Section 13

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Appendix A: Land Use Categories from General Plans

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Table 1. General Plan Land Use Categories Correlated to District Customer Sector			
General plan land use categories		**Generalized land use categories**	**District customer sector**
Abbreviation	**Description**		
Sacramento County General Plan			
AG-RES	AGRICULTURAL-RESIDENTIAL	Rural estate	Single-family
COMM/OFF	COMMERCIAL/OFFICES	Commercial	Commercial
INT IND	INTENSIVE INDUSTRIAL	Industrial	Industrial
LDR	LOW DENSITY RESIDENTIAL	Single family	Single family
MDR	MEDIUM DENSITY RESIDENTIAL	Multi-family - low density	Multi-family
NAT PRES	NATURAL PRESERVE	Non-irrigated	--
PQP	CEMETERY,PUBLIC,QUASI-PUBLIC	Public	Institutional
REC	RECREATION	Public recreation	Landscape irrigation
UDA	URBAN DEVELOPMENT AREA	Mixed land use	Commercial
UTOD	URBAN TRANSIT-ORIENTED DEVELOPMENT	Mixed land use	Commercial
City of Sacramento General Plan			
ECLR	Employment Center Low Rise	Commercial	Commercial
PRK	Parks and Recreation	Public recreation	Landscape irrigation
PUB	Public/Quasi-Public	Public	Institutional
SCnt	Suburban Center	Commercial	Commercial
SCor	Suburban Corridor	Commercial	Commercial
SNHD	Suburban Neighborhood High Density	Multi-family - high density	Multi-family
SNLD	Suburban Neighborhood Low Density	Single family	Single family
SNMD	Suburban Neighborhood Medium Density	Multi-family - low density	Multi-family
UCntHigh	Urban Center High	Commercial	Commercial
Citrus Heights General Plan			
Business Professional	Commercial	Commercial	Commercial
General Commercial	Commercial	Commercial	Commercial
High Density Residential	Multi-family - high density	Multi-family - high density	Multi-family

Table 1. General Plan Land Use Categories Correlated to District Customer Sector			
General plan land use categories		**Generalized land use categories**	**District customer sector**
Abbreviation	**Description**		
Low Density Residential	Single family	Single family	Single family
Medium Density Residential	Multi-family - low density	Multi-family - low density	Multi-family
Open Space	Non-irrigated	Non-irrigated	--

