise be a small fire.

Drought

Recent concerns about the effects of climate change, particularly drought, are contributing to concerns about wildfire vulnerability. The term 'drought' is applied to a period in which an unusual scarcity of rain causes a serious hydrological imbalance. Unusually dry winters, or significantly less rainfall than normal, can lead to relatively drier conditions and leave reservoirs and water tables lower. Drought leads to problems with irrigation and contributes to additional fires, or increased difficulty in fighting fires.

Development

Growth and development in scrubland and forested areas is increasing the number of human-caused structures in Southern California interface areas. Wildfire affects development, yet development can also influence wildfire. Owners often prefer homes that are private with scenic views, nestled in vegetation, and use natural materials. A private setting is usually far from public roads, or hidden behind a narrow, curving driveway. These conditions, however, make evacuation and firefighting difficult. The scenic views found along mountain ridges can also mean areas of dangerous topography. Natural vegetation contributes to scenic beauty, but it may also provide a ready trail of fuel leading a fire directly to the combustible fuels of the home itself.

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Windstorm Hazards

Hazard Characteristics



Santa Ana wind conditions results in two general disaster conditions. The most common is fire fanned by the high winds. This was the situation in 1993 in Laguna Beach when a massive fire destroyed a number of homes in the surrounding hills. Wind driven flames again caused the destruction of more than 3,000 homes in Southern California in October, 2003. Other forms of disaster would be direct building damage, damage to utilities and infrastructure as a result of the high winds. This has occurred in the past few years in many southland communities including San Bernardino County.

Santa Ana winds commonly occur between October and February, with December having the highest frequency of events. Summer events are rare. Wind speeds are typically north to east at 35 knots through and below passes, and canyons with gusts to 50 knots. Stronger Santa Ana winds has gusts greater than 60 knots over widespread areas, and gusts greater than 100 knots in favored areas. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of a sea breeze. The sea breeze which typically blows onshore daily, can moderate the Santa Ana winds during the late morning and afternoon hours. Santa Ana winds are an important forecast challenge because of the high fire danger associated with them. Also, unusually high surf conditions on the northeast side of the Channel Islands normally accompany a Santa Ana event.

The Beaufort Scale below, coined and developed by Sir Francis Beaufort in 1805, illustrates the effect that varying wind speed can have on sea swells and structures:

Table: Beaufort Scale
(Source : NOAA Storm Center)

Beaufort Force	Speed (mph)	Wind Description - State of Sea - Effects on Land
0	Less 1	Calm - Mirror-like - Smoke rises vertically
1	1-3	Light - Air Ripples look like scales; No crests of foam - Smoke drift shows direction of wind, but wind vanes do not
2	4-7	Light Breeze - Small but pronounced wavelets; Crests do not break - Wind vanes move; Leaves rustle; You can feel wind on the face
3	8-12	Gentle Breeze - Large Wavelets; Crests break; Glassy foam; A few whitecaps - Leaves and small twigs move constantly; Small, light flags are extended
4	13-18	Moderate Breeze - Longer waves; Whitecaps - Wind lifts dust and loose paper; Small branches move
5	19-24	Fresh Breeze - Moderate, long waves; Many whitecaps; Some spray - Small trees with leaves begin to move

Beaufort Force	Speed (mph)	Wind Description - State of Sea - Effects on Land
6	25-31	Strong Breeze - Some large waves; Crests of white foam; Spray - Large branches move; Telegraph wires whistle; Hard to hold umbrellas
7	32-38	Near Gale - White foam from breaking waves blows in streaks with the wind - Whole trees move; Resistance felt walking into wind
8	39-46	Gale - Waves high and moderately long; Crests break into spin drift, blowing foam in well-marked streaks - Twigs and small branches break off trees; Difficult to walk
9	47-54	Strong Gale - High waves with wave crests that tumble; Dense streaks of foam in wind; Poor visibility from spray - Slight structural damage
10	55-63	Storm - Very high waves with long, curling crests; Sea surface appears white from blowing foam; Heavy tumbling of sea; Poor visibility - Trees broken or uprooted; Considerable structural damage
11	64-73	Violent Storm - Waves high enough to hide small and medium sized ships; Sea covered with patches of white foam; Edges of wave crests blown into froth; Poor visibility - Seldom experienced inland; Considerable structural damage
12	>74	Hurricane - Sea white with spray. Foam and spray render visibility almost non-existent - Widespread damage. Very rarely experienced on land.

Santa Ana Winds and Tornado-Like Wind Activity

Based on local history, most incidents of high wind in the Cucamonga Valley Water District are the result of the Santa Ana and El Niño related wind conditions. While high impact wind incidents are not frequent in the area, significant wind events and sporadic tornado activity have been known to negatively impact the District. In addition, the District is increasingly concerned with "global warming" ramifications and potential increases in wind related events.

What are Santa Ana Winds?

"Santa Ana winds are generally defined as warm, dry winds that blow from the east or northeast (offshore). These winds occur below the passes and canyons of the coastal ranges of Southern California. Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon (the canyon from which it derives its name). Forecasters at the National Weather Service offices in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots." These winds accelerate to speeds of 35 knots as they move through canyons and passes, with gusts to 50 or even 60 knots.

"The complex topography of Southern California combined with various atmospheric conditions create numerous scenarios that may cause widespread or isolated Santa Ana events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). Clockwise circulation around the center of this high pressure area forces air downslope from the high plateau. The air warms as it descends toward the California coast at the rate of five degrees F per 1,000 feet due to compressional heating. Thus, compressional heating provides the primary source of warming. The air is dry since it originated in the desert, and it dries out even more as it is heated."

These regional winds typically occur from October to March, and, according to most accounts are named either for the Santa Ana River Valley where they originate or for the Santa Ana Canyon, southeast of Los Angeles, where they pick up speed.

What are Tornados?

Tornadoes are spawned when there is warm, moist air near the ground, cool air aloft, and winds that speed up and change direction. An obstruction, such as a house, in the path of the wind causes it to change direction. This change increases pressure on parts of the house, and the combination of increased pressures and fluctuating wind speeds creates stresses that frequently cause structural failures.

In order to measure the intensity and wind strength of a tornado, Dr. T. Theodore Fujita developed the Fujita Tornado Damage Scale. This scale compares the estimated wind velocity with the corresponding amount of suspected damage. The scale measures six classifications of tornadoes with increasing magnitude from an "F0" tornado to a "F6+" tornado.

Table: Fujita Tornado Damage Scale
(Source: NOAA Storm Prediction Center)

Scale	Wind Estimated (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys and TV antennas; breaks twigs off trees; pushes over shallow-rooted trees.
F1	73-112	Moderate damage. Peels surface off roofs; windows broken; light trailer houses pushed or overturned; some trees uprooted or snapped; moving automobiles pushed off the road. 74 mph is the beginning of hurricane wind speed.
F2	113-157	Considerable damage. Roofs torn off frame houses leaving strong upright walls; weak buildings in rural areas demolished; trailer houses destroyed; large trees snapped or uprooted; railroad boxcars pushed over; light object missiles generated; cars blown off highway.
F3	158-206	Severe damage. Roofs and some walls torn off frame houses; some rural buildings completely demolished; trains overturned; steel-framed hangar-warehouse-type structures torn; cars lifted off the ground; most trees in a forest uprooted snapped, or leveled.
F4	207-260	Devastating damage. Whole frame houses leveled, leaving piles of debris; steel structures badly damaged; trees debarked by small flying debris; cars and trains thrown some distances or rolled considerable distances; large missiles generated.
F5	261-318	Incredible damage. Whole frame houses tossed off foundations; steel-reinforced concrete structures badly damaged; automobile-sized missiles generated; trees debarked; incredible phenomena can occur.
F6-F12	319 to sonic	Inconceivable damage. Should a tornado with the maximum wind speed in excess of F5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water heaters, storage tanks, automobiles, etc. will create serious secondary damage on structures.

Microbursts



Unlike tornados, microbursts are strong, damaging winds which strike the ground and often give the impression a tornado has struck. They frequently occur during intense thunderstorms. The origin of a microburst is downward moving air from a thunderstorm's core. But unlike a tornado, they affect only a rather small area. University of Chicago storm researcher Dr. Ted Fujita first coined the term "downburst" to describe strong, downdraft winds flowing out of a thunderstorm cell that he believed were responsible for the crash of Eastern Airlines Flight 66 in June of 1975.

A downburst is a straight-direction surface wind in excess of 39 mph caused by a small-scale, strong downdraft from the base of convective thundershowers and thunderstorms. In later investigations into the phenomena he defined two sub-categories of downbursts: the larger macrobursts and small microbursts.

Macrobursts are downbursts with winds up to 117 mph which spread across a path greater than 2.5 miles wide at the surface and which last from five to 30 minutes. The microburst, on the other hand is confined to an even smaller area, less than 2.5 miles in diameter from the initial point of downdraft impact. An intense microburst can result in damaging winds near 270 km/hr (170 mph) and often last for less than five minutes.

Downbursts of all sizes descend from the upper regions of severe thunderstorms when the air accelerates downward through either exceptionally strong evaporative cooling or by very heavy rain which drags dry air down with it. When the rapidly descending air strikes the ground, it spreads outward in all directions, like a fast-running faucet stream hitting the sink bottom.

When the microburst wind hits an object on the ground such as a house, garage or tree, it can flatten the buildings, and strip limbs and branches from the tree. After striking the ground, the powerful outward running gust can wreak further havoc along its path. Damage associated with a microburst is often mistaken for the work of a tornado, particularly directly under the microburst. However, damage patterns away from the impact area are characteristic of straight-line winds rather than the twisted pattern of tornado damage."

Tornados, like those that occur every year in the Midwest and Southeast parts of the United States, are a rare phenomenon in most of California, with most tornado-like activity coming from micro-bursts.

What is Susceptible to Windstorms?

Life and Property

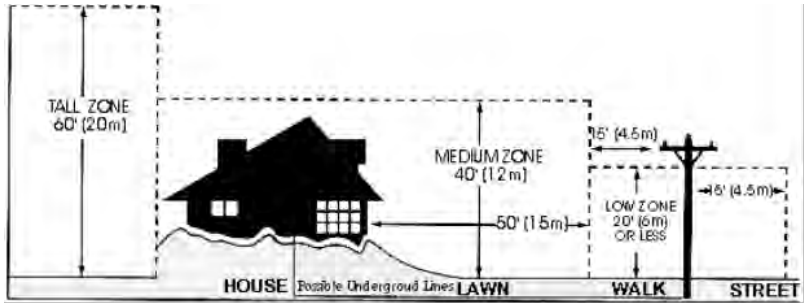
Based on the history of the region, windstorm events can be expected, perhaps annually, across widespread areas of the region which can be adversely impacted during a windstorm event. This can result in the involvement of District emergency response personnel during a wide-ranging windstorm or microburst tornadic activity. Both residential and commercial structures with weak reinforcement are susceptible to damage. Wind pressure creates a direct and frontal assault on

a structure, pushing walls, doors, and windows inward. Conversely, passing currents creates lift suction forces that pull building components and surfaces outward. With extreme wind forces, the roof or entire building can fail causing considerable damage.

Debris carried along by extreme winds can directly contribute to loss of life and indirectly to the failure of protective building envelopes, siding, or walls. When severe windstorms strike a community, downed trees, power lines, and damaged property can be major hindrances to emergency response and disaster recovery.

Utilities

Historically, falling trees are the major cause of power outages in the region. Windstorms such as strong microbursts and Santa Ana Wind conditions cause flying debris and downed utility lines. For example, tree limbs breaking in winds of only 45 mph can be thrown over 75 feet, overhead power lines are damaged, even in relatively minor windstorm events. Falling trees bring electric power lines down to the pavement, creating the possibility of lethal electric shock.



Infrastructure

Windstorms damage buildings, power lines, and other property, and infrastructure, due to falling trees and branches. During wet winters, saturated soils cause trees to become less stable and more vulnerable to uprooting from high winds.

Increased Fire Threat

Perhaps the greatest danger from windstorm activity in Southern California comes from the combination of the Santa Ana winds with the major fires that occur every few years in the urban/wildland interface. With the Santa Ana winds driving the flames, the speed and reach of the flames is even greater than in times of calm wind conditions.

Transportation

Windstorm activity impacts local transportation in addition to the problems caused by downed trees and electrical wires blocking streets and highways. During periods of extremely strong Santa Ana winds, major highways can be temporarily closed to truck and recreational vehicle traffic. However, typically these disruptions are not long lasting, nor do they carry a severe long term economic impact on the region.

Drought Hazards

Hazard Characteristics

Definition

Drought is defined as a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (e.g., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness of the rains (e.g., rainfall intensity, number of rainfall events). Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity. 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. Human beings often exacerbate the impact of drought. Recent droughts in both developing and developed countries and the resulting economic and environmental impacts and personal hardships have underscored the vulnerability of all societies to this "natural" hazard.

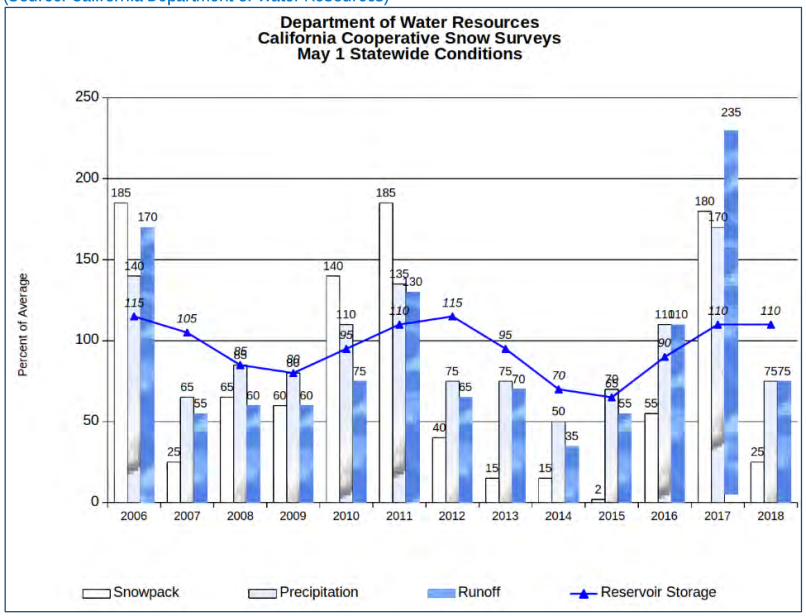
One dry year does not normally constitute a drought in California, but serves as a reminder of the need to plan for droughts. California's extensive system of water supply infrastructure - its reservoirs, groundwater basins, and inter-regional conveyance facilities - mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.

Many governmental utilities, the National Oceanic and Atmospheric Administration (NOAA), and the California Department of Water Resources, as well as academic institutions such as the University of Nebraska-Lincoln's National Drought Mitigation Center and the National Drought Mitigation Center, generally agree that there is no clear definition of drought. Drought is highly variable depending on location.

General Situation

Figure: Water Supply Conditions below illustrates several indicators commonly used to evaluate California water conditions. The percent of average values are determined for measurement sites and reservoirs in each of the State's ten major hydrologic regions. Snow pack is an important indicator of runoff from Sierra Nevada watersheds, the source of much of California's developed water supply.

Figure: Water Supply Conditions
(Source: California Department of Water Resources)



Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multiyear period. There is no universal definition of when a drought begins or ends.

Types of Drought

There are four different ways that drought can be defined:
(1) Meteorological - a measure of departure of precipitation from normal. Due to climatic differences what is considered a drought in one location may not be a drought in another location.
(2) Agricultural - refers to a situation when the amount of moisture in the soil no longer meets the needs of a particular crop.
(3) Hydrological - occurs when surface and subsurface water supplies are below normal.
(4) Socioeconomic - refers to the situation that occurs when physical water shortage begins to affect people.

Historical California Droughts

A significant drought, reported by many of the ranchers in Southern California, occurred in 1860. The great drought of the 1930s, coined the "Dust Bowl," was geographically centered in the Great Plains yet ultimately affected water shortages in California. The drought conditions in the plains resulted in a large influx of people to the west coast. Approximately 350,000 people from Arkansas and Oklahoma immigrated mainly to the Great Valley of California. As more people moved into California, including San Bernardino County increases in intensive agriculture led to overuse of the Santa Ana River watershed and groundwater resulting in regional water shortages. Several bills have been introduced into Congress in an effort to mitigate the effects of drought. In 1998, President Clinton signed into law the National Drought Policy Act, which called for the development of a national drought policy or framework that integrates actions and responsibilities among all levels of government. In addition, it established the National Drought Policy Commission to provide advice and recommendations on the creation of an integrated federal policy. The most recent bill introduced into Congress was the National Drought Preparedness Act of 2003, which established a comprehensive national drought policy and statutorily authorized a lead federal utility for drought assistance. Currently there exists only an ad-hoc response approach to drought unlike other disasters (e.g., hurricanes, floods, and tornadoes) which are under the purview of FEMA.

Droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. The 1929-34 droughts established the criteria commonly used in designing storage capacity and yield of large Northern California reservoirs. The driest single year of California's measured hydrologic record was 1977. According to USGS, California's most recent multi-year droughts occurred between 1987-92, 2006-2010 and 2012-2016.

The Long-term Climatic Viewpoint

The historical record of California hydrology is brief in comparison to geologically modern climatic conditions. The following sampling of changes in climatic conditions over time helps put California's twentieth century droughts into perspective. Most of the dates shown below are necessarily approximations.

Not only must the climatic conditions be inferred from indirect evidence, but the onset or extent of changed conditions may vary with geographic location. Readers interested in the subject of paleo-climatology are encouraged to seek out the extensive body of popular and scientific literature on this subject.

Past California Droughts

The historical record of California hydrology is brief in comparison to the time period of geologically modern climatic conditions. The following samplings of changes in climatic and hydrologic conditions help put California's twentieth century droughts into perspective, by illustrating the variability of possible conditions. Most of the dates shown below are approximations, since the dates must be inferred from indirect sources.

11,000 years before present

Beginning of Holocene Epoch- Recent time, the time since the end of the last major glacial epoch.

6,000 years before present

Approximate time when trees were growing in areas now submerged by Lake Tahoe. Lake levels were lower then, suggesting a drier climate.

900-1300 A.D. (Approximate)

The Medieval Warm Period, a time of warmer global average temperatures. The Arctic ice pack receded, allowing Norse settlement of Greenland and Iceland. The Anasazi civilization in the Southwest flourished, its irrigation systems supported by monsoonal rains.

1300-1800 A.D. (Approximate)

The Little Ice Age, a time of colder average temperatures. Norse colonies in Greenland failed near the start of the time period, as conditions became too cold to support agriculture and livestock grazing. The Anasazi culture began to decline about 1300 and had vanished by 1600, attributed in part to drought conditions that made agriculture infeasible.

Mid - 1500s A.D.

Severe, sustained drought throughout much of the continental U.S., according to dendrochronology. Drought suggested as a contributing factor in the failure of European colonies at Parris Island, South Carolina and Roanoke Island, North Carolina.

1850s A.D.

Sporadic measurements of California precipitation began.

1890s A.D.

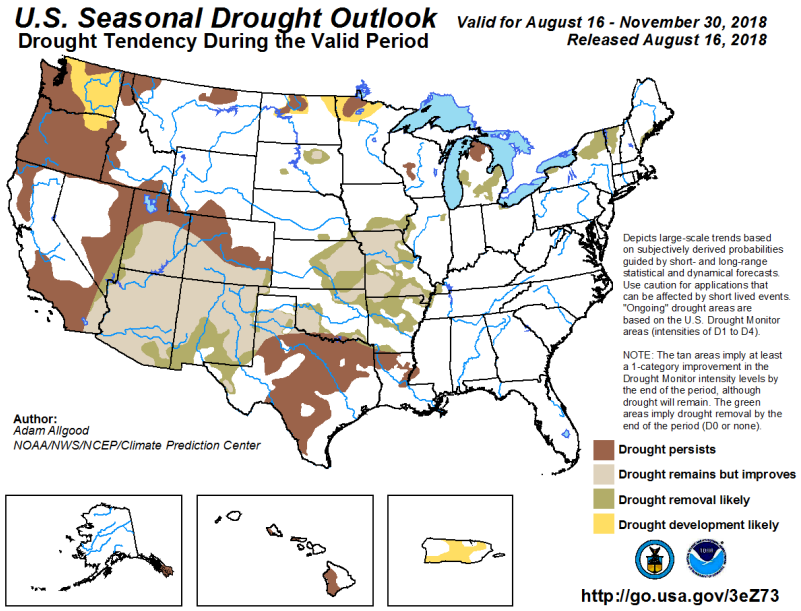
Long-term stream flow measurements began at a few California locations.

Palmer Drought Severity Index

Of the many varied indexes used to measure drought, the "Palmer Drought Severity Index" (PDSI) is the most commonly used drought index in the United States. Developed by meteorologist Wayne Palmer, the PDSI is used to measure dryness based on recent temperature compared to the amount of precipitation. It utilizes a number range, 0 as normal, drought shown in terms of minus numbers, and wetness shown in positive numbers. The PDSI is most effective at analyzing long-range drought forecasts or predications. Thus, the PDSI is very effective at evaluation trends in the severity and frequency of prolonged periods of drought, and conversely wet weather. The National Oceanic and Atmospheric Administration (NOAA) publish weekly Palmer maps, which are also used by other scientists to analyze the long-term trends associated with global warming and how this has affected drought conditions.

The following map is the most current snapshot of drought conditions across the U.S. It is provided by NOAA's Climate Prediction Center.

Map: U.S. Seasonal Drought Outlook
(Source: NOAA Climate Prediction Center)



Appendix - Attachments

FEMA Letter of Approval

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA, 94607-4052

FEMA

September 13, 2019

Rossana Ammari
Risk Management Analyst
Cucamonga Valley Water District
10440 Ashford St.
Rancho Cucamonga, CA 91730

Dear Ms. Ammari:

We have completed our final review of the *Cucamonga Valley Water District Hazard Mitigation Plan*, officially adopted by the Cucamonga Valley Water District on September 10, 2019, and found the plan to be in conformance with Title 44 Code of Federal Regulations (CFR) Part 201.6 *Local Mitigation Plans*.

The approval of this plan ensures the Cucamonga Valley Water District's continued eligibility for project grants under FEMA's Hazard Mitigation Assistance programs, including the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program. All requests for funding, however, will be evaluated individually according to the specific eligibility, and other requirements of the particular program under which applications are submitted.

FEMA's approval of the *Cucamonga Valley Water District Hazard Mitigation Plan* is for a period of five years, effective starting the date of this letter. Prior to September 13, 2024, the Cucamonga Valley Water District is required to review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding. The enclosed plan review tool provides additional recommendations to incorporate into the plan when the Cucamonga Valley Water District undertakes its identified plan maintenance process.

If you have any questions regarding the planning or review processes, please contact the FEMA Region IX Hazard Mitigation Planning Team at fema-r9-mitigation-planning@fema.dhs.gov.

Sincerely,

Juliette Hayes
Director
Mitigation Division
FEMA, Region IX

Board of Directors Resolution

RESOLUTION NO. 2019-9-1

RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT ADOPTING THE JULY 2019 HAZARD MITIGATION PLAN

WHEREAS, the Cucamonga Valley Water District ("District) is most vulnerable to natural and human-caused hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the District acknowledges the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving pre-disaster and post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the District's July 2019 Hazard Mitigation Plan has been developed by District staff and key stakeholders, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the District's Hazard Mitigation Plan, and

WHEREAS, the District's July 2019 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the District,

NOW THEREFORE BE IT RESOLVED by the Board of Directors that the Cucamonga Valley Water District hereby adopts the July 2019 Hazard Mitigation Plan.

APPROVED, ADOPTED, AND SIGNED this 10th day of September 2019.

CUCAMONGA VALLEY WATER DISTRICT

James V. Curatalo, Jr.
President, Board of Directors

ATTEST:

John Bosler
Secretary, Board of Directors

Cucamonga Valley Water District
Service Beyond Expectation

RESOLUTION NO. 2019-9-1

STATE OF CALIFORNIA)
COUNTY OF SAN BERNARDINO) ss.

I, **JOHN BOSLER,** Secretary of the Board of Directors of Cucamonga Valley Water District, do hereby certify that the foregoing **Resolution No. 2019-9-1** was adopted by the Board of Directors of said District at a regular board meeting held on September 10, 2019. A recorded vote of the Board is as follows:

AYES: Curatalo, Cetina, Reed, and Tiegs

NOES: _____

ABSENT: Gonzalez

JOHN BOSLER
Cucamonga Valley Water District
and the Board of Directors thereof

Board of Directors Staff Report

Cucamonga Valley Water District
Service Beyond Expectation

STAFF REPORT

Date: September 10, 2019

To: Board of Directors
From: John Bosler, General Manager/CEO
Agenda Title: **Adopt Resolution No. 2019-9-1 Adopting the July 2019 Hazard Mitigation Plan**

Purpose
The Disaster Mitigation Act of 2000 requires communities to prepare and to keep an updated local hazard mitigation plan (HMP) recognizing potential natural hazards and to identify and consider mitigation measures to reduce the risks associated with such hazards. The HMP is a tool to aid in facility and infrastructure planning and improvements and is a requirement for federal hazard mitigation grants and funding from the Federal Emergency Management Agency (FEMA). The HMP must be updated approximately every five years, and final acceptance of the plan by FEMA is contingent upon adoption by the local jurisdiction's governing body. Staff is seeking the Board of Directors adoption of Resolution No. 2019-9-1 finalizing the HMP Process.