Appendix B: Long Term Cumulative Costs by CIP Category

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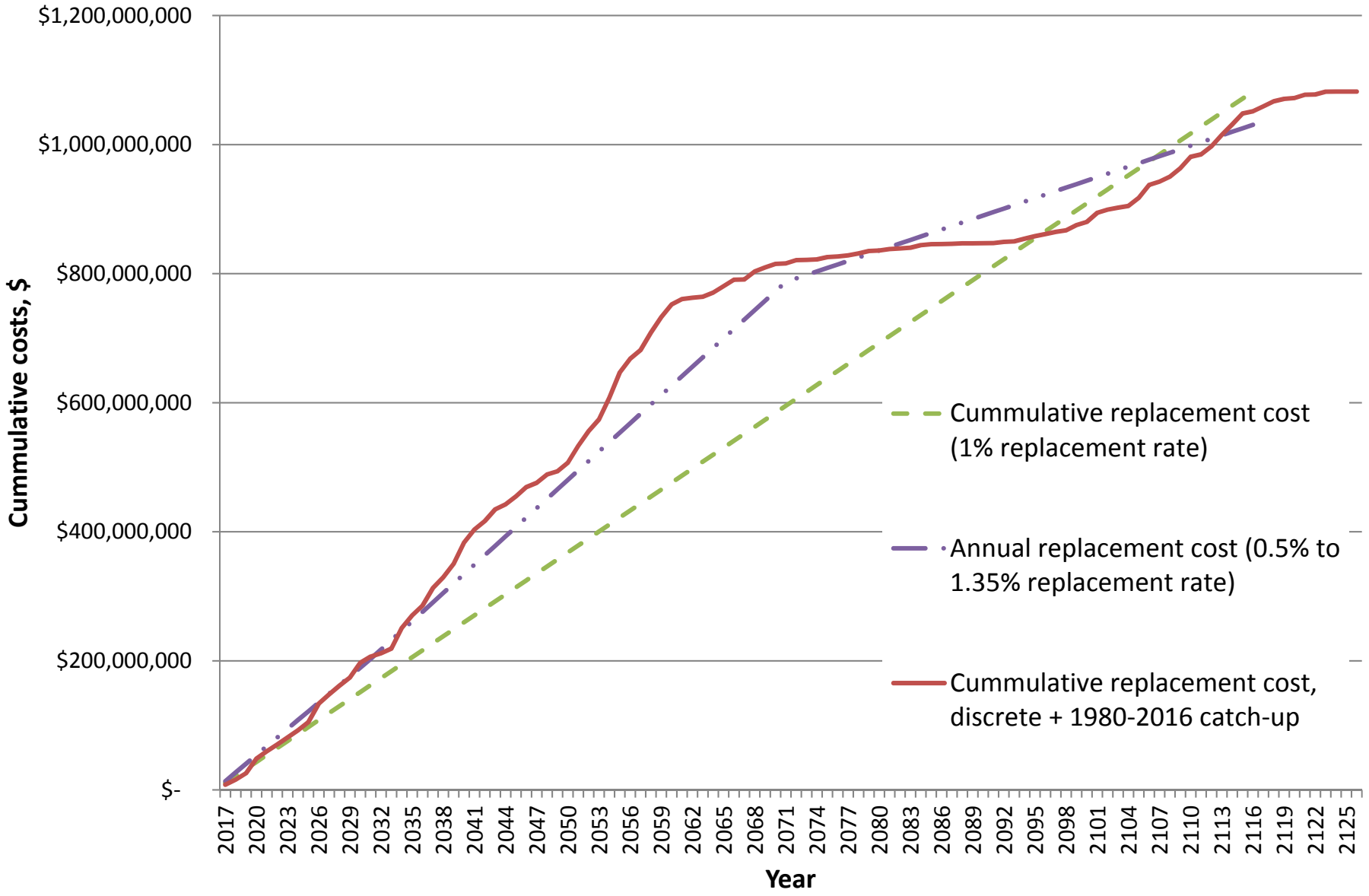