Background
The HMP process began last summer with the assistance from Emergency Planning Consultants and the Hazard Mitigation Plan Committee (HMPC), which consisted of District staff. Carolyn Harshman, President, from Emergency Planning Consultants (EPC) facilitate the District's 2019 HMP Project (project) and follow it through the review process with California Office of Emergency Services (Cal/OES) and FEMA. The project required participating jurisdictions to follow a FEMA-prescribed planning process that focused on key initiatives strategically aligned with the District's mission to provide high quality, safe and reliable water and wastewater services while practicing good stewardship of natural and financial resources.

Through the planning process, the HMPC developed a Mitigation Actions Matrix that identified desired and planned projects derived from the District's various Master Plans and reflects the following goals in the HMP: (1) protect life and property, (2) enhance public awareness, (3) preserve natural systems, (4) encourage partnerships and implementation, and (5) strengthen emergency services. The adoption of the HMP will allow the District to seek mitigation funding when the opportunity becomes available. The HMP will be a living document and reviewed by the HMPC annually as the Mitigation Actions Matrix is updated, and opportunities for mitigation grant funding becomes available.

On July 16, 2019, staff received notice from FEMA that the District's Hazard Mitigation Plan (HMP) is eligible for final approval pending adoption by the Cucamonga Valley Water District's Board of Directors.

Alignment with Strategic Goals
The adoption of the District's Hazard Mitigation Plan is the key to mitigation grant funding when the opportunity becomes available and meets the District's goal to be fiscally responsible.

Cucamonga Valley Water District
Service Beyond Expectation

Fiscal Impact
There are no costs associated with adopting the Hazard Mitigation Plan.

Recommendation
It is recommended that the Board of Directors adopt Resolution No. 2019-9-1 adopting the July 2019 Hazard Mitigation Plan.

Attachment: Resolution No. 2019-9-1
Hazard Mitigation Plan
Cal OES Governor's Office of Emergency Services
U.S. Department of Homeland Security (FEMA)

Submitted by: Carrie Guarino, Assistant General Manager
Prepared by: Roberta M. Perez, Human Resources Manager
Rossana Ammari, Risk Management Analyst

Q&A | ELEMENT A: PLANNING PROCESS | A1a.
Q: Does the plan document the planning process, including how it was prepared (with a narrative description, meeting minutes, sign-in sheets, or another method)? (Requirement §201.6(c)(1))
A: See **Planning Team Sign-In Sheets** below.

Planning Team Sign-In Sheets

Cucamonga Valley Water District
Hazard Mitigation Plan
Planning Committee Meeting #1
June 26, 2018

Name	Department
Carolyn Harshman	Emergency Planning Consultants
Nikolas Baikal	Engineering
Juan Truong	Engineering
JR Roberts	Treatment
Robert Kerzko	Operations
Kristeen Farlow	Communications & Outreach
Agnes Boros	Finance
Chad Brantley	Finance
Rossana Annarei	HR/Risk
Roberta M. Perez	HR/Risk Mgmt.

Cucamonga Valley Water District

Hazard Mitigation Team Planning #2
August 1, 2018 @ 2:00 PM / Operation Conference Room

PRINT	SIGN
Carolyn Harshman	
Robert M. Kerzko	
Agnes Boros	
JR Roberts	
Russel Silva	
Nikolas Baikal	
Chad Brantley	
Rossana Annarei	

Cucamonga Valley Water District
Service Beyond Expectation

Cucamonga Valley Water District
Hazard Mitigation Plan
Planning Committee Meeting #3
October 2, 2018

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Robert Kaczka	Operations Division
Kristeen Farlow	Communications & Outreach
AGNES BOROS	FINANCE
Russel Silva	Engineering
NIKOLAS BAYKAL	Engineering
Eduardo Espinoza	Engineering
Robbie Verstegen	HR/Risk
Roberta M. Perez	HR/Risk

Cucamonga Valley Water District
Hazard Mitigation Plan
Planning Committee Meeting #4
December 12, 2018

Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Roberta M. Perez	Human Resources/Risk Mgmt
Kristeen Farlow	Communication Manager
Erin Morales	Communications & Outreach
JR Roberts	Treatment
NIKOLAS BAYKAL	ENGINEERING
ROSSANA AMMARE	HR/RISK
AGNES BOROS	Finance
MIKE MANSTAS	PRODUCTION

Cucamonga Valley Water District
Service Beyond Expectation

The Pipeline Newsletter

Save the Date

Holiday Office Closures

- ***Nov. 12:*** Observance of Veterans' Day
- ***Nov. 22/23:*** Thanksgiving Holiday
- ***Dec. 24/25:*** Christmas Holiday
- ***Dec. 31:*** Closed at 12:00 p.m. for New Year's Eve
- ***Jan. 1:*** New Year's Day

Save the Date

- ***February 1 – April 30:*** Water Savvy Landscape Contest
- ***March 18-24:*** Fix a Leak Week
- ***April 6:*** Earth Day & Open House
- ***April 27:*** Water Savvy Garden Tour
- ***May 13:*** Fifth Grade Poster Contest Awards Ceremony

Time to Fall Back

Be sure to turn back your sprinkler timer this fall along with your clock! Shorter daylight hours and cooler weather mean lawns and gardens need less water. Remember to practice "Shorter Days, Shorter Watering Times". This is also a great time to replace the batteries in your irrigation controller to maintain consistent watering throughout the year. Remember, 60% of household water use occurs outdoors and watering less in the fall and winter are a great way to be water efficient. For more water saving tips and no-cost programs, visit CVWDwater.com.



Emergency Planning a CVWD Priority

The District is preparing a FEMA-mandated Hazard Mitigation Plan (HMP) which will be available for input by the public in the near future. The HMP provides guidance on mitigating against hazards which for us include earthquakes, wildfire, flooding, drought, climate change and terrorism. Disasters can result in loss of life, property and infrastructure. In order to prevent or lessen the loss caused by disasters, the HMP helps communities by assessing vulnerabilities and identifying actions to reduce those risks. Stay tuned for more information about the District's planning process. For more information about CVWD's HMP and the planning process, please contact HR@CVWDwater.com.

General Information

909-987-2591
Customer Service: 855-654-CVWD
Bill Pay: 855-654-CVWD
CVWDwater.com
Email: info@CVWDwater.com
Office Hours:
Mon. through Thurs. 7:30 a.m. - 5:30 p.m.
Friday 7:30 a.m. - 4:30 p.m.

Cucamonga Valley Water District
Service Beyond Expectation

Board of Directors

James V. Curatalo Jr., President
Luis Cetina, Vice President
Oscar Gonzalez, Director
Randall James Reed, Director
Kathleen J. Tiegs, Director

6

Community Partner Meeting Invitation and Sign-In Sheet

Cucamonga Valley Water District
Service Beyond Expectation

10440 Ashford Street, Rancho Cucamonga, CA 91730-2799
P.O. Box 638, Rancho Cucamonga, CA 91729-0638
(909) 987-2591 Fax (909) 586-3927

Martin E. Zvirbulis
Secretary/General Manager/CEO

[Name], [Title]
[Company]
[Address]

November 8, 2018

Dear [Name],

The Cucamonga Valley Water District is cordially inviting you (or a member of your team) to attend and participate in our educational Hazard Mitigation Plan (HMP) Community Outreach Meeting.

Date: Wednesday, December 12, 2018

Time: 10:00 am to 12:00 pm

Where: The Frontier Project | 10435 Ashford Street, Rancho Cucamonga

Cucamonga Valley Water District is in the process of preparing a FEMA-mandated Hazard Mitigation Plan (HMP). Your input is valuable to the District as our community partner. Our HMP will be available for review in the near future. So that you are aware, the Hazard Mitigation Plan provides guidance on mitigating against hazards, which for us include earthquakes, wildfire, flooding, drought, climate change, and terrorism. Disasters can result in loss of life, property, and infrastructure. In order to prevent or lessen the loss caused by disasters, the Hazard Mitigation Plan helps communities by assessing vulnerabilities and identifying actions to reduce those risks.

Please submit your meeting registration form by 11:00 AM on December 11, 2018, so that we can insure adequate materials and supplies are available for attendees.

If you have any questions about the Hazard Mitigation Plan, please contact HR@CVWDwater.com.

Thank you,

Rossana Ammari
Risk Management Analyst
HR & Risk Management Division

James V. Curatalo Jr. President | **Luis Cetina** Vice President | **Oscar Gonzalez** Director | **Randall James Reed** Director | **Kathleen J. Tiegs** Director

Cucamonga Valley Water District
Service Beyond Expectation

CUCAMONGA VALLEY WATER DISTRICT • P.O. BOX 638 • RANCHO CUCAMONGA, CA 91730 • (909) 987-2591

Hazard Mitigation Plan Community Partner Meeting Registration

December 12, 2018 | 10:00AM to 12:00PM

Attendee's Name: _____

Agency/Business: _____

☐ **Yes, I will be able to attend.**

☐ And, I will be bringing guest(s):

Guest(s) Names: _____

_____

_____

☐ **No, I will not be able to attend.**

Please submit this registration form by 11:00am on December 11, 2018, via

E-mail to: HR@CVWDwater.com

OR

Fax to: (909) 586-3927

This invitation was addressed to: Alta Loma School District, James Moore

Cucamonga Valley Water District
Hazard Mitigation Plan
Stakeholders Workshop
December 12, 2018

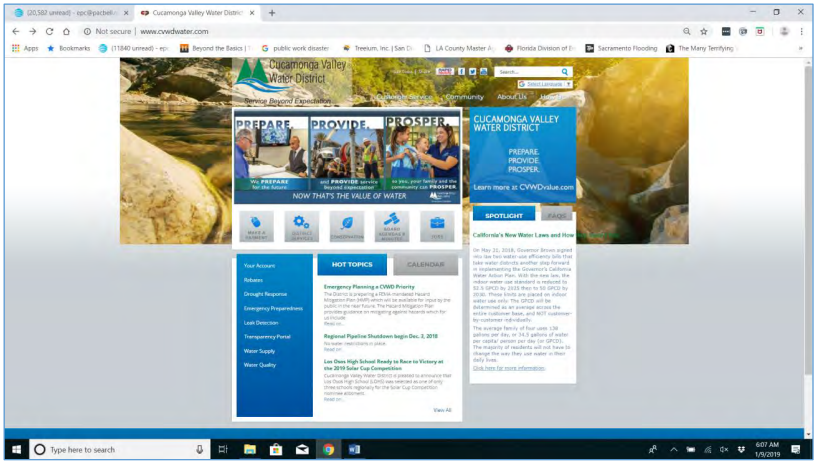
Name	Department
CAROLYN HARSHMAN	EMERGENCY PLANNING CONSULTANTS
Kel Jones	CSD
ROSSANA ANNAREE	CVWD
JAVIER PINEDO	F.W.C. SAFETY
Tom Jenkins	F.W.C. SAFETY
TROY AMENT	CHAFFEY COLLEGE
JASON FORTIER	SAN BERNARDINO SHERIFF'S DEPT.
Raymond Cheung	City of Ontario
Roberta M. Perez	CVWD
Zach Campos	VICTORIA GARDENS
Aminah Meeks	City of Upland - SB City
Nikolas Bakal	CVWD
Joseph Rains	Fire RCFD

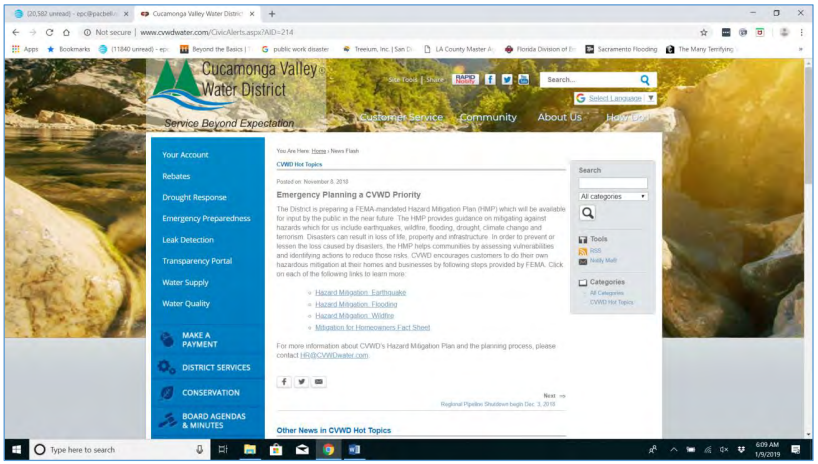
Cucamonga Valley Water District
Hazard Mitigation Plan
Stakeholders Workshop
December 12, 2018

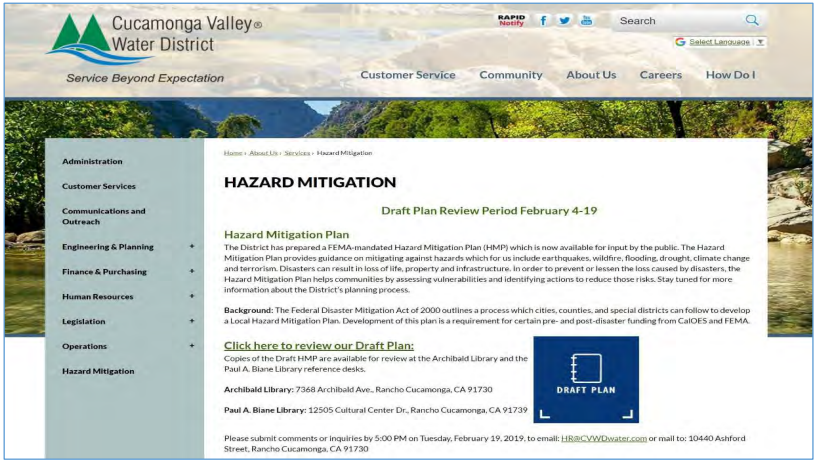
Name	Department
AGNES BOROS	Finance
Chad Bradley	Admin
Carrie Cordier	Fin & Admin
Erin Morales	CVWD
Lisa Espinoza	Private - Commercial Metals Company (CMC)

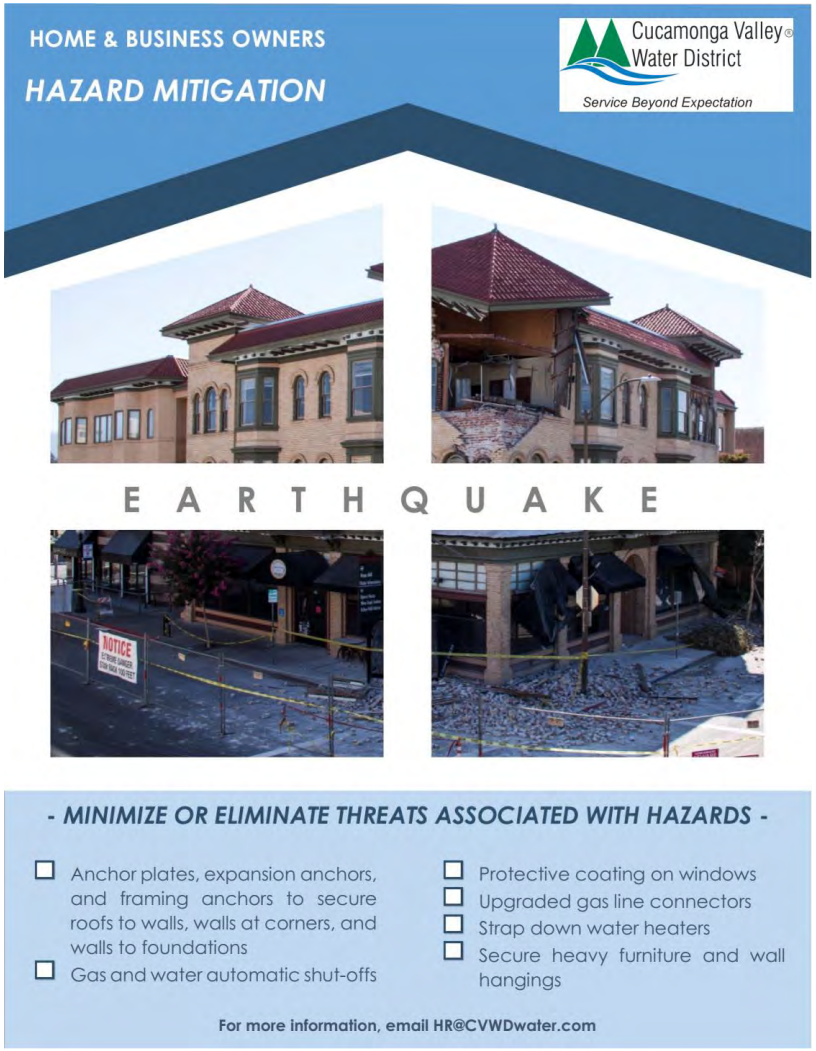
Web Postings and Notices






Cucamonga Valley Water District
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Rebates
Drought Response
Emergency Preparedness
Leak Detection
Transparency Portal
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Other News in CVWD Hot Topics


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Engineering & Planning
Finance & Purchasing
Human Resources
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Operations
Hazard Mitigation
HAZARD MITIGATION
Draft Plan Review Period February 4-19
Hazard Mitigation Plan
Click here to review our Draft Plan:
DRAFT PLAN


HOME & BUSINESS OWNERS
HAZARD MITIGATION
Cucamonga Valley Water District
Service Beyond Expectation
E A R T H Q U A K E
NOTICE
- MINIMIZE OR ELIMINATE THREATS ASSOCIATED WITH HAZARDS -
Anchor plates, expansion anchors, and framing anchors to secure roofs to walls, walls at corners, and walls to foundations
Gas and water automatic shut-offs
Protective coating on windows
Upgraded gas line connectors
Strap down water heaters
Secure heavy furniture and wall hangings
For more information, email HR@CVWDwater.com

Cucamonga Valley Water District
Service Beyond Expectation

HOME & BUSINESS OWNERS

HAZARD MITIGATION



F L O O D I N G

- MINIMIZE OR ELIMINATE THREATS ASSOCIATED WITH HAZARDS -

- ☐ Elevate utilities (electrical control boxes, air conditioning, etc.)
- ☐ Raise structure to above base flood elevation
- ☐ Install sump pump in basement and other areas prone to flood
- ☐ Redirect flood waters with drainage and barriers
- ☐ Build pond to serve as retention basis for excess water
- ☐ Install backflow valve

For more information, email HR@CVWDwater.com

Cucamonga Valley Water District
Service Beyond Expectation

HOME & BUSINESS OWNERS

HAZARD MITIGATION



W I L D F I R E

- MINIMIZE OR ELIMINATE THREATS ASSOCIATED WITH HAZARDS -

- ☐ Create defensible space
- ☐ Install automatic sprinklers
- ☐ Enclose eaves
- ☐ Relocate sheds and wood stacks away from structure
- ☐ Utilize Class A fire-rated siding, roofing materials and underlayment
- ☐ Install dual pane windows with tempered glass
- ☐ Place metal mesh over attic and crawl space vents

For more information, email HR@CVWDwater.com

FEMA Fact Sheet

Mitigation for Homeowners

Mitigation is the effort to reduce the loss of life and property by lessening the impact of disasters. Stated plainly, mitigation can keep natural hazards, like flooding and hurricanes, from having catastrophic impacts.

Mitigation reduces a property's risk to future events and allows residents to return home more quickly, with less damage, after an event. While it may involve a larger initial investment, mitigation pays off in the long run. In fact, estimates indicate that on average, for every $1 spent on mitigation, $4 are saved from future losses.

Mitigation Options for Homeowners
There are a wide range of options for protecting your home from flood and wind events through mitigation. Be sure to consult with a licensed contractor and the local building department before making any structural changes to understand requirements and obtain any necessary permits.

Before you mitigate, know your risk

Before you mitigate, you need to know what you are protecting your property from. Your local floodplain manager and emergency manager can give you information on the wind and water hazards possible in your community.

In addition, flood mitigation projects are usually benchmarked against the Base Flood Elevation (BFE) for your area. The BFE is the level floodwater is expected to reach during a flood event that has a one-in-100 chance of occurring in any given year. The BFE is shown on the Flood Insurance Rate Map (FIRM) and in the Flood Insurance Study. To find your BFE, talk to your floodplain manager.

Flood Mitigation Options

- Anywhere it rains, it can flood. Protect your investment in your home by purchasing flood insurance, even if you do not live in a high-risk flood zone.
- Elevate your home's lowest floor above the Base Flood Elevation (BFE). Elevating can lower flood insurance premiums and reduce the risk from increased future flood levels.
- Elevate or floodproof HVAC and/or mechanical units, ductwork, electrical systems, and other utilities above the BFE to protect against flood damage and reduce repair costs.
- Install flood vents in foundation walls, garages, and other enclosed areas. Flood vents reduce flood damage by allowing water to flow through and drain out.
- Use flood-resistant materials in areas of your home below the BFE, like replacing carpeting with tiles or using flood-resistant insulation and gypsum wallboard (Sheetrock), to prevent water from doing major damage.
- Anchor any fuel tanks to the floor and make sure vents and fill line openings are above the BFE (this may require permission from your fuel provider). A fuel tank can tip over or float in a flood, spilling fuel and becoming a fire hazard.
- Install a backflow valve on your sewer system to prevent sewage back up in your home.
- Add waterproof veneer to exterior walls to prevent shallow flooding from damaging your home. Seal your basement walls with waterproofing compounds.

Wind Mitigation Options

- Install hurricane shutters to protect windows and glass doors.

Cucamonga Valley Water District
Service Beyond Expectation

- Gable end roofs are more susceptible to high wind than other roof types. If you have a gable end roof, add bracings to reinforce the roof.
- Consider fastening the roof to the walls with hurricane straps.
- Reinforce garage doors and double-entry doors to prevent failure under wind pressure. Garage doors can be reinforced with girts and by strengthening the glider wheel tracks. Double-entry doors can be reinforced with a heavy-duty dead bolt, adding slide bolts on one of the doors, and using longer hinge attachments on the door and frame.
- Maintain your property. Anything from loose shingles to trees can become a windborne missile. The distance between your home and any tree should be greater than a full-grown tree's height.

General Protective Measures
Mitigation reduces or eliminates future losses, but you should also consider other measures to protect your family, your valuables, and your peace of mind.

- Have a go-kit and make an emergency plan. Instructions and templates are available from Ready.gov. Familiarize yourself with local emergency and evacuation plans.
- Consider purchasing a generator for your home that automatically turns on when the power goes out. If you install one, elevate it above the BFE.
- Store important documents and sentimental items like photographs above the BFE (preferably on an upper floor). Make copies of your photos and store them in more than one location.

Mitigation Requirements for Homeowners

If your local community official determines your home to be substantially or repetitively damaged by flood, you may be required to bring the structure into compliance with the community's local floodplain management ordinance. If that's the case, you may be able to utilize up to $30,000 if you have a flood insurance policy issued through the National Flood Insurance Program (NFIP) which offers a coverage called Increased Cost of Compliance (ICC). ICC provides financial assistance to eligible policyholders to offset the costs to mitigate structures relatively faster than without having flood insurance. For more information, talk to your insurance agent.

Interested in learning more about how to mitigate?

FEMA produces mitigation guidance for communities, businesses, and homeowners, including:

- Building Science Publications: Flood and Wind
- Protecting Your Home and Property From Flood Damage (also available in Spanish)
- Homeowner's Guide to Retrofitting
- Mitigation's Value to Your Community Fact Sheet

FEMA also provides grant funding for certain kinds of mitigation projects under the Hazard Mitigation Assistance Program. This funding must be accessed via your local government. Contact your local emergency management agency for more information.

"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

August 2017

Los Angeles Times & Foothill Reader Posting for Public Input – 2/5/19

Cucamonga Valley Water District
Service Beyond Expectation

PUBLIC REVIEW PERIOD
DRAFT 2019 HAZARD MITIGATION PLAN
FEBRUARY 4 - 18, 2019

The Cucamonga Valley Water District has completed its Draft Hazard Mitigation Plan.

In an effort to reduce the Nation's mounting natural disaster losses, Congress passed the Disaster Mitigation Act of 2000 (DMA 2000). Section 322 of DMA 2000 requires that state and local governments develop a Hazard Mitigation Plan (HMP) in order to remain eligible for pre and post-disaster mitigation funding. These funds include the Hazard Mitigation Grant Program (HMGP), Hazard MitigationAssistance (HMA), Flood Mitigation Assistance (FMA) and the Pre-Disaster Mitigation (PDM) programs, which are administered by the Federal Emergency Management Agency (FEMA). Agencies with an adopted and federally approved HMP are eligible for available mitigation funds before and after the next disaster strikes.

The Cucamonga Valley Water District (CVWD) has completed its FEMA-mandated HMP which is now available for input by the public. The HMP provides guidance on mitigating against hazards which for CVWD includes earthquakes, wildfire, flooding, drought, climate change and terrorism. Disasters can result in loss of life, property and infrastructure. In order to prevent or lessen the loss caused by disasters, the HMP helps communities by assessing vulnerabilities and identifying actions to reduce those risks. CVWD encourages customers to do their own hazard mitigation at their homes and businesses by following steps provided by FEMA available at CVWDwater.com or FEMA.gov.

Provide Comments: All interested parties are encouraged to review the draft HMP and send comments via mail to HR/Risk: 10440 Ashford Street, Rancho Cucamonga, CA 91730 or by email: HR@cvwdwater.com.

Comments are requested by 5:00 PM on Tuesday, February 19, 2019.

The Draft Plan can be reviewed at CVWDwater.com or a printed copy can be picked up at our office at 10440 Ashford Street, Rancho Cucamonga, CA 91730.



Rancho Cucamonga TV Posting for Public Input – 2/5/19

Cucamonga Valley Water District
Service Beyond Expectation

PUBLIC REVIEW PERIOD
DRAFT 2019 HAZARD MITIGATION PLAN
FEBRUARY 4 - 18, 2019

The Cucamonga Valley Water District has completed its Draft Hazard Mitigation Plan (HMP) which is now available for input by the public. The HMP helps communities by assessing vulnerabilities and identifying actions to reduce those risks. Agencies with an adopted and federally approved HMP are eligible for available mitigation funds before and after the next disaster strikes.

PUBLIC REVIEW PERIOD
FEBRUARY 4 - 18, 2019

Comments due by 5:00 PM on Tuesday, February 19, 2019.

Review the draft HMP at CVWDwater.com.

Send comments to HR/Risk:
10440 Ashford Street, Rancho Cucamonga, CA 91730
or by email: HR@cvwdwater.com.



Drought Resolutions

RESOLUTION NO. 2014-4-2
A RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT URGING CONTINUED OUTREACH EFFORTS ON WATER USE EFFICIENCY WITH CUSTOMERS IN RESPONSE TO THE STATEWIDE DROUGHT

WHEREAS, California is experiencing one of the most severe droughts on record and many areas will face water shortages this year, and

WHEREAS, the 2014 water year has been one of the driest in decades and follows two consecutive dry years throughout the state, and

WHEREAS, even after recent rain and snowfall, the state's major reservoirs remain well below average levels for the date and the statewide snowpack is less than a third of normal, with little time remaining to recover in 2014, and

WHEREAS, the State Water Project has announced an initial allocation of zero for its customers in 2014 while the federal Central Valley Project has announced the lowest-ever allocations for its contractors, creating a real possibility that 25 million Californians and more than a million acres of farmland will receive no water from the projects this year, and

WHEREAS, Governor Brown declared a drought state of emergency on January 17, 2014, and called on all Californians to do their part to reduce their water use, and

WHEREAS, though local water supply conditions vary around the state, California is nevertheless in a statewide drought, and it is critical that all residents do what they can to use water wisely to maximize supplies and protect water reserves in case next year is dry, too, and

WHEREAS, Cucamonga Valley Water District has made significant investments in local programs to improve water supply reliability, including the development of recycled water, improvements to local groundwater basins, increased educational efforts on water use efficiency and other advanced planning efforts to diversify our water supplies, and will continue to do so.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of the Cucamonga Valley Water District recognizes that California is in a statewide drought and there is a critical need for all Californians to use water efficiently on an ongoing basis as the state continues to face drought conditions, and

BE IT FURTHER RESOLVED, that the Board of Directors thanks its customers for their ongoing water efficiency efforts and asks them to continue their efforts wherever possible at this time in response to the drought.

Cucamonga Valley Water District
Service Beyond Expectation

PASSED, APPROVED AND ADOPTED this 22nd day of April 2014.

Oscar Gonzalez

President, Board of Directors

ATTEST:

Martin E. Zvirbulis

Secretary, Board of Directors

STATE OF CALIFORNIA)
COUNTY OF SAN BERNARDINO) ss.

I, **MARTIN E. ZVIRBULIS,** Secretary of the Board of Directors of Cucamonga Valley Water District, do hereby certify that the foregoing **Resolution No. 2014-4-2** was adopted by the Board of Directors of said District at a regular board meeting held on **April 22, 2014**. A recorded vote of the Board is as follows:

AYES: Directors CETINA, CURATALO, GONZALEZ, REED, TIEGS

NOES: Directors NONE

ABSENT: Directors NONE

MARTIN E. ZVIRBULIS, SECRETARY
Cucamonga Valley Water District
and the Board of Directors thereof

RESOLUTION NO. 2014-8-2

RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT IMPOSING MANDATORY RESTRICTIONS ON WATER USE IN ORDER TO COMPLY WITH STATEWIDE DROUGHT REGULATIONS

WHEREAS, on January 17, 2014, Governor Jerry Brown issued a proclamation declaring a State of Emergency due to drought conditions. On April 25, 2014, the Governor issued an Executive Order calling for a redoubling of efforts to conserve water and directed the State Water Resources Control Board ("SWRCB") to adopt emergency regulations pursuant to Water Code Section 1058.5 which grants the SWRCB the authority to adopt emergency regulations; and

WHEREAS, on July 15, 2014, the SWRCB adopted Resolution No. 2014-0038 which adopted Emergency Regulations For Statewide Urban Water Conservation ("Regulations") which became effective July 28, 2014 and remain in place for up to 270 days (9 months), unless extended due to continued drought conditions or unless the SWRCB determines that the Regulations are no longer necessary. The Regulations are set forth in Title 23, Sections 863-865 of the California Code of Regulations; and

WHEREAS, the Regulations impose certain requirements on "urban water suppliers" that have water shortage contingency plans in place. "Urban water suppliers" are defined as suppliers providing water to over 3,000 municipal customers or providing over 3,000 acre-feet per year to municipal customers. The Cucamonga Valley Water District ("District") meets the definition of an "urban water supplier" since it provides water to approximately 45,000 water connections. The District has adopted Ordinance No. 47, "Encouraging Water Use Efficiency" ("Conservation Ordinance") and a Water Supply Shortage Contingency Plan ("Plan"). Except as otherwise specifically set forth in this Resolution, all provisions of the Conservation Ordinance and Plan shall remain in full force and effect; and

WHEREAS, the Regulations require the District to move to the stage in its Plan that imposes mandatory restrictions on outdoor irrigation of ornamental landscapes or turf with potable water. The purpose of this Resolution is to move to the first mandatory level of water use reduction which is Stage 2 Alert of the Plan; and

WHEREAS, Water Code Section 31026 provides that the District has the power to restrict the use of water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the wastage of water or the use of water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the District and may prohibit use of such water during such periods for specific uses which the District may from time to time find to be nonessential. The District has the authority to impose monetary fines and penalties and take other applicable actions pursuant to Water Code Sections 350-358, 375-377, and 31029; and

5. Fines For Noncompliance

(a) Financial penalties will be assessed in accordance with the notice, imposition, appeal, and collection procedures for noncompliance as set forth in the District Code including, but not necessarily limited to, the applicable provisions of Sections 4.20.040 and 4.24.050 regarding the failure to comply. For example, financial penalties will be assessed when a customer who, in the reasonable discretion of the General Manager/CEO, or his/her representative, violates the requirements set forth in this Resolution. The applicable provisions of the District Code outline those penalties and the method of notifying a customer.

(b) As set forth in the District Code, the financial penalties will be assessed when a customer violates the requirements outlined in this Resolution as follows:

(i) First Violation - The District shall issue a written notice of a first violation to the customer. The first notice of violation shall be a warning given to the customer by using a door hanger. Any notice required under this Resolution may include, for example and not by way of limitation, the following information: (i) the water conservation stage and restrictions that are in effect; (ii) actions required for compliance in order to prevent future violations; and (iii) penalties and enforcement actions which may be imposed for future violations.

(ii) Second Violation - For a second violation, the District shall impose a penalty in the amount of fifty dollars ($50.00) which will be added to the water customer's water bill. The second violation shall be in writing by regular mail to the address at which the customer is normally billed.

(iii) Third Violation - For a third violation, the District shall impose a penalty in the amount of one hundred dollars ($100.00) which will be added to the customer's water bill.

(iv) Fourth Violation - After a fourth and any subsequent violation, the District shall impose a penalty in the amount of one hundred fifty dollars ($150.00) which will be added to the customer's water bill.

(v) Notices for the third and subsequent violations shall be given in writing in the following manner:

By giving the notice to the customer at the property where the violation occurred; or

If the water customer is absent from or unavailable at the premises at which the violation occurred, by leaving a copy with some person of suitable age and discretion at the premises and sending a copy through the regular mail to the address at which the water customer is normally billed; or

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If a person of suitable age or discretion cannot be found, then by affixing a copy in a conspicuous place at the premises at which the violation occurred, and also sending a copy through the regular mail to the address at which the customer is normally billed.

(c) If the General Manager/CEO, or his/her representative deems it appropriate, water service will be terminated at the location where the violation occurred due to a failure to comply with this Resolution or a failure to pay financial penalties. Any such service termination shall be implemented under the District's authority and procedures including, but not limited to, the District's rules and regulations for water service.

6. Purpose Of Restrictions And Fines The regulatory purposes of imposing the requirements and financial penalties, as set forth in this Resolution, are to conserve water, deter waste and unreasonable use of water, encourage efficiency, and to help cover the costs incident to the investigation, inspection, and administration of the enforcement of this Resolution.

7. Future Stage(s) The Board may make a determination as to when it may be necessary to move to a further Stage, or a lesser Stage, in the Plan. Section 4.24.040 of the Plan, as set forth in the District Code, provides that Stage 1 of the Plan remains in effect at all times and does not require the Board to adopt a resolution for implementation.

8. CEQA The Board finds that adopting and enforcing mandatory restrictions on water use in order to comply with SWRCB requirements is exempt from the California Environmental Quality Act ("CEQA") pursuant to State CEQA Guidelines Section 15268 and Public Resources Code Section 21080(b)(1) as a ministerial action. The Regulations mandate that each urban water supplier implement requirements and actions of the stage of its water shortage contingency plan that imposes mandatory restrictions on outdoor irrigation. Therefore, an action to implement a particular phase of a water shortage contingency plan is not a discretionary action and as such it is statutorily exempt from CEQA.

9. Publication Following Adoption This Resolution shall be in full force and effect immediately upon adoption. Within 10 calendar days of adoption of this Resolution, the Board shall issue its determination of shortage and corrective measures by public proclamation published in a daily newspaper of general circulation a minimum of 3 times for 3 consecutive weeks. Three publications in a newspaper regularly published once a week or more often, with at least 5 days intervening between the respective publication dates not counting such publication dates, are sufficient. Such declaration and notice shall provide the extent, terms and conditions respecting the use and consumption of water in accordance with the applicable water conservation stage. Upon such declaration and publication of such notice, due and proper notice shall be deemed to have been given each and every person supplied water within the District.

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10. Severability If any section, subsection, clause or phrase in this Resolution is for any reason held invalid, the validity of the remainder of this Resolution shall not be affected thereby. The Board hereby declares that it would have passed this Resolution and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

PASSED AND ADOPTED this 26th day of August, 2014.

Oscar Gonzalez
President

ATTEST:

Martin E. Zvirbulis
Secretary

Cucamonga Valley Water District
Service Beyond Expectation

ORDINANCE NO. 2015-5-1

ORDINANCE OF THE CUCAMONGA VALLEY WATER DISTRICT REVISING WATER USE EFFICIENCY REQUIRMENTS AND WATER SUPPLY SHORTAGE CONTINGENCY PLAN TO COMPLY WITH STATEWIDE DROUGHT REGULATIONS

WHEREAS, on April 1, 2015, Governor Jerry Brown issued the fourth in a series of Executive Orders directing the State Water Resources Control Board ("SWRCB") to impose restrictions to achieve a statewide 25% reduction in total potable water production through February 2016; and

WHEREAS, on May 5-6, 2015, the SWRCB will take final action to adopt its Emergency Regulation Implementing the 25% Conservation Standard ("Regulation") which includes a prohibition against certain irrigation practices and an order that all urban water suppliers reduce their total potable water production by a defined percentage which has been applied to each urban water supplier; and

WHEREAS, the Board desires to adopt this Ordinance in order to incorporate the additional provisions from the Regulation into the Cucamonga Valley Water District Code ("District Code") in existing Chapter 4.20 Encouraging Water Use Efficiency and Chapter 4.24 Water Supply Shortage Contingency Plan. These District Code revisions will enable the District to implement the requirements that the SWRCB is imposing on the District by way of the Regulation; and

WHEREAS, revisions to the District Code will also provide the framework for declaring Drought Alert Stages and for implementing a corresponding Drought Rate structure in the event such a rate structure is adopted by the Board and made part of the District's rules and regulations. It is anticipated that the Board will consider the adoption of a Drought Rate on June 9, 2015 and if adopted, it is anticipated that such a rate structure would go into effect on July 1, 2015; and

WHEREAS, Water Code Section 31026 provides that the District has the authority to restrict the use of water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the wastage of water or the use of water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the District and may prohibit use of such water during such periods for specific uses which the District may from time to time find to be nonessential. The District has the authority to impose monetary fines and penalties and take other applicable actions pursuant to Water Code Sections 350-358, 375-377, and 31029; and

WHEREAS, in accordance with Water Code Sections 350 et seq., 375 et seq., and 31027, at least seven (7) days before consideration of this Ordinance, a Notice of Public Hearing was published in the Inland Valley Daily Bulletin, a newspaper of general circulation. A certified copy of the proposed Ordinance was also posted at the District Offices at least five (5) days before the hearing; and

WHEREAS, currently the District is at a STAGE 2 WATER WATCH, and based on the proposed Regulation by the SWRCB, it is anticipated that the District will need to declare a new drought stage in order to achieve a 32% reduction in total potable water production as mandated by the SWRCB; and

NOW THEREFORE, THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT DOES HEREBY ORDAIN AS FOLLOWS:

Section 1 All of the foregoing Recitals are true and correct and the Board so finds and determines. The Recitals set forth above are incorporated herein and made an operative part of this Ordinance.

Section 2 The Board conducted a public hearing on May 12, 2015 at 6:00 p.m., or as soon thereafter as practicable, at the District offices located at 10440 Ashford St., Rancho Cucamonga, CA 91730-2799 as part of the Regular Meeting of the Board.

Section 3 Title 4 – Chapter 4.20 WATER USE EFFICIENCY, Section 4.20.030 of the District Code is hereby amended, in its entirety, in order to include a new provision as item (9):

4.20.030 Water use efficiency practices.

Customers are required to practice the following activities:

(1) Hosing paved areas for health and safety purposes only with the use of a waterbroom or water-efficient pressure washer using not more than five gallons per minute.
(2) Wash vehicles using a hose equipped with a shutoff nozzle so that water does not flow to waste.
(3) All decorative fountains shall be equipped with recirculating systems.
(4) Upon notification by the District, repair all leaks.
(5) Adjust sprinklers so there is no run-off, over-spray or excessive irrigation from the property.
(6) Restaurants will only serve water on request.
(7) Hotels will offer guests the option to not launder linen daily.
(8) Industrial customers will review their water-using processes to evaluate ways to increase water conservation.
(9) Prohibition of watering outdoor landscapes during and within 48 hours after a measureable rainfall.

No water customer of the District shall make, cause, use, or permit the use of water in a manner contrary to any provision of this Chapter.

Section 4 Title 4 – Chapter 4.24 WATER SUPPLY SHORTAGE CONTINGENCY PLAN, Section 4.24.040 of the District Code is hereby revised and amended, in its entirety, in order to make revisions to certain provisions of existing drought alert stages and to add STAGE 6 – SEVERE WATER EMERGENCY and STAGE 7 – WATER CRISIS - CATASTROPHIC:

STAGE 1 – ENCOURAGING WATER USE EFFICIENCY

This Stage [Chapter 4.20 of this Code]) outlines mandatory prohibited water waste practices. Stage 1 remains in effect at all times and does not require the Board of Directors adopt a resolution for implementation.

STAGE 2 - WATER WATCH

A Stage 2 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by ten (10) percent from a time period determined by the District. In addition to Stage 1 measures,

hours of watering are limited to 4 p.m. through 9 a.m., and are enacted by resolution of the Board.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050

STAGE 3 - WATER ALERT

A Stage 3 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by fifteen (15) percent from a time period determined by the District. In addition to Stage 2 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

STAGE 4 - CRITICAL WATER ALERT

A Stage 4 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by twenty (20) percent from a time period determined by the District. In addition to Stage 3 measures, limits may be applied to the number of days and frequency and duration of outdoor watering as determined by the District when Stage 4 is enacted by resolution of the Board.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

STAGE 5 – WATER EMERGENCY

A Stage 5 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by twenty-five (25) percent from a time period determined by the District. In addition to Stage 4 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

STAGE 6 – SEVERE WATER EMERGENCY

A Stage 6 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by thirty-five (35) percent as a result from a catastrophic event, such as earthquake, loss of imported water supply, other natural disaster or severe drought conditions. In addition to Stage 5 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution. The following end-user prohibitions are also in effect under Stage 6:

a) The irrigation with potable water on ornamental turf areas on public street medians.

b) The irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

STAGE 7 - WATER CRISIS - CATASTROPHIC

A Stage 7 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by fifty (50) percent as a result from a catastrophic event, such as earthquake, loss of imported water supply or other natural disaster. In addition to Stage 6 measures, all non-essential outdoor water may be prohibited as determined by the District and enacted by resolution.

Additionally, the use of water for construction purposes shall be curtailed during a water emergency crisis with the exception that recycled water may be used for such purposes. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050

Section 5 The President of the Board shall sign this Ordinance and the Secretary of the Board shall attest thereto, and this Ordinance shall be in full force and effect immediately upon adoption. Within fifteen (15) days after adoption of this Ordinance, a summary of this Ordinance shall be published with the names of the Directors voting for and against this Ordinance and a certified copy of the full text of this Ordinance, along with the names of those Directors voting for and against this Ordinance, shall be posted in the District offices.

Section 6 If any section, subsection, clause or phrase in this Ordinance is for any reason held invalid, the validity of the remainder of this Ordinance shall not be affected thereby. The Board hereby declares that it would have passed this Ordinance and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

ADOPTED this 12th day of May, 2015 by the Board of Directors of the Cucamonga Valley Water District.

James V. Curatalo, Jr.
President

ATTEST:

Martin E. Zvirbulis
Secretary

I, **MARTIN E. ZVIRBULIS,** Secretary of the Board of Directors of Cucamonga Valley Water District, do hereby certify that the foregoing **Ordinance No. 2015-5-1** was adopted by the Board of Directors of said District at a regular board meeting held on **May 12, 2015**. A recorded vote of the Board is as follows:

AYES: Directors Cetina, Curatalo, Gonzalez, Reed, Tiegs

NOES: Directors None

ABSENT: Directors None

MARTIN E. ZVIRBULIS, SECRETARY
Cucamonga Valley Water District
and the Board of Directors thereof

RESOLUTION NO. 2015-5-3

RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT DECLARING A STAGE 6 SEVERE WATER EMERGENCY PURSUANT TO ITS WATER SUPPLY SHORTAGE CONTINGENCY PLAN TO COMPLY WITH STATEWIDE DROUGHT REGULATIONS

WHEREAS, on August 26, 2014 the Board of Directors took action to declare a STAGE 2 WATER WATCH pursuant to Title 4 – Chapter 4.24 Water Supply Shortage Contingency Plan which is set forth in the Cucamonga Valley Water District Code ("District Code"). Said action was taken in response to the Governor's 2014 Executive Order which declared a State of Emergency due to extended drought conditions, and

WHEREAS, on April 1, 2015, the Governor issued a subsequent Executive Order requiring a mandatory 25% statewide reduction in total potable water production and directed the State Water Resources Control Board ("SWRCB") to develop an Emergency Regulation Implementing The 25% Conservation Standard ("Regulation"); and

WHEREAS, on April 28, the SWRCB published a Notice of Proposed Rulemaking to consider taking action to adopt its Regulation at its May 5-6, 2015 meeting, and

WHEREAS, under the draft Regulation, the District is required to reduce total potable water production by 32% as part of the mandate for a total statewide reduction; and

WHEREAS, based on the Regulation, it is anticipated that the District will need to declare a STAGE 6 – SEVERE WATER EMERGENCY in order to achieve a 32% reduction in total potable water production as mandated by the SWRCB; and

WHEREAS, Water Code Section 31026 provides that the District has the power to restrict the use of water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the wastage of water or the use of water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the District and may prohibit use of such water during such periods for specific uses which the District may from time to time find to be nonessential. The District has the authority to impose monetary fines and penalties and take other applicable actions pursuant to Water Code Sections 350-358, 375-377, and 31029; and

WHEREAS, pursuant to the District Code, the Board may take action by resolution to declare, change and rescind, as applicable, the particular stage of the water supply shortage. The District Code provides for declaring Drought Alert Stages and for implementing a corresponding Drought Rate structure in the event such a rate structure is adopted by the Board and made part of the District's rules and regulations. It is anticipated that the Board will consider the adoption of a Drought Rate on June 9, 2015 and if adopted, it is anticipated that such a rate structure would go into effect on July 1, 2015. Therefore, the Board desires to adopt this Resolution in order to declare a STAGE 6 – SEVERE WATER EMERGENCY and establish the measures to be implemented during said STAGE 6.

NOW THEREFORE BE IT RESOLVED by the Board of Directors as follows:

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following manner: Giving the notice to the customer at the property where the violation occurred; or if the water customer is absent from or unavailable at the premises at which the violation occurred, by leaving a copy with some person of suitable age and discretion at the premises and sending a copy through the regular mail to the address at which the water customer is normally billed; or if a person of suitable age or discretion cannot be found, then by affixing a copy in a conspicuous place at the premises at which the violation occurred, and also sending a copy through the regular mail to the address at which the customer is normally billed.

(c) If the General Manager/CEO, or his/her representative deems it appropriate, water service will be terminated at the location where the violation occurred due to a failure to comply with this Resolution or a failure to pay financial penalties. Any such service termination shall be implemented under the District's authority and procedures including, but not limited to, the District's rules and regulations for water service.

Section 5 Purpose Of Restrictions And Fines The regulatory purposes of imposing the requirements and financial penalties, as set forth in this Resolution, are to conserve water, deter waste and unreasonable use of water, encourage efficiency, and to help cover the costs incident to the investigation, inspection, and administration of enforcement of this Resolution.

Section 6 Future Stage(s) The Board may make a determination as to when it may be necessary to move to a further Stage, or a lesser Stage, under the District Code. Section 4.24.040 of the District Code provides that Stage 1 remains in effect at all times and does not require the Board to adopt a resolution for implementation.

Section 7 CEQA The Board finds that adopting and enforcing mandatory restrictions on water use in order to comply with SWRCB requirements is exempt from the California Environmental Quality Act ("CEQA") pursuant to State CEQA Guidelines Section 15268 and Public Resources Code Section 21080(b)(1) as a ministerial action. The Regulations mandate that each urban water supplier reduce its total potable water production by a specific percentage as imposed by the SWRCB. Therefore, an action to implement a particular drought stage is not a discretionary action and as such it is statutorily exempt from CEQA.

Section 8 Publication Following Adoption This Resolution shall be in full force and effect immediately upon adoption. Within 10 calendar days of adoption of this Resolution, the Board shall issue its determination of shortage and corrective measures by public proclamation published in a daily newspaper of general circulation a minimum of 3 times for 3 consecutive weeks. Three publications in a newspaper regularly published once a week or more often, with at least 5 days intervening between the respective publication dates not counting such publication dates, are sufficient. Such declaration and notice shall provide the extent, terms and conditions respecting the use and consumption of water in accordance with the applicable water conservation stage. Upon such declaration and publication of such notice, due and proper notice shall be deemed to have been given each and every person supplied water within the District.

Section 9 Severability If any section, subsection, clause or phrase in this Resolution is for any reason held invalid, the validity of the remainder of this Resolution shall not be affected thereby. The Board hereby declares that it would have passed this Resolution and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more

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sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

PASSED AND ADOPTED this 12th day of May, 2015.

James V. Curatalo, Jr.
President

ATTEST:

Martin E. Zvirbulis
Secretary

Cucamonga Valley Water District
Service Beyond Expectation

RESOLUTION NO. 2016-4-3
A RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT AFFIRMING LONG-TERM WATER CONSERVATION MANAGEMENT POLICY IN CALIFORNIA

WHEREAS, local California water agencies have invested nearly $20 billion in the past 20 years to build and prudently manage diverse water supply portfolios to meet their customers' needs and provide reliable supplies during times of drought; and

WHEREAS, the Cucamonga Valley Water District, since 2009, has achieved a 71% conservation savings, in addition to making numerous investments in groundwater banking, recycled water, and water quality improvement projects to achieve drought-resiliency for the communities served by the District; and

WHEREAS, the emergency drought regulation adopted in May 2015 and extended in February 2016 by the State Water Resources Control Board largely overlooked these investments and required local urban water suppliers to impose mandatory reductions in water use on their customers, even where hydrology and available local supply options did not warrant such stringent reductions; and

WHEREAS, Californians responded heroically to the drought emergency and largely met the statewide goal of reducing urban water use by 25% through February 2016; and

WHEREAS, as the state's focus transitions from the emergency regulation to a potential long-term policy approach to conservation, local water agencies believe it should be the state's policy to emphasize investments in drought-resiliency and ongoing water-use efficiency and to leave discretion with local water agencies to choose appropriate management strategies; and

WHEREAS, California water agencies affirmatively support a long-term policy that demands high levels of water use efficiency, promotes innovation in developing water shortage contingency plans, requires high levels of accountability at local water agencies, and preserves local control over water management decisions;

NOW, THEREFORE, BE IT RESOLVED, that Cucamonga Valley Water District supports a long-term policy that will result in a highly efficient and resilient water future and will allow local water agencies to continue planning for and investing in the water supply reliability actions needed to meet California's 21st century water needs; and

BE IT FURTHER RESOLVED that Cucamonga Valley Water District believes long-term water management policy is most appropriately developed and administered by the California Department of Water Resources, which already has the lead role in managing the state's Urban Water Management Plan and Water Shortage Contingency Plan process.