Figure 1. Distribution Mains Cummulative Replacement Costs

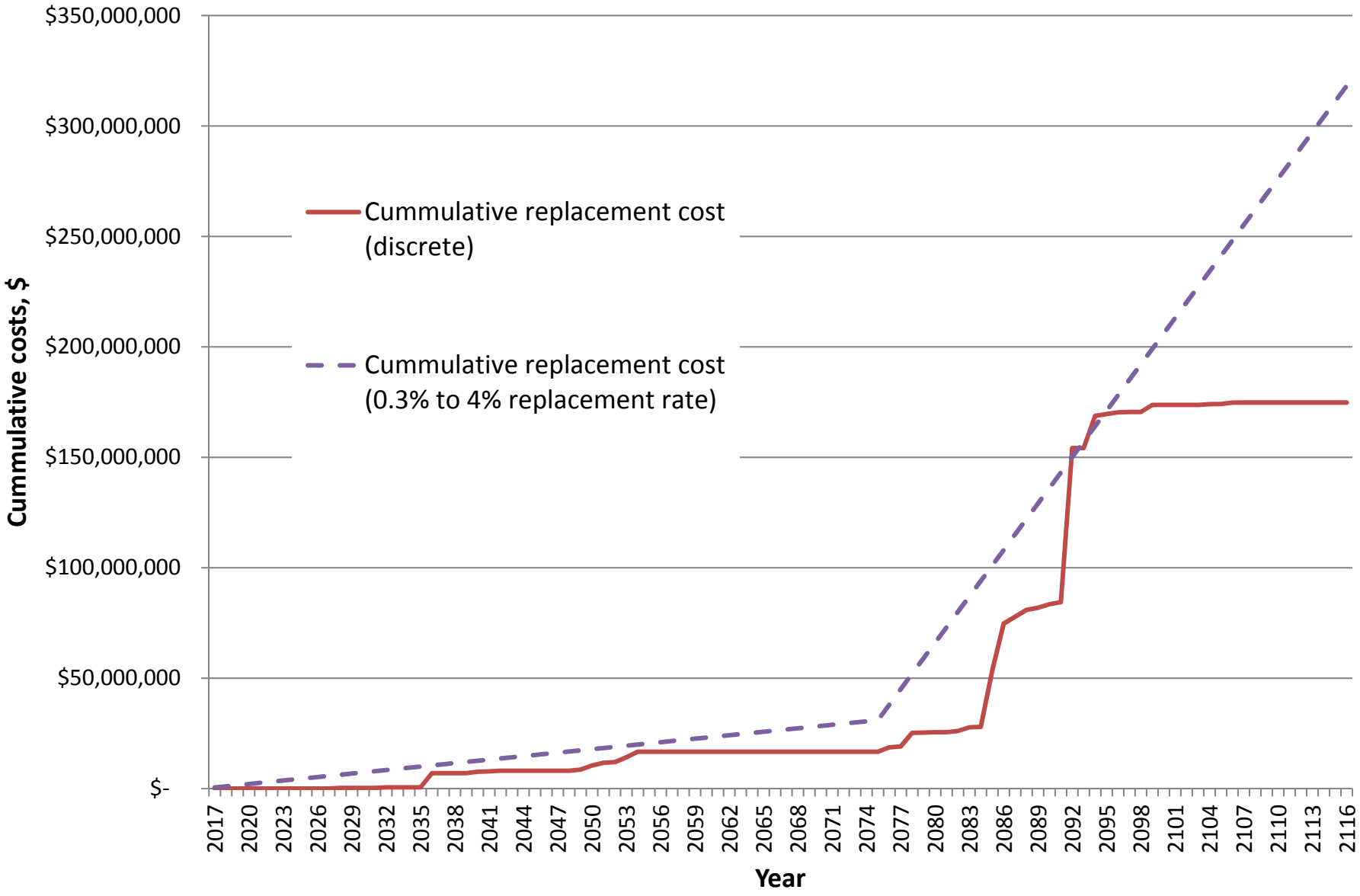

Figure 2. Transmission Mains Cummulative Replacement Costs

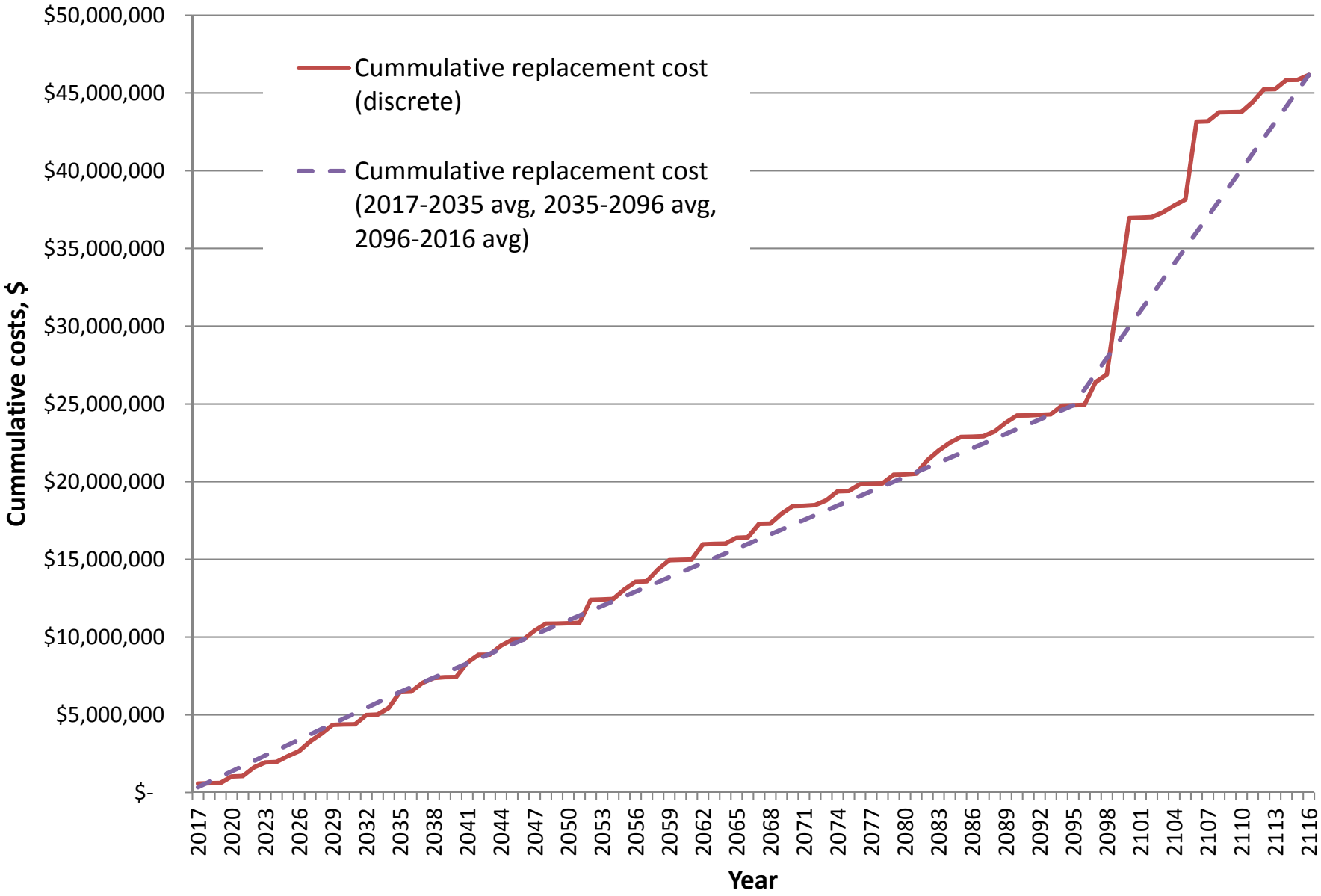

Figure 3. Storage Tank and BPS Cummulative Replacement Costs