RESOLUTION NO. 2016-4-3

APPROVED, ADOPTED, AND SIGNED this 26th day of April 2016.

CUCAMONGA VALLEY WATER DISTRICT

James V. Curatalo, Jr.
President, Board of Directors

ATTEST:

Martin Zvirbulis
Secretary, Board of Directors

RESOLUTION NO. 2016-6-4

RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT MOVING FROM STAGE 6 TO STAGE 1 OF THE WATER SUPPLY SHORTAGE CONTINGENCY PLAN

WHEREAS, on April 1, 2015, the Governor issued an Executive Order requiring a mandatory 25% statewide reduction in total potable water production and directed the State Water Resources Control Board ("SWRCB") to develop an Emergency Regulation Implementing the 25% Conservation Standard ("Regulation"); and

WHEREAS, the SWRCB adopted the Regulation which required the District to reduce total potable water production by 32% as part of the mandate for a total statewide reduction; and

WHEREAS, on May 12, 2015 the Board of Directors took action to declare a STAGE 6 SEVERE WATER EMERGENCY pursuant to Title 4 – Chapter 4.24 Water Supply Shortage Contingency Plan which is set forth in the Cucamonga Valley Water District Code ("District Code") which required a 35% conservation mandate to its customers, and

WHEREAS, moving to a STAGE 6 SEVERE WATER EMERGENCY also triggered the implementation of drought rates as a mechanism to ensure the District continued to generate sufficient revenues to operate, manage and maintain its facilities and services, even in times of severe drought and mandatory conservation, and

WHEREAS, since the implementation of the Regulation, the District has implemented programs, communicated with customers and monitored water production and as a result, customers have achieved an overall conservation savings of 27%, and

WHEREAS, on May 18, 2016 the SWRCB revised the Regulation implementing a self-certification process allowing urban water agencies to certify its demand and supply picture under a continued three-year dry year scenario, and

WHEREAS, District staff has determined that under the self-certification process it is able to sufficiently meet the water demands of its customers due to proper water supply planning and the prudent investments it has made in projects and programs to increase the District's drought resiliency, and

WHEREAS, pursuant to the District Code, the Board may take action by resolution to declare, change and rescind, as applicable, the particular stage of the water supply shortage. The District Code provides for declaring Drought Alert Stages and for implementing a corresponding Drought Rate structure in the event such a rate structure is adopted by the Board and made part of the District's rules and regulations. Therefore, the Board desires to adopt this Resolution in order to move to a STAGE 1 – ENCOURAGING WATER USE EFFICIENCY.

NOW THEREFORE BE IT RESOLVED by the Board of Directors as follows:

Section 1 Incorporation of Recitals All of the foregoing Recitals are true and correct and the Board so finds and determines. The Recitals set forth above are incorporated herein and made an operative part of this Resolution.

Section 2 Compliance With SWRCB Revised Regulation The Board hereby determines that based upon the SWRCB self-certification process, the District has sufficient water supplies to meet the needs of its customers, and is not requiring a conservation savings percentage; however, the District continues to encourage customers to efficiently use its water resources.

Section 3 Declaration of STAGE 1 ENCOURAGING WATER USE EFFICIENCY The Board hereby moves from Stage 6 – SEVERE WATER EMERGENCY to STAGE 1 – ENCOURAGING WATER USE EFFICIENCY of the Water Supply Shortage Contingency Plan. Under STAGE 1 the following actions are prohibited, except where necessary to address an immediate health and safety need or to comply with a term or condition in a permit issued by a state or federal agency:

(a) Applying water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or a structure is prohibited. Sprinklers shall be adjusted so that there is no runoff, overspray or excessive irrigation from the property;

(b) Using a hose to wash an automobile is prohibited except where the hose is equipped with a shut-off nozzle;

(c) Applying water to any hard surface including, but not limited to, driveways, sidewalks, and asphalt is prohibited. However, in the event there is a need to comply with health and safety requirements, paved areas may be hosed down with the use of a water-broom or water-efficient pressure washer using not more than 5 gallons per minute;

(d) Using potable water in a fountain or other decorative water feature is prohibited, except where the water is part of a recirculating system;

(e) Leaks and broken sprinklers shall be repaired upon notification by the District.

(f) Restaurants will only serve water on request.

(g) Hotels will offer guests the option to not launder linen daily.

(h) Watering outdoor landscapes during and within 48 hours after a measurable rainfall is prohibited.

(i) The irrigation with potable water on ornamental turf areas on public street medians.

(j) The irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission.

RESOLUTION NO. 2016-6-4

Section 4 Water Commodity Drought Rates Water Commodity Drought Rates set forth in the District Code apply in different amounts during the applicable Stages 2 – 7. As a result of the adoption of this Resolution which moves the District from STAGE 6 to STAGE 1, Water Commodity Drought Rates shall be of no further force or effect.

Section 5 Publication Following Adoption This Resolution shall be in full force and effect immediately upon adoption. Within 10 calendar days of adoption of this Resolution, the Board shall issue its determination of shortage and corrective measures by public proclamation published in a daily newspaper of general circulation a minimum of 3 times for 3 consecutive weeks. Three publications in a newspaper regularly published once a week or more often, with at least 5 days intervening between the respective publication dates not counting such publication dates, are sufficient. Such declaration and notice shall provide the extent, terms and conditions respecting the use and consumption of water in accordance with the applicable water conservation stage. Upon such declaration and publication of such notice, due and proper notice shall be deemed to have been given each and every person supplied water within the District.

Section 6 Severability If any section, subsection, clause or phrase in this Resolution is for any reason held invalid, the validity of the remainder of this Resolution shall not be affected thereby. The Board hereby declares that it would have passed this Resolution and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

PASSED AND ADOPTED this 28th day of June 2016.

James V. Curatalo, Jr.
President

ATTEST:

Martin E. Zvirbulis
Secretary

APPENDIX O

COUNTY OF SAN BERNARDINO'S 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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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 BOARD GOVERNED COUNTY SERVICE AREAS 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 the Board Governed County Service Areas and their Zones.

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 Board Governed County Service Areas and their Zones, 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 Board Governed County Service Areas and their Zones 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 Board Governed County Service Areas and their Zones, 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

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.

COUNTY OF SAN BERNARDINO - Hazard Mitigation Plan Update

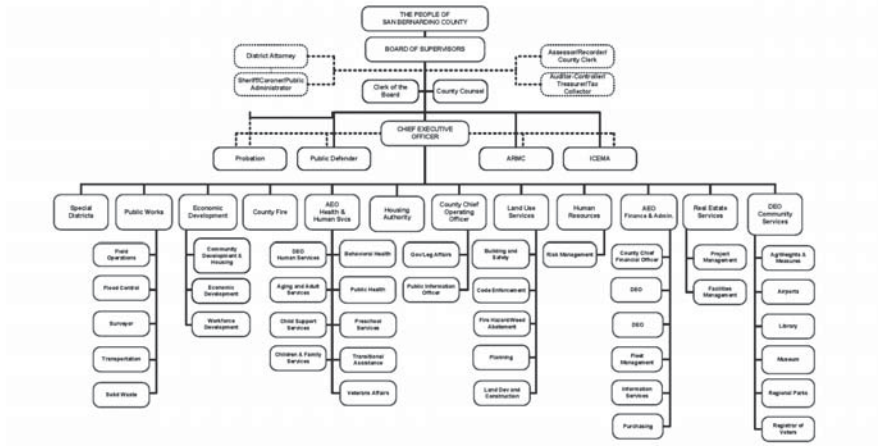


Figure 1-1: Organizational Chart for San Bernardino County

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.

San Bernardino County Fire Protection District
San Bernardino County, California



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)

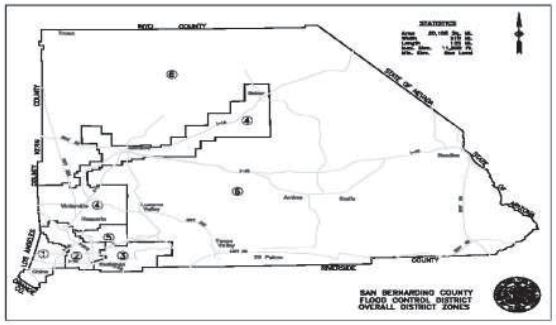


Figure 1-3: Map of San Bernardino County Flood Control District

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.

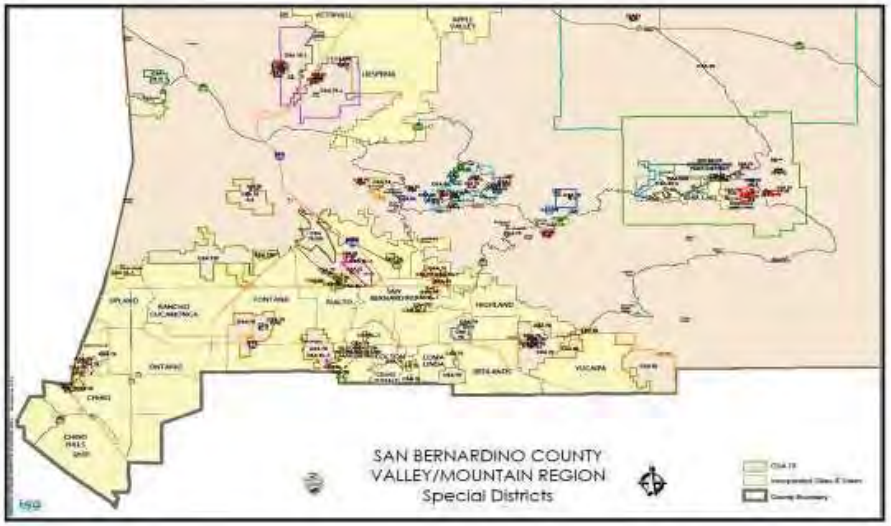


Figure 1-4: Map of Special District Department Districts



Figure 1-5: Special Districts Valley/Mountain Region

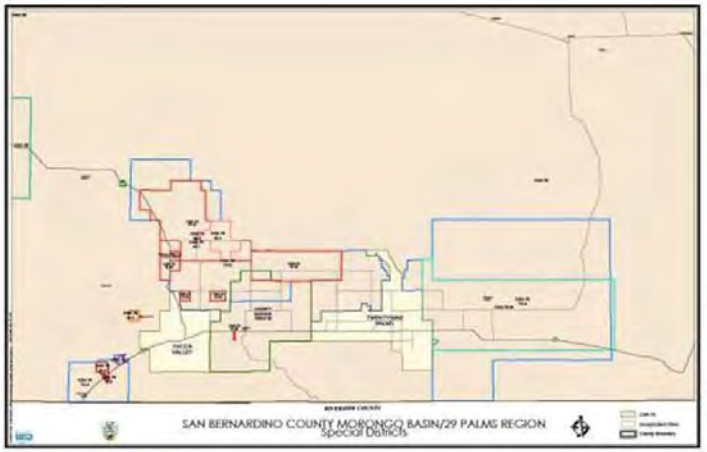


Figure 1-6: Morongo Basin/Twentynine Palms Region



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.

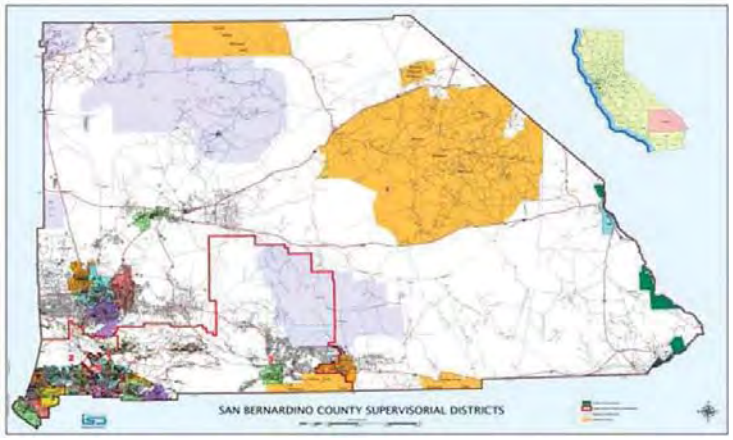


Figure 1-8: Unincorporated and Corporate Areas in San Bernardino County



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)*

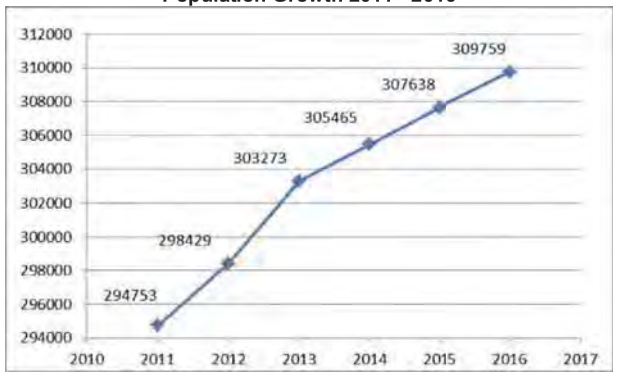


Figure 1-10: San Bernardino County Unincorporated Area Population Changes 2011 - 2016

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.

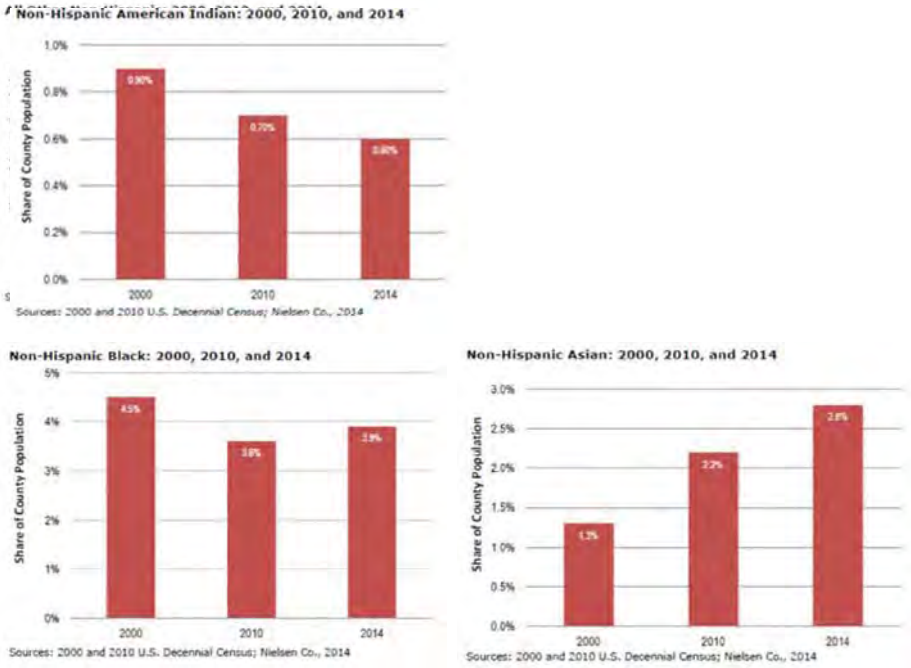


Figure 1-11: San Bernardino County Unincorporated Area 2014 Population by Ethnicity

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/

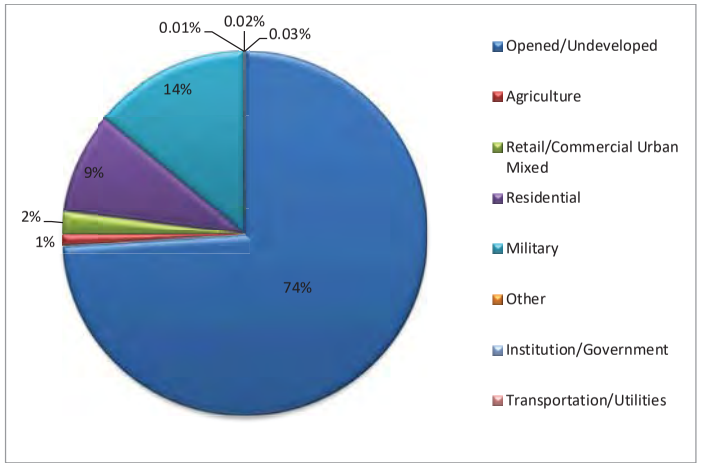


Figure 1-12: San Bernardino County Land Use

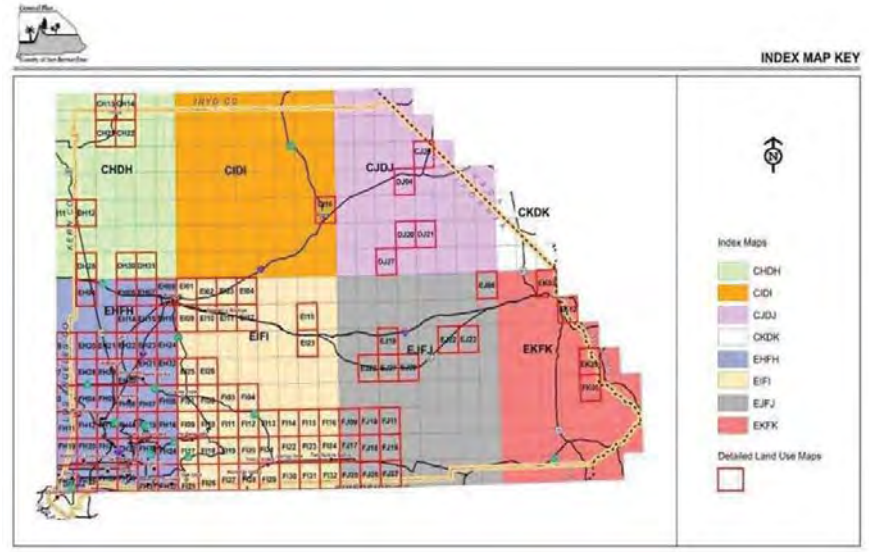


Figure 1-13: San Bernardino County Land Use Map

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.

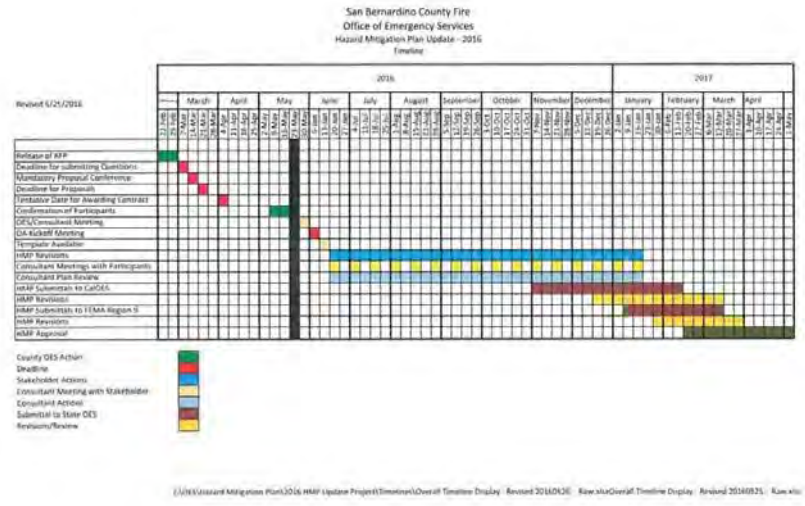
The Multi-Jurisdictional Planning Team members worked together to jointly determine and rank the risks facing the six participating agencies, develop goals and objectives to mitigate the risks, and identify which of the participating jurisdictions would be most appropriate for leading any particular 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.

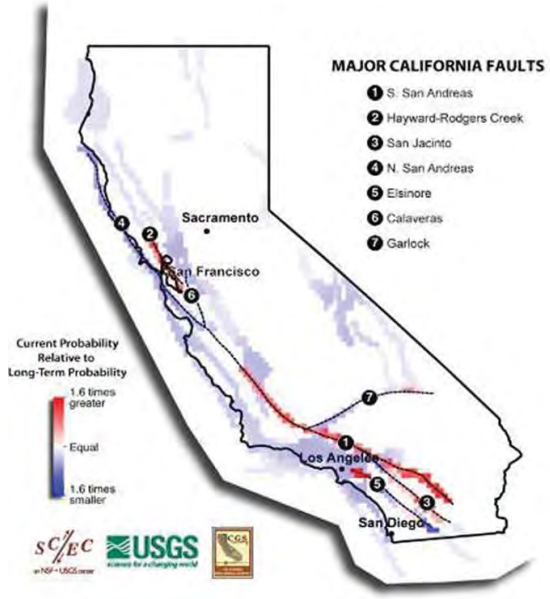


Figure 4-1: Major California Faults

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

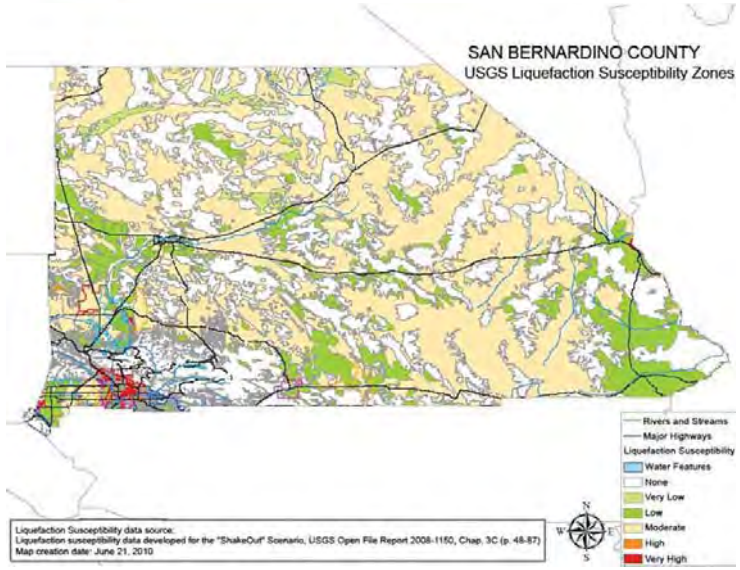


Figure 4-2: USGS Liquefaction Susceptibility Zone

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/).

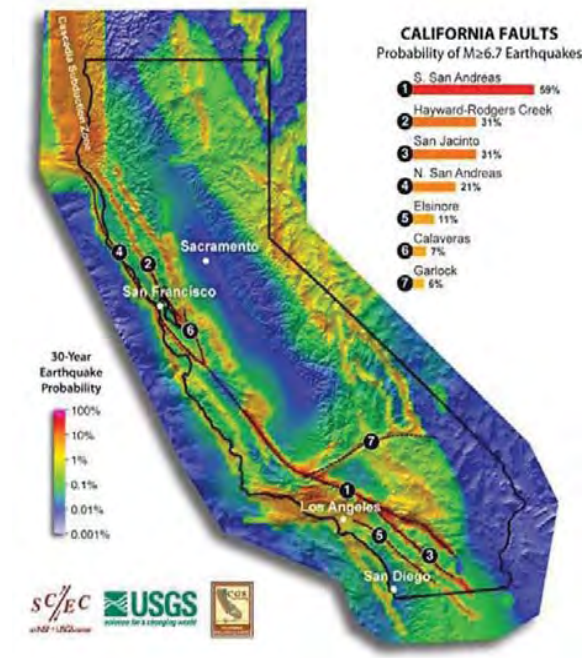


Figure 4-3: California Faults Probability of ≥ M 6.7 Earthquake

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.