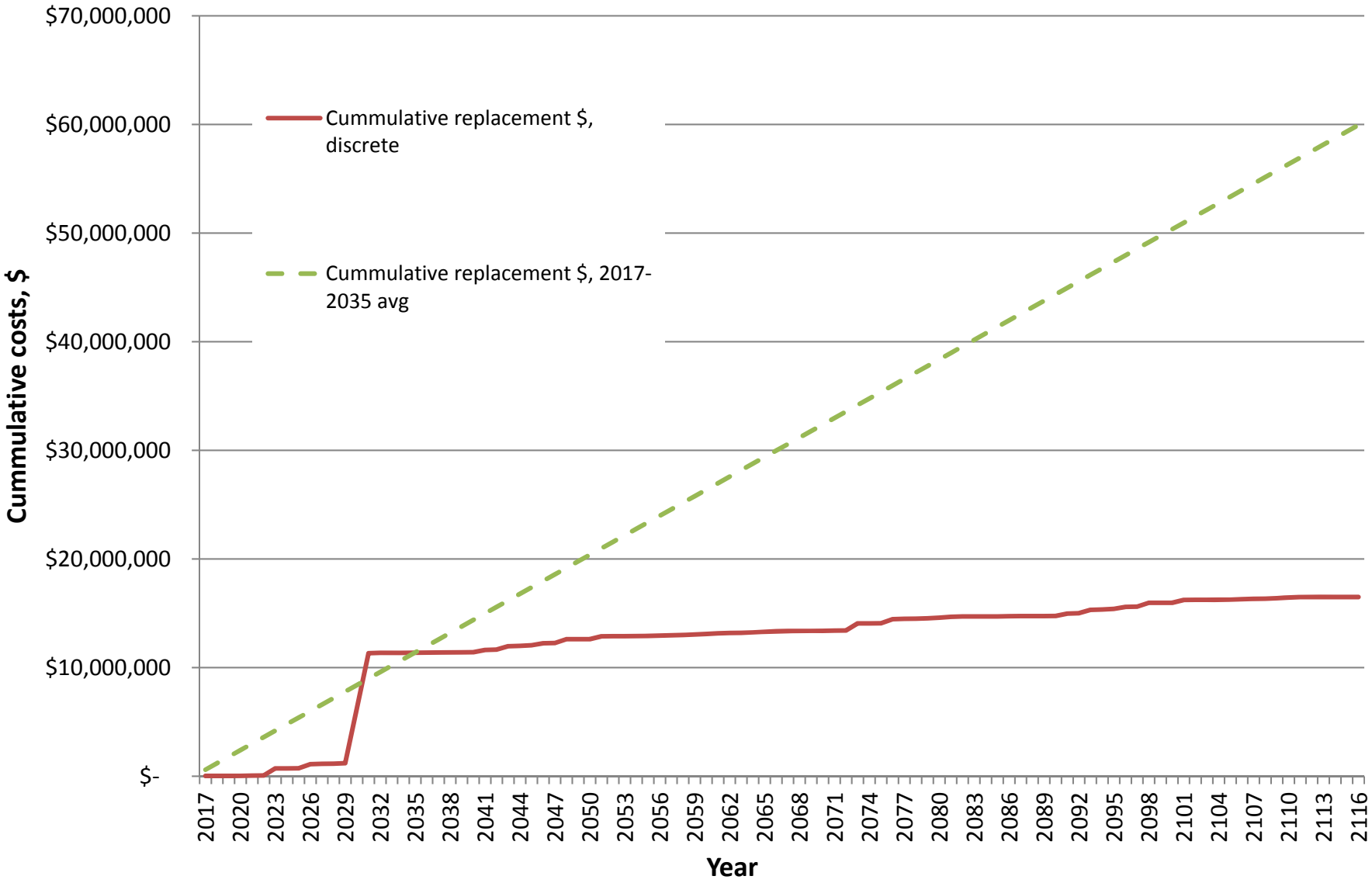

Figure 4. Buildings and Structures Cummulative Replacement Costs

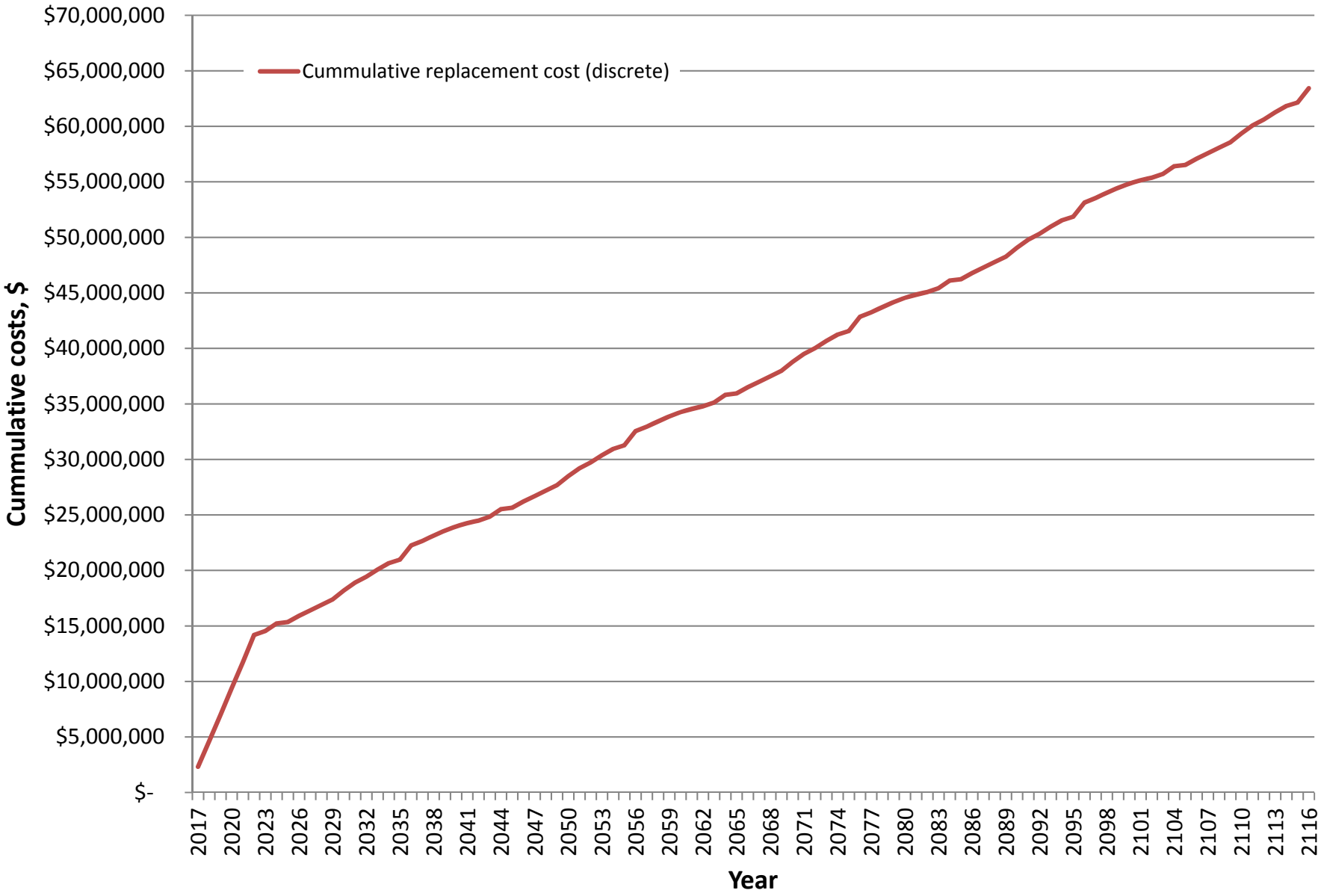