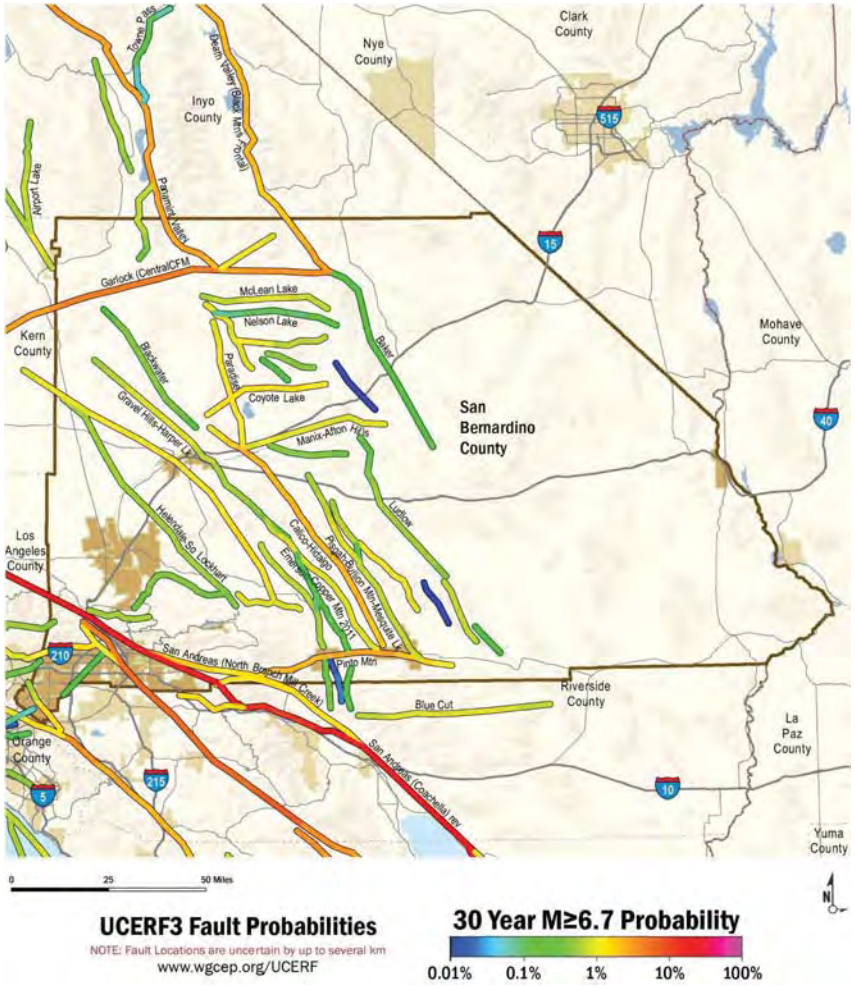


Figure 4-4: California Area Earthquake Probabilities by Magnitude

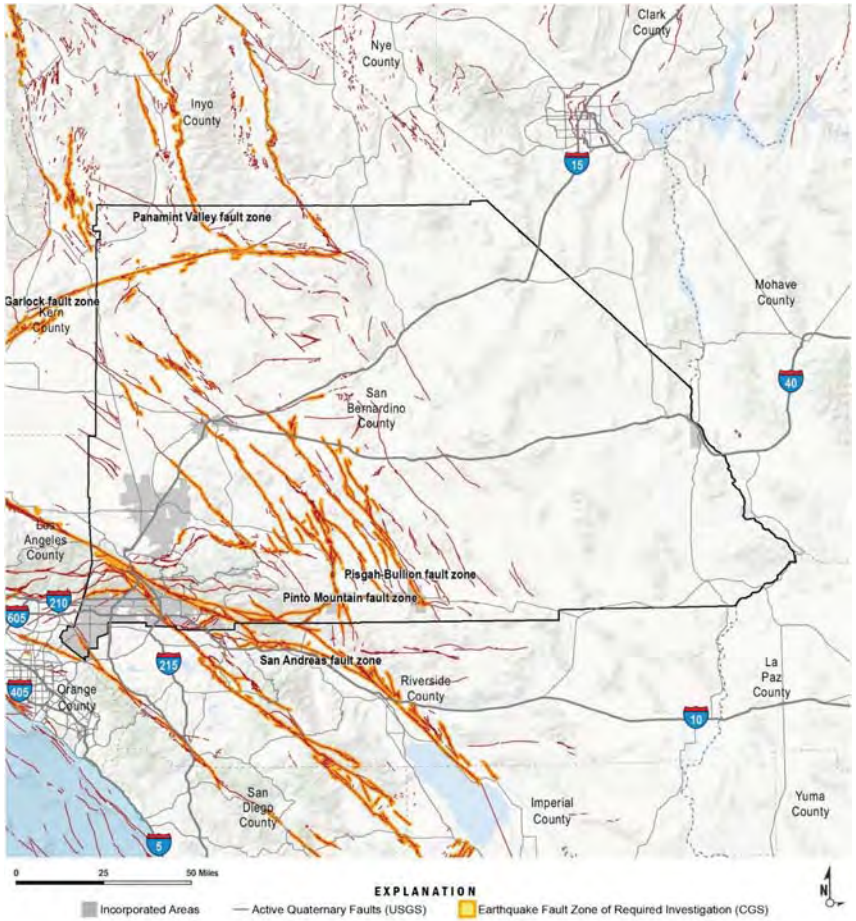


Figure 4-5: Earthquake Fault Zone

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

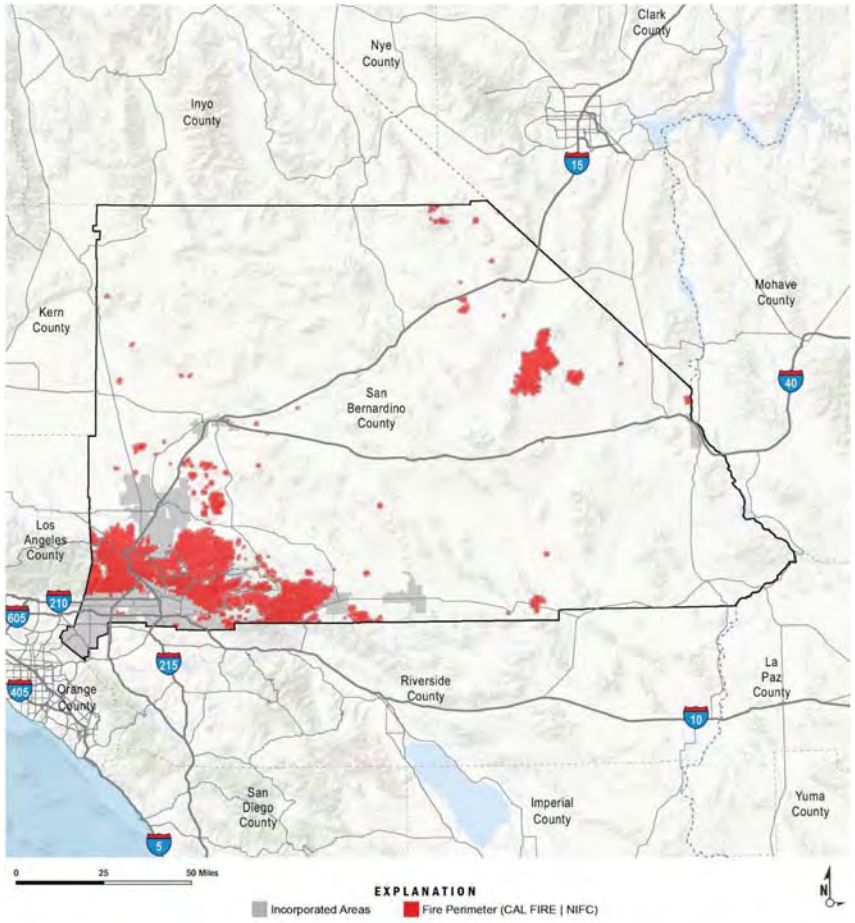


Figure 4-6: Wildfire History 1900 – 2016 (CalFire and USFS Data 2010)

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.

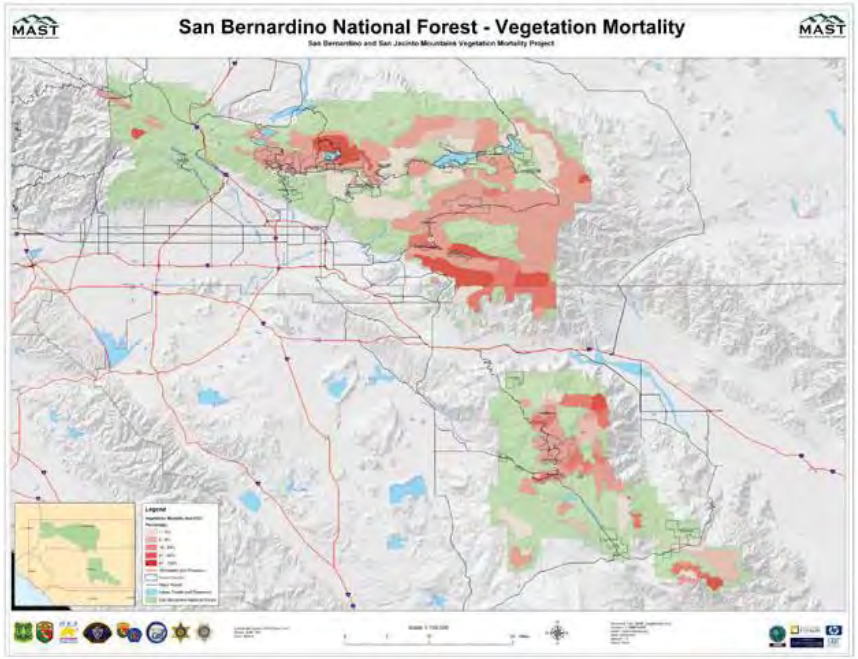


Figure 4-7: San Bernardino National Forest – Vegetation Mortality

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.

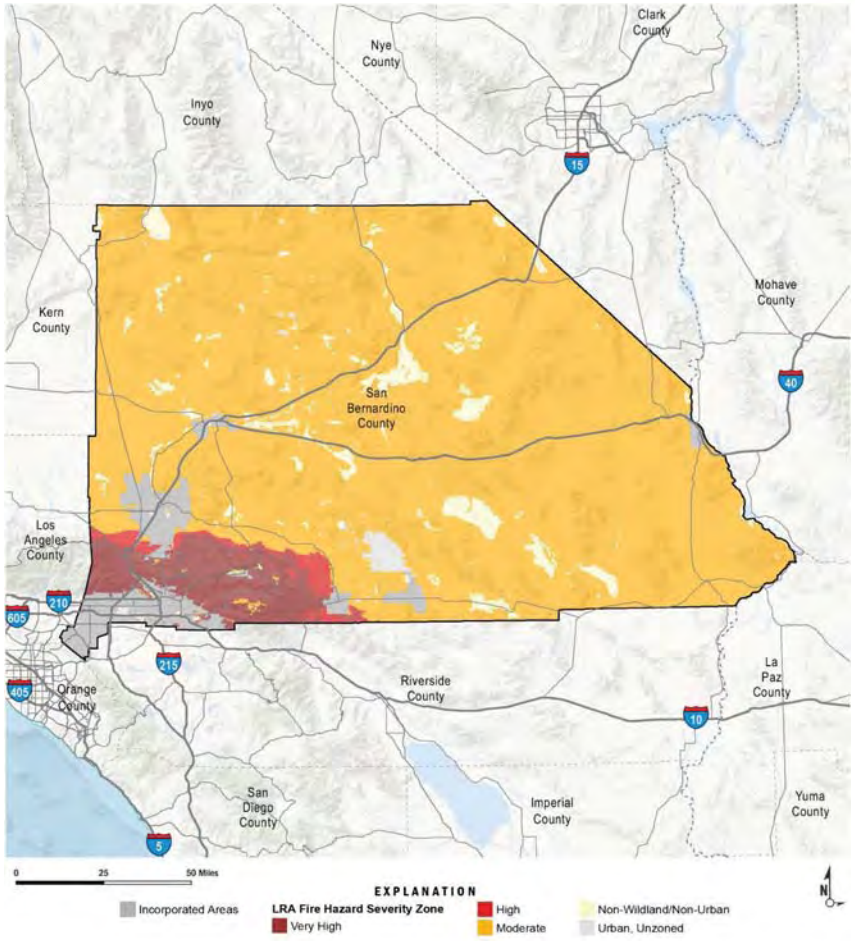


Figure 4-8: Fire Hazard Severity Zone

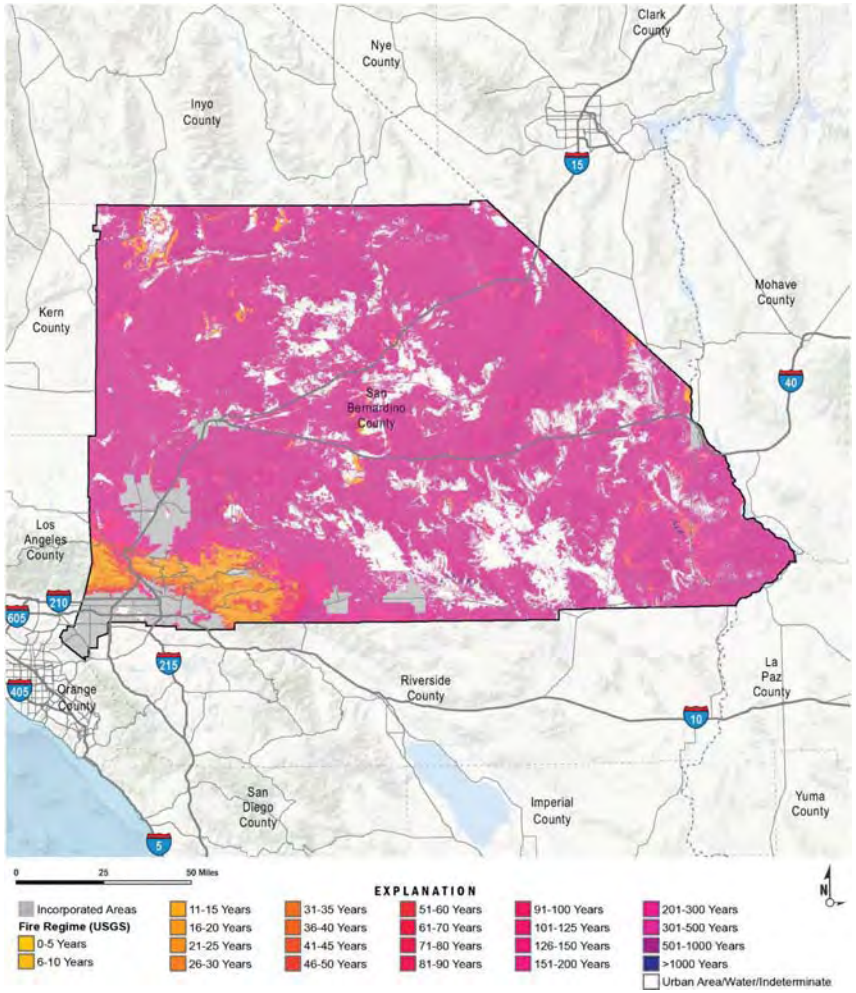


Figure 4-9: USGS Mean Fire Return Interval Map

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.

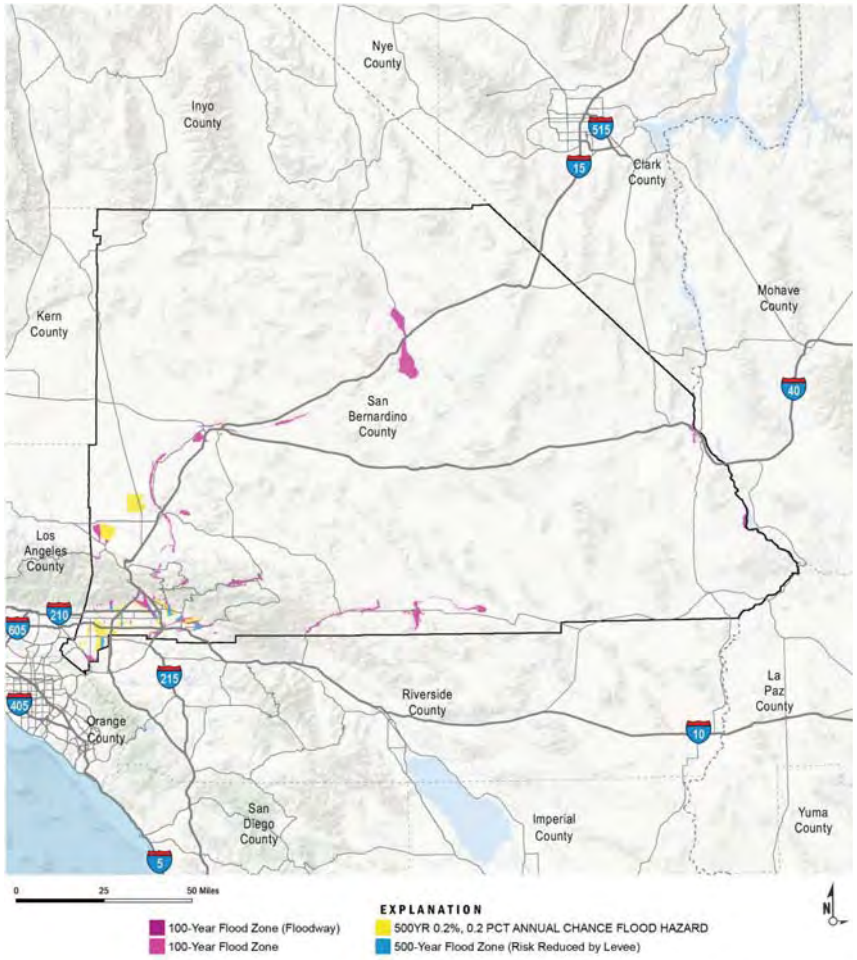


Figure 4-10: Flood Hazard Severity Zone Map

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).

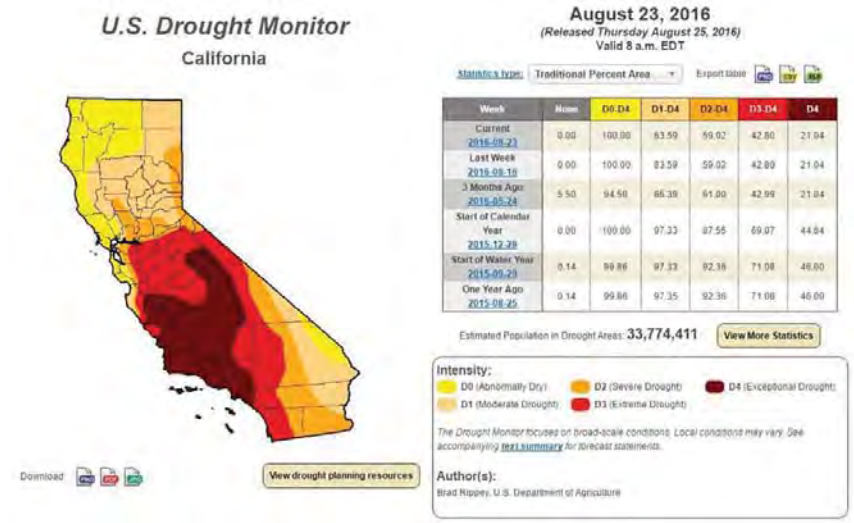


Figure 4-11: US Drought Monitor Map for the State of California on August 23, 2016

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.

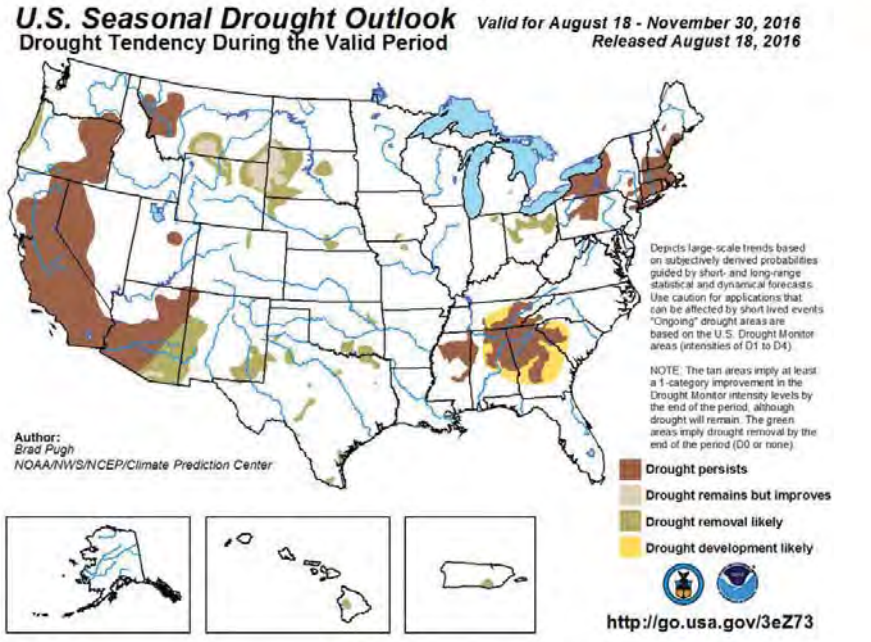


Figure 4-12: USSDO Drought Tendency Map (Valid August 18-November 30, 2016

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.

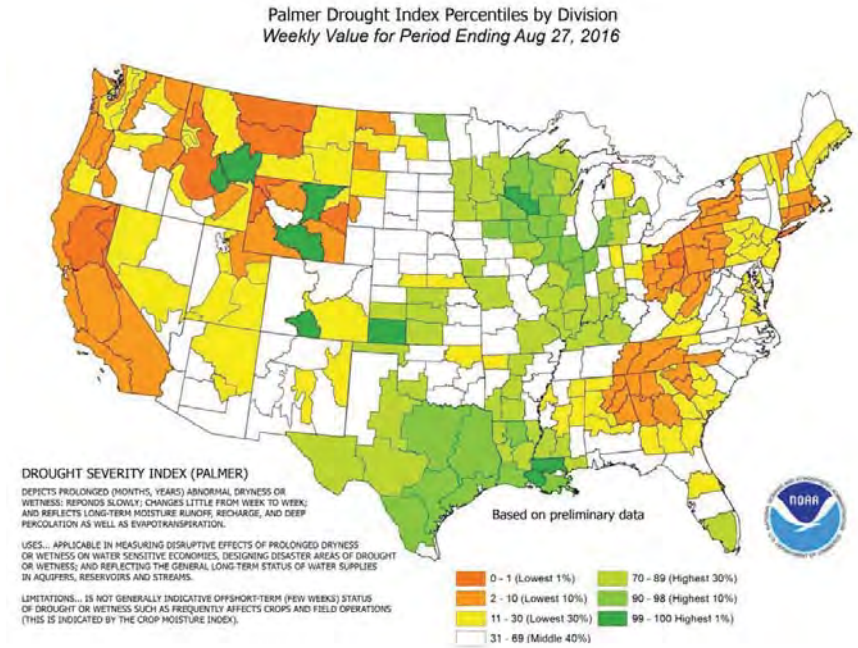


Figure 4-13: Month SPI through the end of August 2016 for San Bernardino County

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.

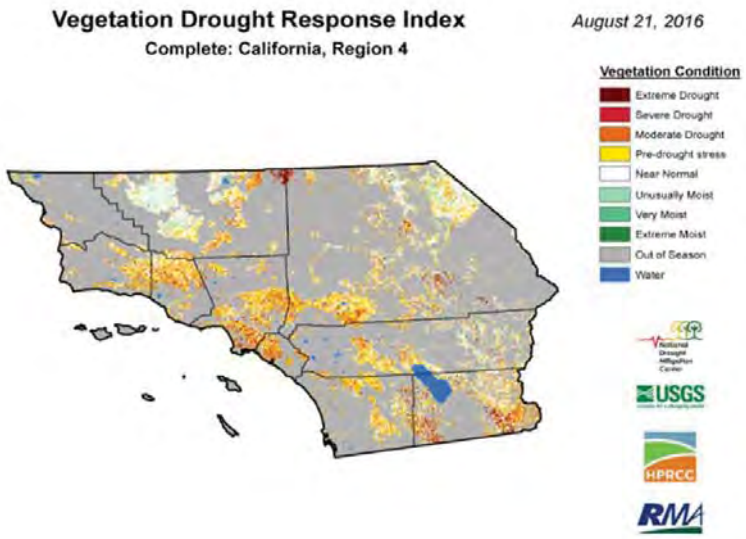


Figure 4-14: Vegetation Drought Response Index – California Region 4 for August 21, 2016

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.

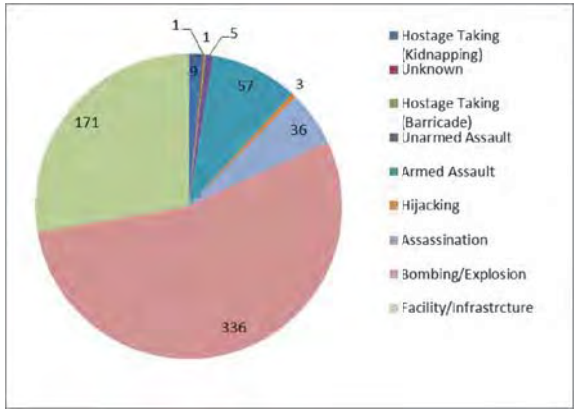
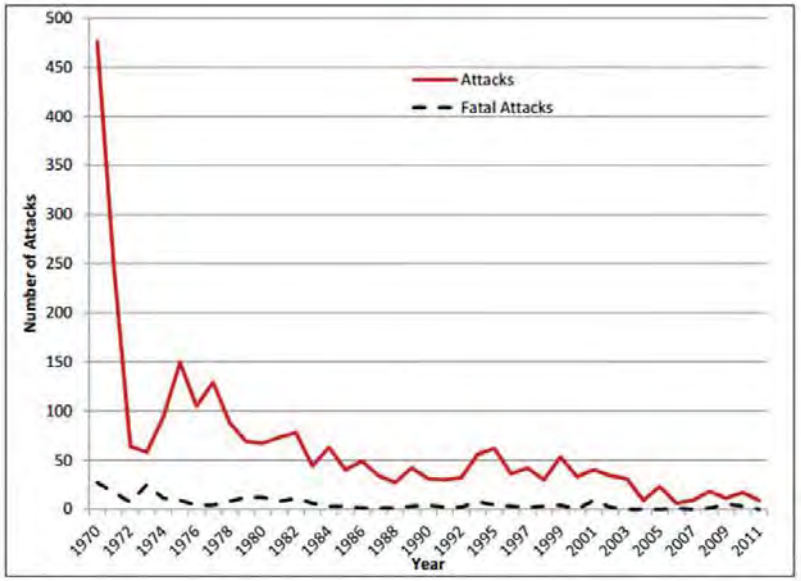


Figure 4-15: Types of Terrorist Attacks in California from 1970-Present

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

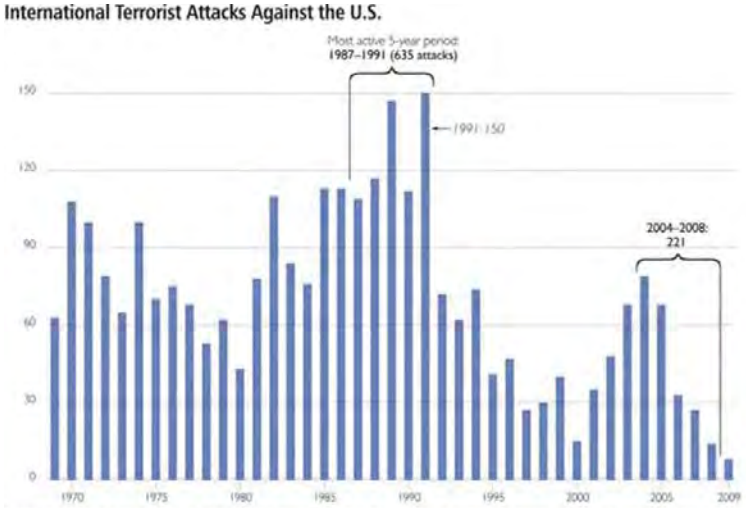


Figure 4-17: International Terrorist Attacks Against the United States

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

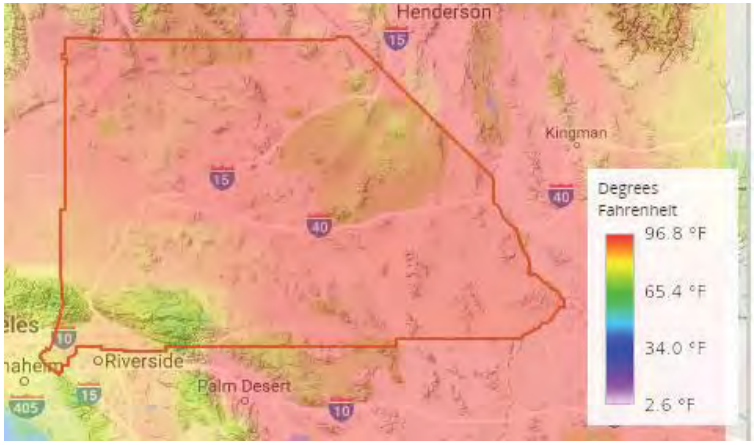


Figure 4-20: July Decadal Average High Temperature Map; 2090

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

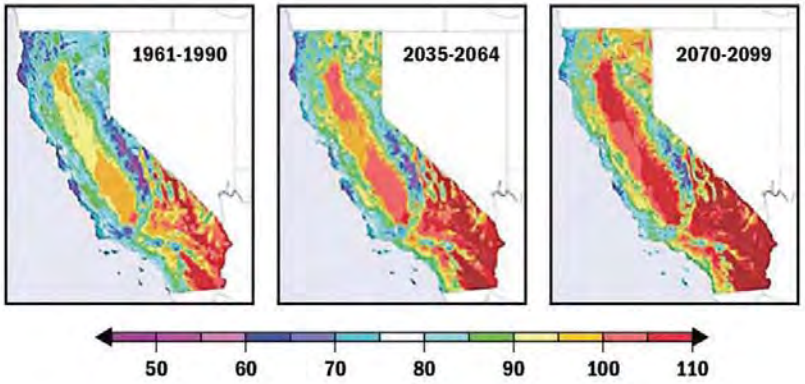


Figure 4-21: California Historical and Projected Temperature increases 1961-2099

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.

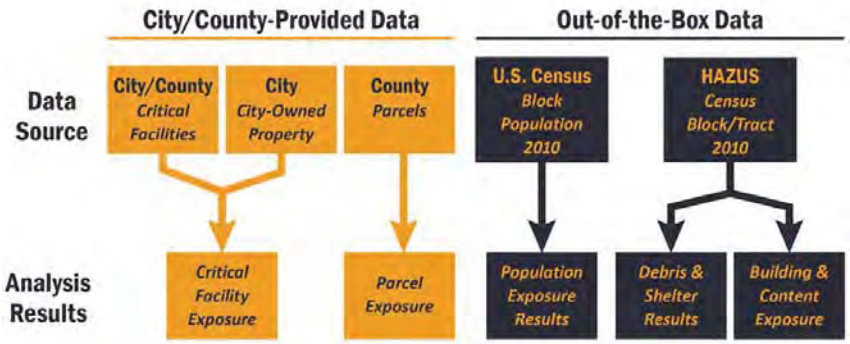


Figure 4-22: Data Source and Methodology

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 %**

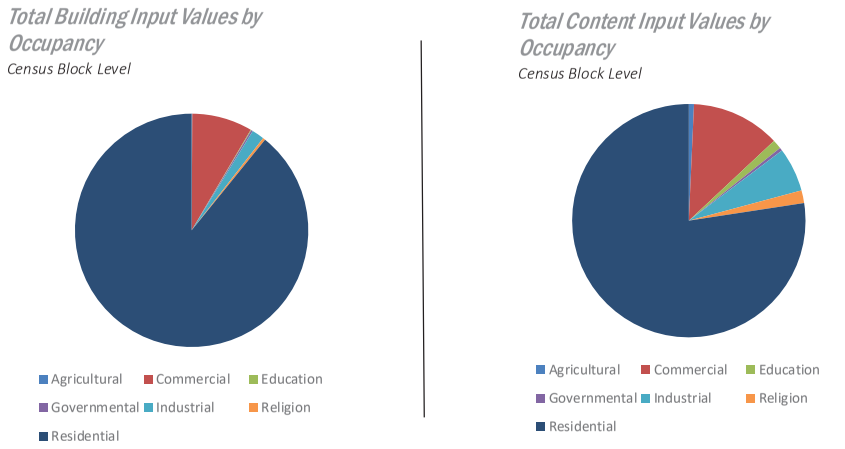


Figure 4-23: Census Block Building and Content Exposure Values

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 %**

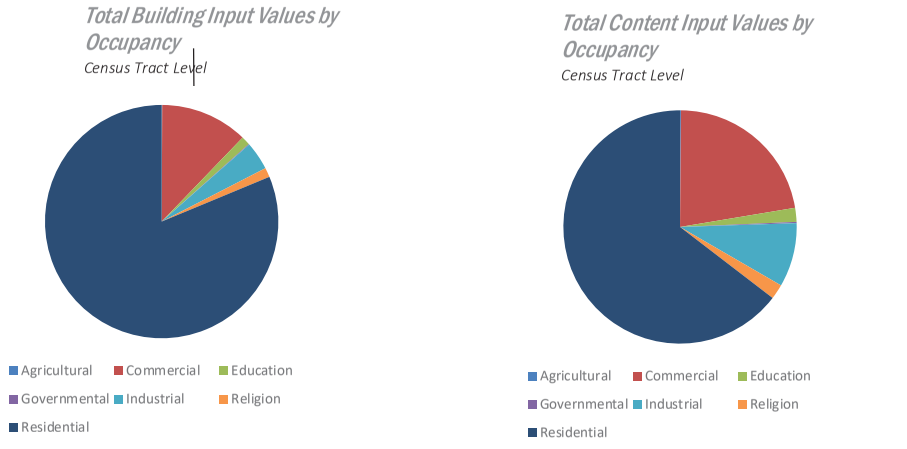


Figure 4-24: Census Tract Building and Content Exposure Values

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

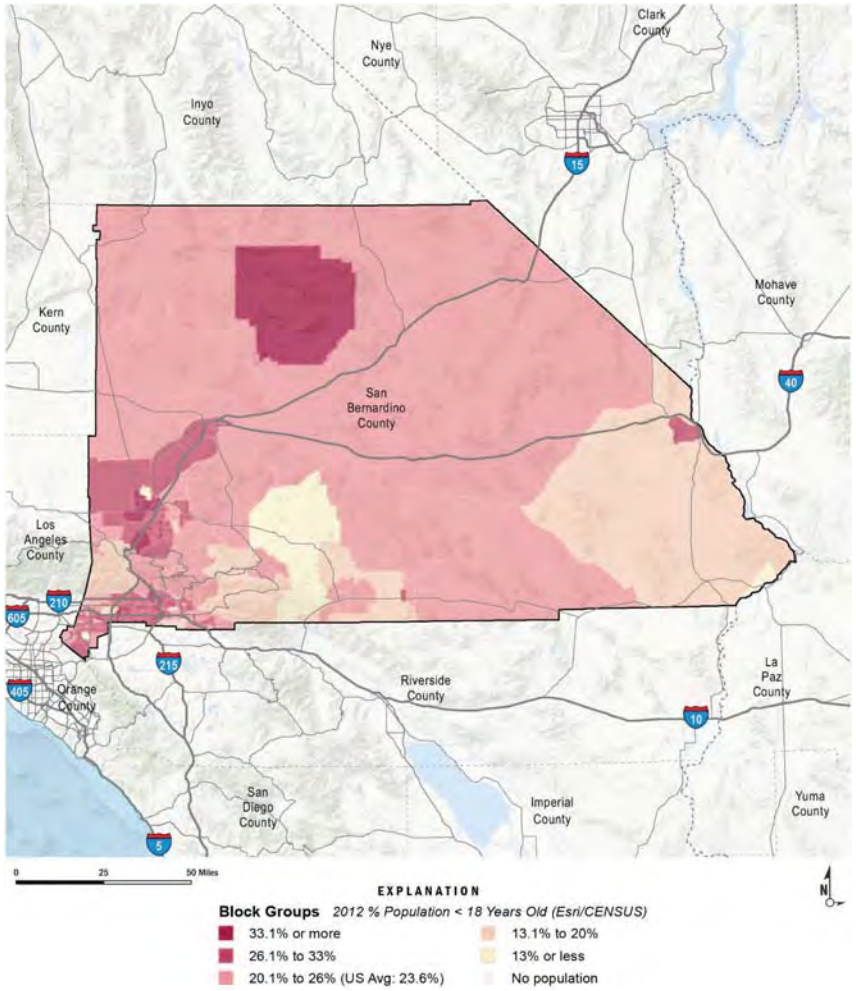


Figure 4-26: Population Under Age 18

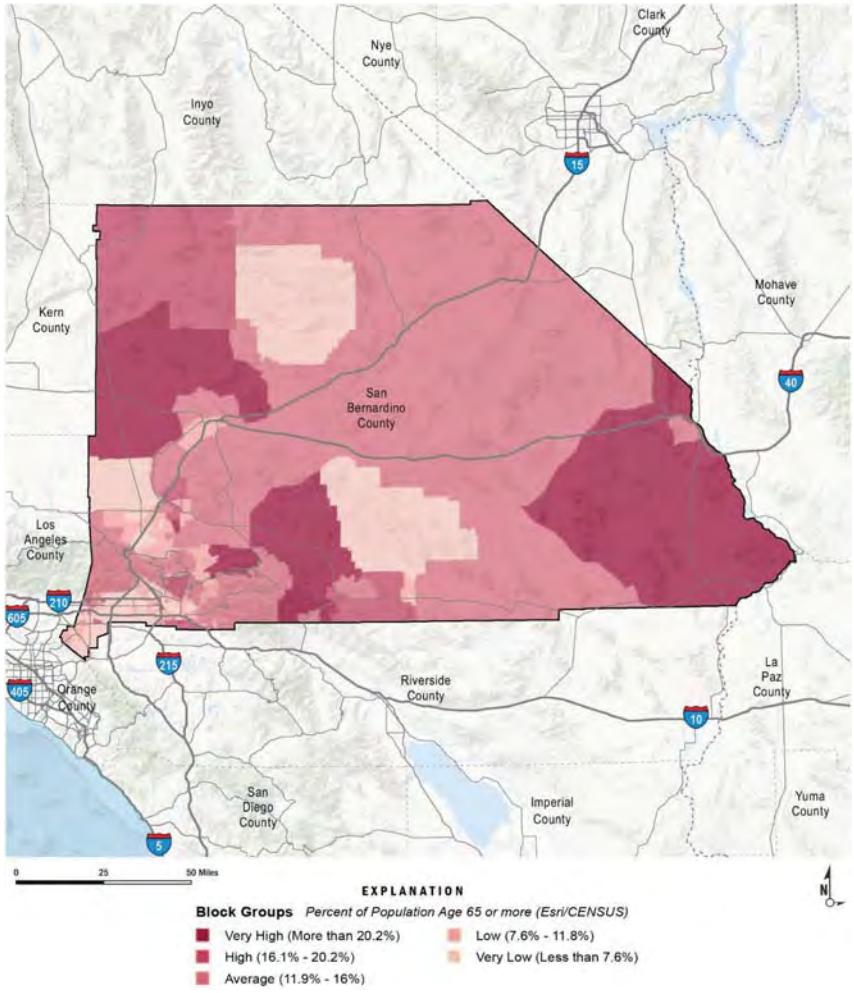


Figure 4-27: Population Over Age 65

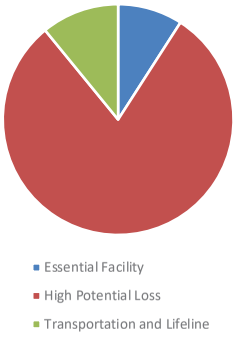
4.11.1.4 Critical Facility List

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.

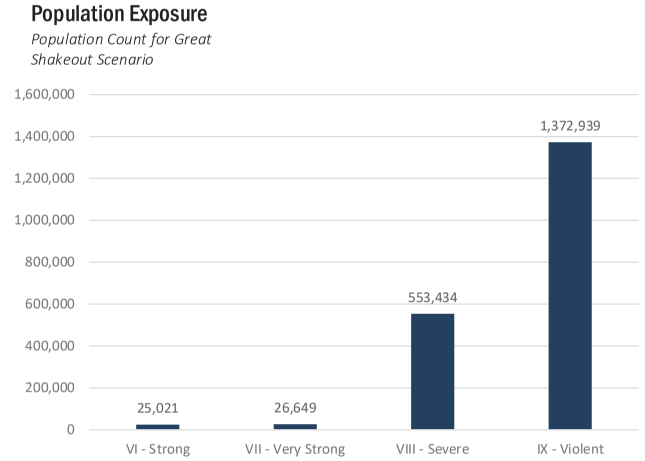


Figure 4-28: Population Exposure to the Great Shakeout EQ Shake Severity Zone

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%**

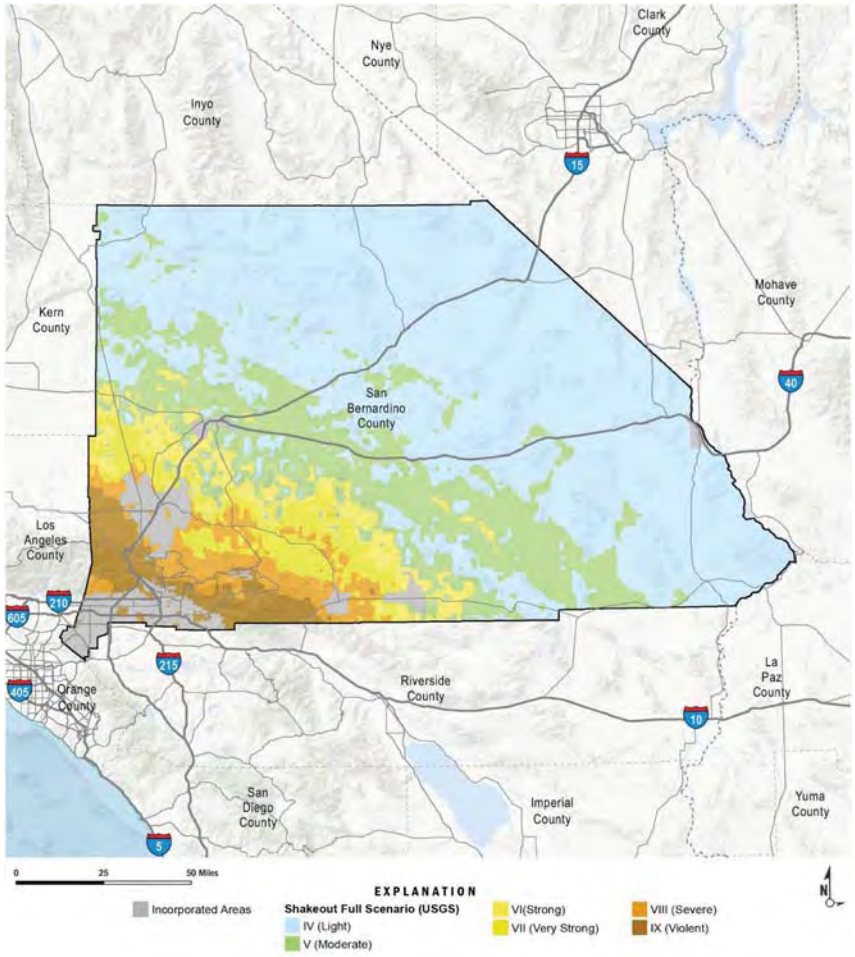


Figure 4-29: Great Shakeout Scenario MMI Classes

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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

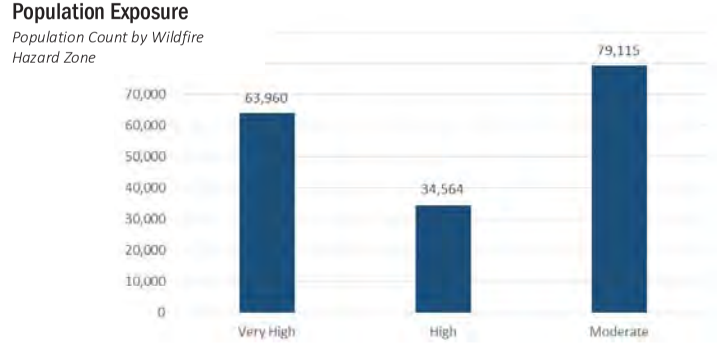


Figure 4-30: Population at Risk from Wildfire Hazards

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.

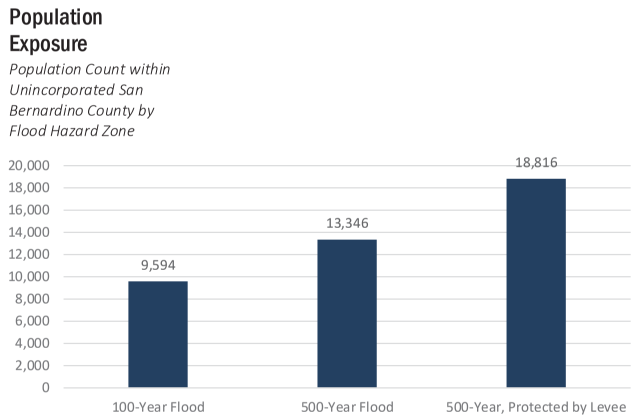


Figure 4-31: Population Exposed to NFIP Flood Zones

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

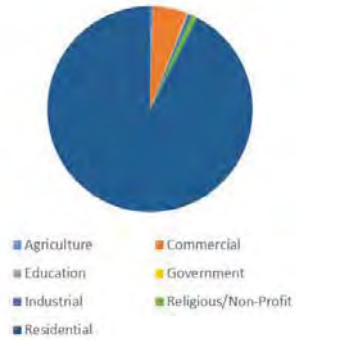
Building Type	Building Replacement Costs ($000)	Building Replacement Cost (% of Total Value)	Content Replacement Cost ($000)	Content Replacement Cost (% of Total Value)	Total Estimated Loss ($000)	Total Loss Estimation (% of Total Value)
Agriculture	$ 147.00	0.10%	$ 246.00	0.17%	$ 427.00	0.30%
Commercial	$ 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



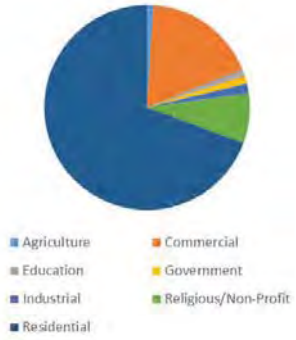
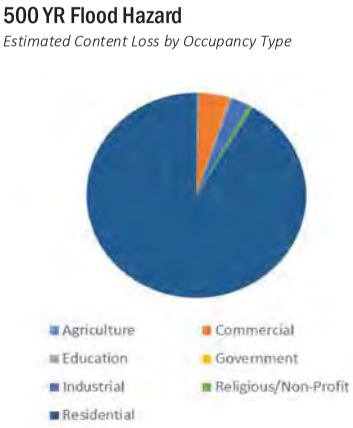


Figure 4-32: Total Building and Content Loss by Occupancy Type for 100 Year Flood

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%**



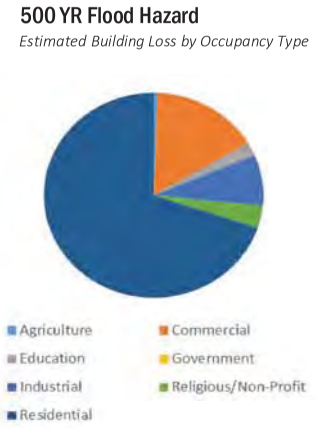


Figure 4-33: Total Building and Content Loss by Occupancy Type for 500 Year Flood

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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.

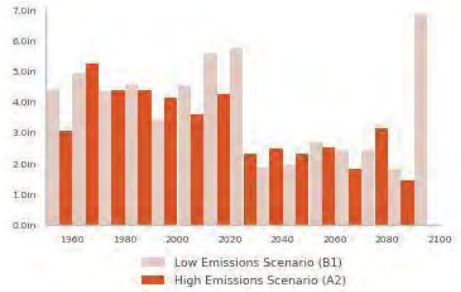


Figure 4-34: Decadal Snowpack Averages 1960-2090

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

		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

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: f*uture 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 P

WATER SUPPLY SHORTAGE RESOLUTIONS

RESOLUTION NO. 2015-5-3

RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT DECLARING A STAGE 6 SEVERE WATER EMERGENCY PURSUANT TO ITS WATER SUPPLY SHORTAGE CONTINGENCY PLAN TO COMPLY WITH STATEWIDE DROUGHT REGULATIONS

WHEREAS, on August 26, 2014 the Board of Directors took action to declare a STAGE 2 WATER WATCH pursuant to Title 4 – Chapter 4.24 Water Supply Shortage Contingency Plan which is set forth in the Cucamonga Valley Water District Code ("District Code"). Said action was taken in response to the Governor's 2014 Executive Order which declared a State of Emergency due to extended drought conditions, and

WHEREAS, on April 1, 2015, the Governor issued a subsequent Executive Order requiring a mandatory 25% statewide reduction in total potable water production and directed the State Water Resources Control Board ("SWRCB") to develop an Emergency Regulation Implementing The 25% Conservation Standard ("Regulation"); and

WHEREAS, on April 28, the SWRCB published a Notice of Proposed Rulemaking to consider taking action to adopt its Regulation at its May 5-6, 2015 meeting, and

WHEREAS, under the draft Regulation, the District is required to reduce total potable water production by 32% as part of the mandate for a total statewide reduction; and

WHEREAS, based on the Regulation, it is anticipated that the District will need to declare a STAGE 6 – SEVERE WATER EMERGENCY in order to achieve a 32% reduction in total potable water production as mandated by the SWRCB; and

WHEREAS, Water Code Section 31026 provides that the District has the power to restrict the use of water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the wastage of water or the use of water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the District and may prohibit use of such water during such periods for specific uses which the District may from time to time find to be nonessential. The District has the authority to impose monetary fines and penalties and take other applicable actions pursuant to Water Code Sections 350-358, 375-377, and 31029; and

WHEREAS, pursuant to the District Code, the Board may take action by resolution to declare, change and rescind, as applicable, the particular stage of the water supply shortage. The District Code provides for declaring Drought Alert Stages and for implementing a corresponding Drought Rate structure in the event such a rate structure is adopted by the Board and made part of the District's rules and regulations. It is anticipated that the Board will consider the adoption of a Drought Rate on June 9, 2015 and if adopted, it is anticipated that such a rate structure would go into effect on July 1, 2015. Therefore, the Board desires to adopt this Resolution in order to declare a STAGE 6 – SEVERE WATER EMERGENCY and establish the measures to be implemented during said STAGE 6.

NOW THEREFORE BE IT RESOLVED by the Board of Directors as follows:

RESOLUTION NO. 2015-5-3

Section 1 Incorporation of Recitals All of the foregoing Recitals are true and correct and the Board so finds and determines. The Recitals set forth above are incorporated herein and made an operative part of this Resolution.

Section 2 Compliance With SWRCB Reduction Mandate The Board hereby determines that in order to meet its 32% reduction standard as mandated by the SWRCB, it must declare a STAGE 6 – SEVERE WATER EMERGENCY. The Board hereby determines that the District is required to reduce customer water usage by 32% percent as a result of the SWRCB Regulation which has resulted from severe drought conditions. In addition to Stage 5 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution. Penalties for violating any of the above provisions will be assessed according to the District Code.

Section 3 Declaration Of Stage 6 – Severe Water Emergency The Board hereby declares a STAGE 6 – SEVERE WATER EMERGENCY and hereby establishes the restrictions and prohibitions as set forth below. The following actions are prohibited, except where necessary to address an immediate health and safety need or to comply with a term or condition in a permit issued by a state or federal agency:

(a) Applying water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or a structure is prohibited. Sprinklers shall be adjusted so that there is no runoff, overspray or excessive irrigation from the property;

(b) Using a hose to wash an automobile is prohibited except where the hose is equipped with a shut-off nozzle;

(c) Applying water to any hard surface including, but not limited to, driveways, sidewalks, and asphalt is prohibited. However, in the event there is a need to comply with health and safety requirements, paved areas may be hosed down with the use of a water-broom or water-efficient pressure washer using not more than 5 gallons per minute;

(d) Using potable water in a fountain or other decorative water feature is prohibited, except where the water is part of a recirculating system;

(e) Leaks and broken sprinklers shall be repaired upon notification by the District.

(f) Restaurants will only serve water on request.

(g) Hotels will offer guests the option to not launder linen daily.

(h) Watering outdoor landscapes during and within 48 hours after a measurable rainfall is prohibited.

(i) The irrigation with potable water on ornamental turf areas on public street medians.

(j) The irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission.

Section 4 Fines For Noncompliance Financial penalties will be assessed in accordance with the notice, imposition, appeal, and collection procedures for noncompliance as set forth in the District Code including, but not necessarily limited to, the applicable provisions of Sections 4.20.040 and 4.24.050 regarding the failure to comply.

(a) For example, financial penalties will be assessed when a customer who, in the reasonable discretion of the General Manager/CEO, or his/her representative, violates the requirements set forth in this Resolution. The applicable provisions of the District Code outline those penalties and the method of notifying a customer.

(b) As set forth in the District Code, the financial penalties will be assessed when a customer violates the requirements outlined in this Resolution as follows:

(i) First Violation - The District shall issue a written notice of a first violation to the customer. The first notice of violation shall be a warning given to the customer by using a door hanger. Any notice required under this Resolution may include, for example and not by way of limitation, the following information: the water conservation stage and restrictions that are in effect; actions required for compliance in order to prevent future violations; and penalties and enforcement actions which may be imposed for future violations.

(ii) Second Violation - For a second violation, the District shall impose a penalty in the amount of fifty dollars ($50.00) which will be added to the water customer's water bill. The second violation shall be in writing by regular mail to the address at which the customer is normally billed.

(iii) Third Violation - For a third violation, the District shall impose a penalty in the amount of one hundred dollars ($100.00) which will be added to the customer's water bill.

(iv) Fourth Violation - After a fourth and any subsequent violation, the District shall impose a penalty in the amount of one hundred fifty dollars ($150.00) which will be added to the customer's water bill.

(v) Notices for the third and subsequent violations shall be given in writing in the following manner: Giving the notice to the customer at the property where the violation occurred; or if the water customer is absent from or unavailable at the premises at which the violation occurred, by leaving a copy with some person of suitable age and discretion at the premises and sending a copy through the regular mail to the address at which the water customer is normally billed; or if a person of suitable age or discretion cannot be found, then by affixing a copy in a conspicuous place at the premises at which the violation occurred, and also sending a copy through the regular mail to the address at which the customer is normally billed.

(c) If the General Manager/CEO, or his/her representative deems it appropriate, water

service will be terminated at the location where the violation occurred due to a failure to comply with this Resolution or a failure to pay financial penalties. Any such service termination shall be implemented under the District's authority and procedures including, but not limited to, the District's rules and regulations for water service.

Section 5 Purpose Of Restrictions And Fines The regulatory purposes of imposing the requirements and financial penalties, as set forth in this Resolution, are to conserve water, deter waste and unreasonable use of water, encourage efficiency, and to help cover the costs incident to the investigation, inspection, and administration of enforcement of this Resolution.

Section 6 Future Stage(s) The Board may make a determination as to when it may be necessary to move to a further Stage, or a lesser Stage, under the District Code. Section 4.24.040 of the District Code provides that Stage 1 remains in effect at all times and does not require the Board to adopt a resolution for implementation.

Section 7 CEQA The Board finds that adopting and enforcing mandatory restrictions on water use in order to comply with SWRCB requirements is exempt from the California Environmental Quality Act ("CEQA") pursuant to State CEQA Guidelines Section 15268 and Public Resources Code Section 21080(b)(1) as a ministerial action. The Regulations mandate that each urban water supplier reduce its total potable water production by a specific percentage as imposed by the SWRCB. Therefore, an action to implement a particular drought stage is not a discretionary action and as such it is statutorily exempt from CEQA.

Section 8 Publication Following Adoption This Resolution shall be in full force and effect immediately upon adoption. Within 10 calendar days of adoption of this Resolution, the Board shall issue its determination of shortage and corrective measures by public proclamation published in a daily newspaper of general circulation a minimum of 3 times for 3 consecutive weeks. Three publications in a newspaper regularly published once a week or more often, with at least 5 days intervening between the respective publication dates not counting such publication dates, are sufficient. Such declaration and notice shall provide the extent, terms and conditions respecting the use and consumption of water in accordance with the applicable water conservation stage. Upon such declaration and publication of such notice, due and proper notice shall be deemed to have been given each and every person supplied water within the District.

Section 9 Severability If any section, subsection, clause or phrase in this Resolution is for any reason held invalid, the validity of the remainder of this Resolution shall not be affected thereby. The Board hereby declares that it would have passed this Resolution and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

RESOLUTION NO. 2015-5-3

PASSED AND ADOPTED this 12th day of May, 2014.

James V. Curatalo, Jr.
President

ATTEST:

Martin E. Zvirbulis
Secretary

RESOLUTION NO. 2016-6-4

RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT MOVING FROM STAGE 6 TO STAGE 1 OF THE WATER SUPPLY SHORTAGE CONTINGENCY PLAN

WHEREAS, on April 1, 2015, the Governor issued an Executive Order requiring a mandatory 25% statewide reduction in total potable water production and directed the State Water Resources Control Board ("SWRCB") to develop an Emergency Regulation Implementing the 25% Conservation Standard ("Regulation"); and

WHEREAS, the SWRCB adopted the Regulation which required the District to reduce total potable water production by 32% as part of the mandate for a total statewide reduction; and

WHEREAS, on May 12, 2015 the Board of Directors took action to declare a STAGE 6 SEVERE WATER EMERGENCY pursuant to Title 4 – Chapter 4.24 Water Supply Shortage Contingency Plan which is set forth in the Cucamonga Valley Water District Code ("District Code") which required a 35% conservation mandate to its customers, and

WHEREAS, moving to a STAGE 6 SEVERE WATER EMERGENCY also triggered the implementation of drought rates as a mechanism to ensure the District continued to generate sufficient revenues to operate, manage and maintain its facilities and services, even in times of severe drought and mandatory conservation, and

WHEREAS, since the implementation of the Regulation, the District has implemented programs, communicated with customers and monitored water production and as a result, customers have achieved an overall conservation savings of 27%, and

WHEREAS, on May 18, 2016 the SWRCB revised the Regulation implementing a self-certification process allowing urban water agencies to certify its demand and supply picture under a continued three-year dry year scenario, and

WHEREAS, District staff has determined that under the self-certification process it is able to sufficiently meet the water demands of its customers due to proper water supply planning and the prudent investments it has made in projects and programs to increase the District's drought resiliency, and

WHEREAS, pursuant to the District Code, the Board may take action by resolution to declare, change and rescind, as applicable, the particular stage of the water supply shortage. The District Code provides for declaring Drought Alert Stages and for implementing a corresponding Drought Rate structure in the event such a rate structure is adopted by the Board and made part of the District's rules and regulations. Therefore, the Board desires to adopt this Resolution in order to move to a STAGE 1 – ENCOURAGING WATER USE EFFICIENCY.

NOW THEREFORE BE IT RESOLVED by the Board of Directors as follows:

Section 1 Incorporation of Recitals All of the foregoing Recitals are true and correct and the Board so finds and determines. The Recitals set forth above are incorporated herein and made an operative part of this Resolution.

RESOLUTION NO. 2016-6-4

Section 2 Compliance With SWRCB Revised Regulation The Board hereby determines that based upon the SWRCB self-certification process, the District has sufficient water supplies to meet the needs of its customers, and is not requiring a conservation savings percentage; however, the District continues to encourage customers to efficiently use its water resources.

Section 3 Declaration of STAGE 1 ENCOURAGING WATER USE EFFICIENCY The Board hereby moves from Stage 6 – SEVERE WATER EMERGENCY to STAGE 1 – ENCOURAGING WATER USE EFFICIENCY of the Water Supply Shortage Contingency Plan. Under STAGE 1 the following actions are prohibited, except where necessary to address an immediate health and safety need or to comply with a term or condition in a permit issued by a state or federal agency:

(a) Applying water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or a structure is prohibited. Sprinklers shall be adjusted so that there is no runoff, overspray or excessive irrigation from the property;

(b) Using a hose to wash an automobile is prohibited except where the hose is equipped with a shut-off nozzle;

(c) Applying water to any hard surface including, but not limited to, driveways, sidewalks, and asphalt is prohibited. However, in the event there is a need to comply with health and safety requirements, paved areas may be hosed down with the use of a water-broom or water-efficient pressure washer using not more than 5 gallons per minute;

(d) Using potable water in a fountain or other decorative water feature is prohibited, except where the water is part of a recirculating system;

(e) Leaks and broken sprinklers shall be repaired upon notification by the District.

(f) Restaurants will only serve water on request.

(g) Hotels will offer guests the option to not launder linen daily.

(h) Watering outdoor landscapes during and within 48 hours after a measurable rainfall is prohibited.

(i) The irrigation with potable water on ornamental turf areas on public street medians.

(j) The irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission.

RESOLUTION NO. 2016-6-4

Section 4 Water Commodity Drought Rates Water Commodity Drought Rates set forth in the District Code apply in different amounts during the applicable Stages 2 – 7. As a result of the adoption of this Resolution which moves the District from STAGE 6 to STAGE 1, Water Commodity Drought Rates shall be of no further force or effect.

Section 5 Publication Following Adoption This Resolution shall be in full force and effect immediately upon adoption. Within 10 calendar days of adoption of this Resolution, the Board shall issue its determination of shortage and corrective measures by public proclamation published in a daily newspaper of general circulation a minimum of 3 times for 3 consecutive weeks. Three publications in a newspaper regularly published once a week or more often, with at least 5 days intervening between the respective publication dates not counting such publication dates, are sufficient. Such declaration and notice shall provide the extent, terms and conditions respecting the use and consumption of water in accordance with the applicable water conservation stage. Upon such declaration and publication of such notice, due and proper notice shall be deemed to have been given each and every person supplied water within the District.

Section 6 Severability If any section, subsection, clause or phrase in this Resolution is for any reason held invalid, the validity of the remainder of this Resolution shall not be affected thereby. The Board hereby declares that it would have passed this Resolution and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

PASSED AND ADOPTED this 28th day of June 2016.

James V. Curatalo, Jr.
President

ATTEST:

Martin E. Zvirbulis
Secretary

APPENDIX Q

WATER SUPPLY SHORTAGE CONTINGENCY PLAN

ORDINANCE NO. 2015-5-1

ORDINANCE OF THE CUCAMONGA VALLEY WATER DISTRICT REVISING WATER USE EFFICIENCY REQUIRMENTS AND WATER SUPPLY SHORTAGE CONTINGENCY PLAN TO COMPLY WITH STATEWIDE DROUGHT REGULATIONS

WHEREAS, on April 1, 2015, Governor Jerry Brown issued the fourth in a series of Executive Orders directing the State Water Resources Control Board ("SWRCB") to impose restrictions to achieve a statewide 25% reduction in total potable water production through February 2016; and

WHEREAS, on May 5-6, 2015, the SWRCB will take final action to adopt its Emergency Regulation Implementing the 25% Conservation Standard ("Regulation") which includes a prohibition against certain irrigation practices and an order that all urban water suppliers reduce their total potable water production by a defined percentage which has been applied to each urban water supplier; and

WHEREAS, the Board desires to adopt this Ordinance in order to incorporate the additional provisions from the Regulation into the Cucamonga Valley Water District Code ("District Code") in existing Chapter 4.20 Encouraging Water Use Efficiency and Chapter 4.24 Water Supply Shortage Contingency Plan. These District Code revisions will enable the District to implement the requirements that the SWRCB is imposing on the District by way of the Regulation; and

WHEREAS, revisions to the District Code will also provide the framework for declaring Drought Alert Stages and for implementing a corresponding Drought Rate structure in the event such a rate structure is adopted by the Board and made part of the District's rules and regulations. It is anticipated that the Board will consider the adoption of a Drought Rate on June 9, 2015 and if adopted, it is anticipated that such a rate structure would go into effect on July 1, 2015; and

WHEREAS, Water Code Section 31026 provides that the District has the authority to restrict the use of water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the wastage of water or the use of water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the District and may prohibit use of such water during such periods for specific uses which the District may from time to time find to be nonessential. The District has the authority to impose monetary fines and penalties and take other applicable actions pursuant to Water Code Sections 350-358, 375-377, and 31029; and

WHEREAS, in accordance with Water Code Sections 350 et seq., 375 et seq., and 31027, at least seven (7) days before consideration of this Ordinance, a Notice of Public Hearing was published in the Inland Valley Daily Bulletin, a newspaper of general circulation. A certified copy of the proposed Ordinance was also posted at the District Offices at least five (5) days before the hearing; and

WHEREAS, currently the District is at a STAGE 2 WATER WATCH, and based on the proposed Regulation by the SWRCB, it is anticipated that the District will need to declare a new drought stage in order to achieve a 32% reduction in total potable water production as mandated by the SWRCB; and

NOW THEREFORE, THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT DOES HEREBY ORDAIN AS FOLLOWS:

Section 1 All of the foregoing Recitals are true and correct and the Board so finds and determines. The Recitals set forth above are incorporated herein and made an operative part of this Ordinance.

Section 2 The Board conducted a public hearing on May 12, 2015 at 6:00 p.m., or as soon thereafter as practicable, at the District offices located at 10440 Ashford St., Rancho Cucamonga, CA 91730-2799 as part of the Regular Meeting of the Board.

Section 3 Title 4 – Chapter 4.20 WATER USE EFFICIENCY, Section 4.20.030 of the District Code is hereby amended, in its entirety, in order to include a new provision as item (9):

4.20.030 Water use efficiency practices.

Customers are required to practice the following activities:

(1) Hosing paved areas for health and safety purposes only with the use of a waterbroom or water-efficient pressure washer using not more than five gallons per minute.
(2) Wash vehicles using a hose equipped with a shutoff nozzle so that water does not flow to waste.
(3) All decorative fountains shall be equipped with recirculating systems.
(4) Upon notification by the District, repair all leaks.
(5) Adjust sprinklers so there is no run-off, over-spray or excessive irrigation from the property.
(6) Restaurants will only serve water on request.
(7) Hotels will offer guests the option to not launder linen daily.
(8) Industrial customers will review their water-using processes to evaluate ways to increase water conservation.
(9) Prohibition of watering outdoor landscapes during and within 48 hours after a measureable rainfall.

No water customer of the District shall make, cause, use, or permit the use of water in a manner contrary to any provision of this Chapter.

Section 4 Title 4 – Chapter 4.24 WATER SUPPLY SHORTAGE CONTINGENCY PLAN, Section 4.24.040 of the District Code is hereby revised and amended, in its entirety, in order to make revisions to certain provisions of existing drought alert stages and to add STAGE 6 – SEVERE WATER EMERGENCY and STAGE 7 – WATER CRISIS - CATASTROPHIC:

STAGE 1 – ENCOURAGING WATER USE EFFICIENCY

This Stage [Chapter 4.20 of this Code]) outlines mandatory prohibited water waste practices. Stage 1 remains in effect at all times and does not require the Board of Directors adopt a resolution for implementation.

STAGE 2 - WATER WATCH

A Stage 2 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by ten (10) percent from a time period determined by the District. In addition to Stage 1 measures,

hours of watering are limited to 4 p.m. through 9 a.m., and are enacted by resolution of the Board.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050

STAGE 3 - WATER ALERT

A Stage 3 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by fifteen (15) percent from a time period determined by the District. In addition to Stage 2 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

STAGE 4 - CRITICAL WATER ALERT

A Stage 4 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by twenty (20) percent from a time period determined by the District. In addition to Stage 3 measures, limits may be applied to the number of days and frequency and duration of outdoor watering as determined by the District when Stage 4 is enacted by resolution of the Board.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

STAGE 5 – WATER EMERGENCY

A Stage 5 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by twenty-five (25) percent from a time period determined by the District. In addition to Stage 4 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

STAGE 6 – SEVERE WATER EMERGENCY

A Stage 6 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by thirty-five (35) percent as a result from a catastrophic event, such as earthquake, loss of imported water supply, other natural disaster or severe drought conditions. In addition to Stage 5 measures, limits may be applied to the number of days, frequency and duration of outdoor watering as determined by the District and enacted by Board resolution. The following end-user prohibitions are also in effect under Stage 6:

a) The irrigation with potable water on ornamental turf areas on public street medians.

b) The irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission.

Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

STAGE 7 - WATER CRISIS - CATASTROPHIC

A Stage 7 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by fifty (50) percent as a result from a catastrophic event, such as earthquake, loss of imported water supply or other natural disaster. In addition to Stage 6 measures, all non-essential outdoor water may be prohibited as determined by the District and enacted by resolution.

Additionally, the use of water for construction purposes shall be curtailed during a water emergency crisis with the exception that recycled water may be used for such purposes. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050

Section 5 The President of the Board shall sign this Ordinance and the Secretary of the Board shall attest thereto, and this Ordinance shall be in full force and effect immediately upon adoption. Within fifteen (15) days after adoption of this Ordinance, a summary of this Ordinance shall be published with the names of the Directors voting for and against this Ordinance and a certified copy of the full text of this Ordinance, along with the names of those Directors voting for and against this Ordinance, shall be posted in the District offices.

Section 6 If any section, subsection, clause or phrase in this Ordinance is for any reason held invalid, the validity of the remainder of this Ordinance shall not be affected thereby. The Board hereby declares that it would have passed this Ordinance and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

ADOPTED this 12th day of May, 2015 by the Board of Directors of the Cucamonga Valley Water District.

James V. Curatalo
President

ATTEST:

Martin E. Zvirbulis
Secretary

ORDINANCE NO. 2019-5-1

AN ORDINANCE OF THE CUCAMONGA VALLEY WATER DISTRICT, SAN BERNARDINO COUNTY, CALIFORNIA, REVISING THE WATER SUPPLY SHORTAGE CONTINGENCY PLAN TO COMPLY WITH STATE WATER CODE

WHEREAS, the Cucamonga Valley Water District (the "District") has adopted a Water Supply Shortage Contingency Plan (the "Plan"), as codified in the District Code Book Chapter 4.24, as required by State Water Code; and

WHEREAS, on May 31, 2018, Senate Bill 606 was signed into law establishing new water use efficiency standards that requires specific water shortage levels; and

WHEREAS, the District's existing Plan must be revised to incorporate three new shortage levels as required by State Water Code Section 10632. The three new shortage levels are: 30%, 40% and greater than 50%; and

WHEREAS, in accordance with Water Code Section 31027(b)(1), at least 5 days before the Board meeting, a summary of this Ordinance was published in the Inland Valley Daily Bulletin, a newspaper of general circulation, and a certified copy of the full text of this Ordinance was posted in the District's offices; and

WHEREAS, the Board conducted a public meeting on May 14, 2019, during which staff presented the new shortage levels required by State Water Code.

NOW THEREFORE, THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT DOES HEREBY ORDAIN AS FOLLOWS:

Section 1 All of the foregoing Recitals are true and correct and the Board so finds and determines. The Recitals set forth above are incorporated herein, are made findings and determinations of the Board, and are made an operative part of this Ordinance.

Section 2 The District hereby adopts language revising Title 4, Chapter 4, Section 4.24.040, as follows:

Normal Conditions – outlines water use efficiency practices as outlined in Chapter 4.20 and is in effect at all times.

Stage 1 (10%) – A Stage 1 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by ten (10) percent from a time period determined by the District. In addition to the water use efficiency practices listed in Chapter 4.20, hours of watering are limited to 4:00 p.m. through 9:00 a.m., and are enacted by Resolution of the Board. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Stage 2 (15%) – A Stage 2 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by fifteen (15) percent from a time period determined by the District. In addition to the water use efficiency practices listed in Chapter 4.20, hours of watering are limited to 4:00 p.m. through 9:00 a.m., and are enacted by Resolution of the Board. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Stage 3 (20%) – A Stage 3 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by twenty (20) percent from a time period determined by the District. In addition to the water use efficiency practices listed in Chapter 4.20, hours of watering are limited to 4:00 p.m. through 9:00 a.m. and limits may be applied to the number of days, frequency, and duration of outdoor potable watering as determined by the District and enacted by Board Resolution. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Stage 4 (25%) – A Stage 4 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by twenty-five (25) percent from a time period determined by the District. In addition to the water use efficiency practices listed in Chapter 4.20, hours of watering are limited to 4:00 p.m. through 9:00 a.m. and limits may be applied to the number of days, frequency, and duration of outdoor potable watering as determined by the District and enacted by Board Resolution. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Stage 5 (30%) – A Stage 5 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by thirty (30) percent from a time period determined by the District. In addition to the water use efficiency practices listed in Chapter 4.20, hours of watering are limited to 4:00 p.m. through 9:00 a.m. and limits may be applied to the number of days, frequency, and duration of outdoor potable watering as determined by the District and enacted by Board Resolution. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Stage 6 (35%) – A Stage 6 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by thirty-five (35) percent from a time period determined by the District. In addition to the water use efficiency practices listed in Chapter 4.20, hours of watering are limited to 4:00 p.m. through 9:00 a.m. and limits may be applied to the number of days, frequency, and duration of outdoor potable watering as determined by the District. In addition, the following end-user prohibitions are also in effect: (a) irrigation with potable water on ornamental turf areas on public street medians, and (b) irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission. These limits must be enacted by Board Resolution. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Stage 7 (40%) – A Stage 7 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by forty (40) percent from a time period determined by the District. In addition to the water use efficiency practices listed in Chapter 4.20, hours of watering are limited to 4:00 p.m. through 9:00 a.m. and limits may be applied to the number of days, frequency, and duration of outdoor potable watering as determined by the District. In addition, the following end-user prohibitions are also in effect: (a) irrigation with potable water on ornamental turf areas on public street medians, and (b) irrigation with potable water of landscapes outside newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission. These limits must be enacted by Board Resolution. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Stage 8 (50%) – A Stage 8 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by fifty (50) percent from a time period determined by the District. In addition to Stage 7 measures, all non-essential outdoor watering may be prohibited as determined by the District and enacted by Resolution. Additionally, the use of potable water for construction and grading purposes shall be curtailed during this stage with the exception that recycled water may be used for such purposes. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Stage 9 (>50%) – A Stage 9 shortage may be declared when the Board of Directors determines that it is likely that the District will require customers to reduce their water usage by greater than fifty (>50) percent from a time period determined by the District. Stage 8 measures remain in effect and will be enacted by Resolution. Penalties for violating any of the above provisions will be assessed according to Section 4.24.050.

Section 8 All ordinances, resolutions, or administrative actions by the Board of Directors, or parts thereof that are inconsistent with any provision of this Ordinance are hereby superseded only to the extent of such inconsistency. Except as otherwise specifically set forth herein, all provisions Title 4 of the District Code, including but not limited to Chapters 4.20 and 4.24, shall remain in full force and effect.

Section 9 The President of the Board of Directors shall sign this Ordinance and the Secretary of the Board of Directors shall attest thereto, and this Ordinance shall be in full force and effect immediately upon adoption. Within 15 days after adoption of this Ordinance, a summary of the Ordinance shall be published with the names of those directors voting for and against this Ordinance and a certified copy of the full text of this Ordinance, along with the names of those Directors voting for and against this Ordinance, shall be posted in the District offices.

Section 10 If any section, subsection, clause or phrase in this Ordinance is for any reason held invalid, the validity of the remainder of this Ordinance shall not be affected thereby. The Board hereby declares that it would have passed this Ordinance and each section, subsection,

sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

Section 11 In accordance with Water Code Section 31027(b)(1), within 15 days after adoption, the District Secretary shall (i) prepare a summary of this Ordinance, which shall be published in the Inland Valley Daily Bulletin, a newspaper of general circulation, with the names of those directors voting for and against it; and (ii) post in the Board's office a certified copy of the full text of this Ordinance, along with the names of those directors voting for and against it.

Section 12 This Ordinance shall take effect immediately upon adoption.

ADOPTED this 14th day of May, 2019, by the Board of Directors of the Cucamonga Valley Water District.

CUCAMONGA VALLEY WATER DISTRICT

James V. Curatalo, President
Board of Directors

ATTEST:

John A. Bosler,
Secretary of the Board of Directors

ORDINANCE NO. 2019-5-1

STATE OF CALIFORNIA)
COUNTY OF SAN BERNARDINO) ss.

I, **JOHN BOSLER,** Secretary of the Board of Directors of Cucamonga Valley Water District, do hereby certify that the foregoing **Ordinance No. 2019-5-1** was adopted by the Board of Directors of said District at a regular board meeting held on May 14, 2019. A recorded vote of the Board is as follows:

AYES: Curatalo, Cetina, Gonzalez, Reed

NOES: _____

ABSENT: Tiegs

JOHN BOSLER
Cucamonga Valley Water District
and the Board of Directors thereof

APPENDIX R

WATER RATE STRUCTURE

ORDINANCE NO. 2015-6-1

AN ORDINANCE OF THE CUCAMONGA VALLEY WATER DISTRICT OF SAN BERNARDINO COUNTY, CALIFORNIA, ESTABLISHING RATES AND CHARGES FOR WATER SERVICE

WHEREAS, the Cucamonga Valley Water District (the "District") is organized and operates pursuant to the County Water District Law, Division 12 commencing with Section 30000 of the California Water Code; and

WHEREAS, the District is authorized to fix and collect charges for the provision of water service pursuant to Water Code Section 31007; and

WHEREAS, the rate structure for the District's bi-monthly water service charges are comprised of two components— a variable Commodity Charge and a fixed Meter Service Charge; and

WHEREAS, the Commodity Charge is determined on the basis of the amount of water served to a parcel of property in hundred cubic feet (HCF) (one HCF = 748 gallons) and consists of 4 tiers which impose higher rates as the level of water consumption increases. This charge is structured to recover a portion of CVWD's fixed costs, and the costs of purchased and other water. The rates for the Meter Service Charge are established on the basis of the size of the water meter serving a property and are calculated to recover the district's fixed costs of water facilities repairs and replacements, as well as the cost of meter reading, billing and customer service; and

WHEREAS, there has been presented to the District Board of Director's proposed rate increases to the water service charges that are designed to proportionately allocate the cost of providing water service to the District's customers, all of which are more fully set forth herein; and

WHEREAS, the state is in the fourth year of a severe drought and mandatory water conservations measures have been implemented statewide; and

WHEREAS, the District has adopted a drought ordinance that specifies different drought stages, depending on the severity of the water shortage. Pursuant to the ordinance each stage beyond stage 1 implements increasing mandatory conservation measures designed to reduce water use and prevent waste; and

WHEREAS, in addition to these conservation measures, the District has determined that, due to the ongoing statewide water shortage emergency, to adopt drought rates that may be implemented during declared drought stages; and

WHEREAS, the District purchases nearly 50% of its water supply from a portion of its water from the Metropolitan Water District of Southern California ("MWD") through the Inland Empire Utilities District (IEUA). The drought has impacted the cost of imported water CVWD purchases from MWD through IEUA and the availability of water supplies; and

WHEREAS, during water shortages, MWD may establish water supply allocations for the amount of water that MWD will deliver to CVWD and other retail water agencies. If CVWD exceeds its allocation, MWD may impose a surcharge or penalty ("MWD Surcharge") on the District for the water it purchases; and

WHEREAS, in addition to any MWD Surcharge that may be imposed on the District, the District anticipates that MWD and IEUA will increase the rates of wholesale water that are sold and delivered to the District and may impose other charges on the District related to its wholesale water service; and

WHEREAS, in developing its rates, the District included projected increases in these costs as part of its long-range financial plan; and

WHEREAS, to ensure that there are sufficient revenues to provide water services to our customers, the District desires to authorize for a five-year period to annually pass through to customers: (1) any increases in the rates for wholesale water and any other charges that MWD or IEUA impose on the District that are greater than those projected in the District's long-range financial plan (each a "Pass-Through Adjustment"). Any Pass-Through Adjustment will only impact the rates of the Commodity Charge set forth in this Ordinance; and

WHEREAS, the annual Pass-Through Adjustments are proposed to be implemented each fiscal year beginning July 1, 2015, and adjusted each fiscal year thereafter, through and including fiscal year commencing July 1, 2019; and

WHEREAS, during the week of April 20, 2015, in accordance with the provisions of Article XIII D, section 6 of the California Constitution, District Staff mailed out notices of the proposed increase in the Water Rates and Service Charges and annual Pass-Through Adjustments (collectively herein, "rate increases"). Such notices were provided to the affected property owners and tenants directly liable for the Water Rates and Service Charges not less than 45 days prior to the public hearing on the proposed establishment of rates and charges as set forth herein; and

WHEREAS, in accordance with Water Code Section 31027(b)(1), at least 5 days before the public hearing, a summary of this Ordinance was published in the Inland Valley Daily Bulletin, a newspaper of general circulation, and a certified copy of the full text of this Ordinance was posted in the District offices; and

WHEREAS, the Board conducted a public hearing on June 9, 2015 at 6:00 p.m. at 10440 Ashford Street, Rancho Cucamonga, CA 91730-2799 in order to receive oral and written testimony regarding this Ordinance. Said date and time were not less than forty five (45) days after the mailing of the notice as set forth above; and

WHEREAS, at the conclusion of the public hearing, written protests against the proposed rate increases were not presented by a majority of record owners of parcels upon which the proposed Water Rates and Service Charges are proposed to be imposed and tenants directly responsible for the payment of Water Rates and Service Charges (i.e., a customer of record); and

WHEREAS, it is deemed to be in the best interests of the District to adopt the rate increases due to the fiscal impacts referenced above.

NOW THEREFORE, THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT DOES HEREBY ORDAIN AS FOLLOWS:

Section 1 All of the foregoing Recitals are true and correct and the Board so finds and determines. The Recitals set forth above are incorporated herein, are made findings and determinations of the Board, and are made an operative part of this Ordinance.

Section 2 The Board hereby finds that written protests against the proposed rate increases were not presented by a majority of record owners of parcels upon which the rate increases are proposed to be imposed and tenants directly responsible for the payment of the water service charges (i.e., a customer of record). The Board is therefore authorized to impose the rate increases as set forth herein.

Section 3 The District hereby adopts the following rate increases in the amounts and on the effective dates set forth below and amends Chapter 4.08.020 as follows:

(a) Bimonthly Meter Service Charge. The rates for the bimonthly meter service charge, according to meter size, are as follows:

Meter Size	Effective 7/1/2015	Effective 7/1/2016	Effective 7/1/2017	Effective 7/1/2018
5/8" x 3/4"	$ 30.35	$35.64	$ 41.75	$ 50.00
3/4"	30.35	35.64	41.75	50.00
1"	50.58	59.39	69.58	83.33
1-1/2"	101.16	118.79	139.16	166.67
2"	161.86	190.06	222.65	266.67
3"	303.48	356.36	417.47	500.00
4"	505.80	593.96	695.79	833.33
6"	1,011.60	1,187.87	1,391.57	1,666.67
8"	1,618.57	1,900.59	2,226.51	2,666.67
10"	2,427.85	2,850.88	3,339.77	4,000.00
12"	3,642.00	4,276.80	5,010.00	6,000.00

(b) Water Commodity Charge – Non-Drought. The rates for the Non-Drought water commodity charge and the amount of water allocated to each tier, based on the hydraulic capacity of the customer's meter, are as follows.

Non-Drought Commodity Rate per hcf	Effective 7/1/2015	Effective 7/1/2016	Effective 7/1/2017	Effective 7/1/2018
Tier 1	$ 1.59	$ 1.60	$ 1.61	$ 1.62
Tier 2	2.11	2.13	2.14	2.16
Tier 3	2.62	2.66	2.68	2.71
Tier 4	2.99	3.03	3.05	3.07

		Allocation in Units (hcf)			
Meter Size	Hydraulic Capacity	Tier 1 No. of Units	Tier 2 No. of Units	Tier 3 No. of Units	Tier 4 No. of Units
¾-inch	1.0	0 - 10	11 - 40	41 - 100	> 100
1-inch	1.67	0 - 17	18 - 67	68 - 167	> 167
1.5-inch	3.33	0 - 33	34 - 133	134 - 333	> 333
2-inch	5.33	0 - 53	54 - 213	214 - 533	> 533
3-inch	10.00	0 - 100	101 - 400	401 - 1,000	> 1,000
4-inch	16.67	0 - 167	168 - 667	668 - 1,667	> 1,667
6-inch	33.33	0 - 333	334 - 1,333	1,334 - 3,333	> 3,333
8-inch	53.33	0 - 533	534 - 2,133	2,134 - 5,333	> 5,333
10-inch	80.00	0 - 800	801 - 3,200	3,201 - 8,000	> 8,000
12-inch	120.00	0 - 1,200	1,201 - 4,800	4,801 - 12,000	> 12,000

(c) Water Commodity Drought Rates – Stages 2-7. The rates for the water commodity charge to be implemented during declared drought stages ("Water Commodity Drought Rates") are listed below. The Water Commodity Drought Rates will be enacted by a vote of the Board of Directors in concurrence with the declaration of drought stages as set forth in Chapter 4.24 of the District Code. The amount of water allocated to each tier is based on the hydraulic capacity of the customer's meter as indicated in section (b).

	(10% Conservation)			
Drought Stage 2 Commodity Rate per hcf	Effective 7/1/2015	Effective 7/1/2016	Effective 7/1/2017	Effective 7/1/2018
Tier 1	$ 1.69	$ 1.70	$ 1.71	$ 1.72
Tier 2	2.15	2.17	2.18	2.20
Tier 3	2.77	2.81	2.83	2.86
Tier 4	3.56	3.65	3.67	3.70

	(15% Conservation)			
Drought Stage 3 Commodity Rate per hcf	**Effective 7/1/2015**	**Effective 7/1/2016**	**Effective 7/1/2017**	**Effective 7/1/2018**
Tier 1	$ 1.79	$ 1.80	$ 1.81	$ 1.82
Tier 2	2.21	2.24	2.25	2.26
Tier 3	2.83	2.87	2.88	2.91
Tier 4	3.80	3.83	3.86	3.88

	(20% Conservation)			
Drought Stage 4 Commodity Rate per hcf	**Effective 7/1/2015**	**Effective 7/1/2016**	**Effective 7/1/2017**	**Effective 7/1/2018**
Tier 1	$ 1.90	$ 1.92	$ 1.93	$ 1.94
Tier 2	2.29	2.31	2.32	2.33
Tier 3	2.89	2.93	2.94	2.96
Tier 4	4.05	4.07	4.10	4.12

	(25% Conservation)			
Drought Stage 5 Commodity Rate per hcf	**Effective 7/1/2015**	**Effective 7/1/2016**	**Effective 7/1/2017**	**Effective 7/1/2018**
Tier 1	$ 2.03	$ 2.05	$ 2.06	$ 2.07
Tier 2	2.36	2.39	2.39	2.40
Tier 3	2.95	2.99	3.00	3.01
Tier 4	4.37	4.40	4.42	4.44

	(35% Conservation)			
Drought Stage 6 Commodity Rate per hcf	**Effective 7/1/2015**	**Effective 7/1/2016**	**Effective 7/1/2017**	**Effective 7/1/2018**
Tier 1	$ 2.34	$ 2.35	$ 2.37	$ 2.38
Tier 2	2.55	2.56	2.56	2.58
Tier 3	3.09	3.13	3.11	3.11
Tier 4	5.68	5.69	5.75	5.77

	(50% Conservation)			
Drought Stage 7 Commodity Rate per hcf	**Effective 7/1/2015**	**Effective 7/1/2016**	**Effective 7/1/2017**	**Effective 7/1/2018**
Tier 1	$ 2.86	$ 2.88	$ 2.88	$ 2.90
Tier 2	3.16	3.18	3.18	3.19

(D) Pass-Through Adjustments. The Board hereby authorizes, for a five-year period, the imposition of Pass-Through Adjustments.

Pass-Through Adjustments may be imposed in the fiscal year commencing July 1, 2015, and each fiscal year thereafter, through and including the fiscal year commencing July 1,

2019. A Pass-Through Adjustment will only impact the rates of the commodity charge set forth in this Ordinance. Provided, however, that (1) any increase in the rates for wholesale water and any other charged that MWD or IEUA imposes on the district that are greater than those projected in the Water Rate Study ("each a Pass-Through Adjustment"); (2) any increase in the rates of the commodity charge as a result of any Pass-Through Adjustment shall not exceed $1.00 per HCF in any one year; and (3) in no event shall such rates be increased as a result of a Pass-Through Adjustment by more than the cost of providing water service.

Prior to implementing any such future rate increase resulting from a Pass-Through Adjustment, the District General Manager is hereby directed and shall provide written notice of any such rate increase to District customers not less than 30 days prior to the effective date of the rate increase. Any such notice may be provided in the regular billing statements of the District sewer customers. In the event that an increase from a Pass-Through Adjustment is implemented in accordance with this Ordinance, the District General Manager, or his authorized designee, is hereby directed and shall revise the schedule of rates and charges set forth in Part D of Chapter 4.08.020 of Title 4 of the District Code to reflect the rate then in effect as a result of any increase resulting from a Pass-Through Adjustment.

(E) Temporary Water Service Rate. The Temporary Water Service Rate (Construction Water) is as follows:

Temporary Water Service Rate per hcf	**Effective 7/1/2015**	**Effective 7/1/2016**	**Effective 7/1/2017**	**Effective 7/1/2018**
Non-Drought	$ 4.58	$ 4.63	$ 4.65	$ 4.70
Drought Stage 2	4.75	4.80	4.81	4.84
Drought Stage 3	4.85	4.90	4.91	4.94
Drought Stage 4	4.97	5.02	5.03	5.05
Drought Stage 5	5.10	5.15	5.15	5.17
Drought Stage 6	5.34	5.38	5.37	5.39
Drought Stage 7 (if available)	6.10	6.13	6.14	6.15

Section 4 The Board finds and determines that the administration, operation, maintenance and improvements of the District water system, which are to be funded by the increased water rates and service charges set forth herein, are necessary to maintain service within the District' existing service area. The Board further finds that the administration, operation, maintenance and improvements of the District water system, to be funded by the increased water service rates and charges, will not expand the District's system. The District further finds that the adoption of the rates and charges is necessary and reasonable to fund the administration, operation, maintenance and improvements of the District water system. Based on these findings, the Board determines that the adoption of the rates and charges established by this Ordinance are exempt from the requirements of the California Environmental Quality Act pursuant to section 21080(b)(8) of the Public Resources Code and section 15273(a) of the State CEQA Guidelines.

Section 5 All ordinances, resolutions, or administrative actions by the Board of Directors, or parts thereof that are inconsistent with any provision of this Ordinance are hereby

superseded only to the extent of such inconsistency. Except as otherwise specifically set forth herein, all provisions Title 4 of the District Code, including but not limited to Chapter 4.08, shall remain in full force and effect.

Section 6 The President of the Board of Directors shall sign this Ordinance and the Secretary of the Board of Directors shall attest thereto, and this Ordinance shall be in full force and effect immediately upon adoption. Within 15 days after adoption of this Ordinance, a summary of the Ordinance shall be published with the names of those directors voting for and against this Ordinance and a certified copy of the full text of this Ordinance, along with the names of those Directors voting for and against this Ordinance, shall be posted in the District offices.

Section 7 If any section, subsection, clause or phrase in this Ordinance is for any reason held invalid, the validity of the remainder of this Ordinance shall not be affected thereby. The Board hereby declares that it would have passed this Ordinance and each section, subsection, sentence, clause, or phrase thereof, irrespective of the fact that one or more sections, subsections, sentences, clauses or phrases or the application thereof be held invalid.

Section 8 In accordance with Water Code Section 31027(b)(1), within 15 days after adoption, the District Secretary shall (i) prepare a summary of this Ordinance, which shall be published in the Inland Valley Daily Bulletin, a newspaper of general circulation, with the names of those directors voting for and against it; and (ii) post in the Board's office a certified copy of the full text of this Ordinance, along with the names of those directors voting for and against it.

Section 9 This Ordinance shall take effect immediately upon adoption.

ADOPTED this 9th day of June, 2015, by the Board of Directors of the Cucamonga Valley Water District.

CUCAMONGA VALLEY WATER DISTRICT

_____

James Curatalo, President
Board of Directors

ATTEST:

_____

Martin Zvirbulis
Secretary of the Board of Directors

APPENDIX S

RESOLUTIONS
WATER SHORTAGE CONTINGENCY PLAN ADOPTION
2020 URBAN WATER MANAGEMENT PLAN ADOPTION

RESOLUTION NO. 2021-6-2

RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT ADOPTING THE CUCAMONGA VALLEY WATER DISTRICT'S 2020 URBAN WATER MANAGEMENT PLAN

WHEREAS, The California Urban Water Management Planning Act, (Wat. Code § 10610, et seq. (the Act)), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare and adopt an Urban Water Management Plan (Plan); and

WHEREAS, the Act generally requires that said Plan be updated and adopted at least once every five years on or before July 1, in years ending in six and one; and

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are required to update and electronically submit their 2020 Plans to the California Department of Water Resources (DWR) by July 1, 2021; and

WHEREAS, pursuant to Water Conservation Act of 2009, also referred to as SB X7-7 (Wat. Code § 10608 et seq.), an "urban retail water supplier" is defined as a water supplier that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre feet of potable water annually at retail for municipal purposes; and

WHEREAS, the Cucamonga Valley Water District (District) meets the definition of an urban retail water supplier for purposes of the Act and SB X7-7 because it directly provides potable municipal water to more than 3,000 end users; and

WHEREAS, the District has prepared an 2020 Plan in accordance with the Act and SB X7-7, which demonstrates the District's compliance in reducing urban per capita total water use and in reducing reliance on delta water supplies;

WHEREAS, the District, in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its 2020 Plan; and

WHEREAS, in accordance with the Act and SB X7-7, the District has prepared its 2020 Plan with its own staff, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its 2020 Plan, and has also utilized DWR's Urban Water Management Plan Guidebook 2020, including its related appendices, in preparing its 2020 Plan; and

WHEREAS, in accordance with applicable law, including Water Code sections 10608.26 and 10642, and Government Code section 6066, a Notice of a Public Hearing regarding the District's 2020 Plan was published within the jurisdiction of the District on May 25, 2021 and June 1, 2021; and

WHEREAS, in accordance with applicable law, including but not limited to Water Code sections 10608.26 and 10642, a virtual public hearing was held on June 8, 2021 at 6 PM, or soon

thereafter, via GoToMeeting (https://global.gotomeeting.com/join/955106309), in order to provide members of the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the 2020 Plan and issues related thereto; and

WHEREAS, pursuant to said public hearing on the District's 2020 Plan, the District, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within the District's service area with regard to the 2020 Plan and encouraged community input regarding the District's 2020 Plan; and

WHEREAS, the Board of Directors has reviewed and considered the purposes and requirements of the Act and SB X7-7, the contents of the 2020 Plan, and the documentation contained in the administrative record in support of the 2020 Plan, and has determined that the factual analyses and conclusions set forth in the 2020 Plan are legally sufficient; and

WHEREAS, the Board of Directors desires to adopt the 2020 Plan prior to July 1, 2021 in order to comply with the Act and SB X7-7; and

WHEREAS, Section 10652 of the California Water Code provides that the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) (CEQA) does not apply to the preparation and adoption of the 2020 Plan pursuant to this part.

NOW THEREFORE BE IT RESOLVED, the Board of Directors of the Cucamonga Valley Water District hereby resolves as follows:

1. The District's 2020 Plan, attached hereto as Exhibit A, is hereby adopted as amended by changes incorporated by the Board of Directors as a result of input received (if any) at the public hearing and ordered filed with the Secretary of the Board of Directors.

2. The General Manager is hereby authorized and directed to include a copy of this Resolution in the District's 2020 Plan.

3. The General Manager is hereby authorized and directed, in accordance with Water Code sections 10621(d) and 10644(a)(1)-(2), to electronically submit a copy of the 2020 Plan to the DWR no later than July 1, 2021.

4. The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit a copy of the 2020 Plan to the California State Library, and any city of county within which the District provides water supplies no later than thirty (30) days after this adoption date.

5. The General Manager is hereby authorized and directed, in accordance with Water Code section 10645, to make the 2020 Plan available for public review on the District's website (https://www.cvwdwater.com/189/Reports-Studies-Regulations) no later than thirty (30) days after filing a copy of the Plan with DWR.

6. The General Manager is hereby authorized and directed, in accordance with Water Code Section 10635(c), to provide that portion of the 2020 Plan prepared pursuant to Water Code Section

10635(a)-(b) to any city or county within which the District provides water supplies no later than sixty (60) days after submitting a copy of the Plan with DWR.

7. The General Manager is hereby authorized and directed to implement the 2020 Plan in accordance with the Act and SB X7-7 and to provide recommendations to the Board of Directors regarding the necessary budgets, procedures, rules, regulations, or further actions to carry out the effective and equitable implementation of the 2020 Plan.

8. The Board of Directors finds and determines that this resolution is not subject to CEQA pursuant to Water Code Section 10652 because CEQA does not apply to the preparation and adoption, including addenda thereto, of an urban water management plan or to the implementation of the actions taken pursuant to such plans. Because this resolution comprises the Board of Directors adoption of its Addendum to the 2020 Plan and involves its implementation, no CEQA review is required.

9. Pursuant to CEQA, the Board of Directors directs staff to file a Notice of Exemption with the San Bernardino County Clerk of the Board of Supervisors within five (5) working days of adoption of this resolution.

10. The document and materials that constitute the record of proceedings on which this resolution and the above findings have been based are located at 385 N. Arrowhead Avenue, San Bernardino, CA 92415. The custodian for these records is the Clerk of the Board.

APPROVED, ADOPTED, AND SIGNED this 8th day of June, 2021.

CUCAMONGA VALLEY WATER DISTRICT

Randall James Reed
President

ATTEST:

John Bosler
Secretary and General Manager / CEO

RESOLUTION NO. 2021-6-1

RESOLUTION OF THE BOARD OF DIRECTORS OF THE CUCAMONGA VALLEY WATER DISTRICT ADOPTING A WATER SHORTAGE CONTINGENCY PLAN UPDATE (WSCP)

WHEREAS, The California Urban Water Management Planning Act, (Wat. Code §10610, et seq. (the Act)), mandates that every urban supplier of water providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare and adopt, in accordance with prescribed requirements, a Water Shortage Contingency Plan (WSCP) as part of its Urban Water Management Plan (Plan); and

WHEREAS, the Act specifies the requirements and procedures for adopting such WSCPs; and

WHEREAS, pursuant to recent amendments to the Act, urban water suppliers are required to adopt and electronically submit their WSCPs to the California Department of Water Resources (DWR) by July 1, 2021; and

WHEREAS, pursuant to the Act, "urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers; and

WHEREAS, the Cucamonga Valley Water District (District) meets the definition of an urban water supplier for purposes of the Act and is required to prepare and adopt and WSCP as part of its 2020 Plan; and

WHEREAS, the District has prepared a WSCP update in accordance with the Act, and in accordance with applicable legal requirements, has undertaken certain coordination, notice, public involvement, public comment, and other procedures in relation to its WSCP; and

WHEREAS, in accordance with the Act, the District has prepared its WSCP update with its own staff, with the assistance of consulting professionals, and in cooperation with other governmental agencies, and has utilized and relied upon industry standards and the expertise of industry professionals in preparing its WSCP update, and has also utilized DWR's Urban Water Management Plan Guidebook 2020, including its related appendices, in preparing its WSCP update; and

WHEREAS, in accordance with applicable law, including Water Code section 10642, and Government Code section 6066, a Notice of a Public Hearing regarding the District's WSCP update was published within the jurisdiction of the District on May 25, 2021 and June 1, 2021; and

WHEREAS, in accordance with applicable law, including but not limited to Water Code section 10642, a virtual public hearing was held on June 8, 2021 at 6 PM, or soon thereafter, via GoToMeeting (https://global.gotomeeting.com/join/955106309) in order to provide members of

the public and other interested entities with the opportunity to be heard in connection with proposed adoption of the WSCP update and issues related thereto; and

WHEREAS, pursuant to said public hearing on the District's WSCP, the District, among other things, encouraged the active involvement of diverse social, cultural, and economic members of the community within the District's service area with regard to the WSCP update, and encouraged community input regarding the District's WSCP update; and

WHEREAS, the Board of Directors has reviewed and considered the purposes and requirements of the Act, the contents of the WSCP update, and the documentation contained in the administrative record in support of the WSCP update, and has determined that the factual analyses and conclusions set forth in the WSCP update are legally sufficient; and

WHEREAS, the Board of Directors desires to adopt the WSCP update and to incorporate it as part of its 2020 Plan prior to July 1, 2021 in order to comply with the Act.

WHEREAS, Section 10652 of the California Water Code provides that the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) (CEQA) does not apply to the preparation and adoption of a WSCP as part of Plan pursuant to California Water Code section 10632.

NOW THEREFORE BE IT RESOLVED, the Board of Directors of the Cucamonga Valley Water District hereby resolves as follows:

1. The Water Shortage Contingency Plan (WSCP), attached hereto as Exhibit A, is hereby adopted as amended by changes incorporated by the Board of Directors as a result of input received (if any) at the public hearing and ordered filed with the Secretary of the Board of Directors and shall be incorporated into the District's 2020 Plan;

2. The General Manager is hereby authorized and directed to include a copy of this Resolution in the District's WSCP update and/or in the District's 2020 Plan;

3. The General Manager is hereby authorized and directed, in accordance with Water Code sections 10621(d) and 10644(a)(1)-(2), to electronically submit a copy of the WSCP update, as part of its 2020 Plan, to DWR no later than July 1, 2021;

4. The General Manager is hereby authorized and directed, in accordance with Water Code section 10644(a), to submit a copy of the WSCP update, as part of its 2020 Plan, to the California State Library, and to any city or county within which the District provides water supplies no later than thirty (30) days after this adoption date;

5. The General Manager is hereby authorized and directed, in accordance with Water Code section 10645, to make the WSCP update available for public review on the District's website (https://www.cvwdwater.com/189/Reports-Studies-Regulations) no later than thirty (30) days after filing a copy of the WSCP, as part of its 2020 Plan, with DWR.

6. The General Manager is hereby authorized and directed to implement the WSCP update in accordance with the Act and to provide recommendations to the Board of Directors regarding

the necessary budgets, procedures, rules, regulations, or further actions to carry out the effective and equitable implementation of the WSCP update.

7. The Board of Directors finds and determines that this resolution is not subject to CEQA pursuant to Water Code Section 10652 because CEQA does not apply to the preparation and adoption of a WSCP or to the implementation of the actions taken pursuant to such plans. Because this resolution comprises the Board of Directors adoption of its WSCP and involves its implementation, no CEQA review is required.

8. Pursuant to CEQA, the Board of Directors directs staff to file a Notice of Exemption with the San Bernardino County Clerk of the Board of Supervisors within five (5) working days of adoption of this resolution.

9. The document and materials that constitute the record of proceedings on which this resolution and the above findings have been based are located at 385 N. Arrowhead Avenue, San Bernardino, CA 92415. The custodian for these records is the Clerk of the Board.

APPROVED, ADOPTED, AND SIGNED this 8th day of June, 2021.

CUCAMONGA VALLEY WATER DISTRICT

Randall James Reed
President

ATTEST:

John Bosler
Secretary and General Manager / CEO