Figure 5. Water Meters Cummulative Replacement Costs

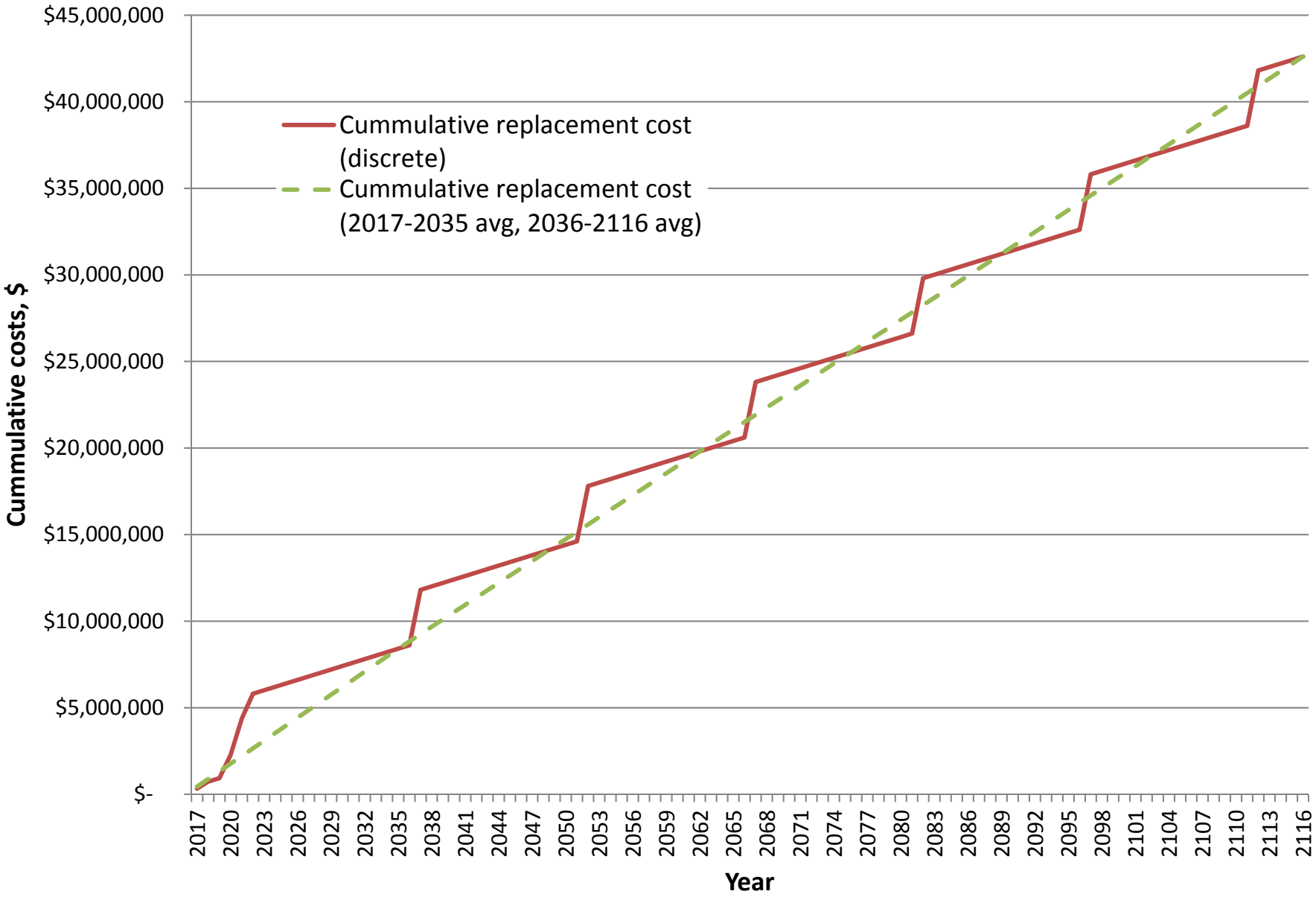

Figure 6. SCADA Cummulative Replacement Costs

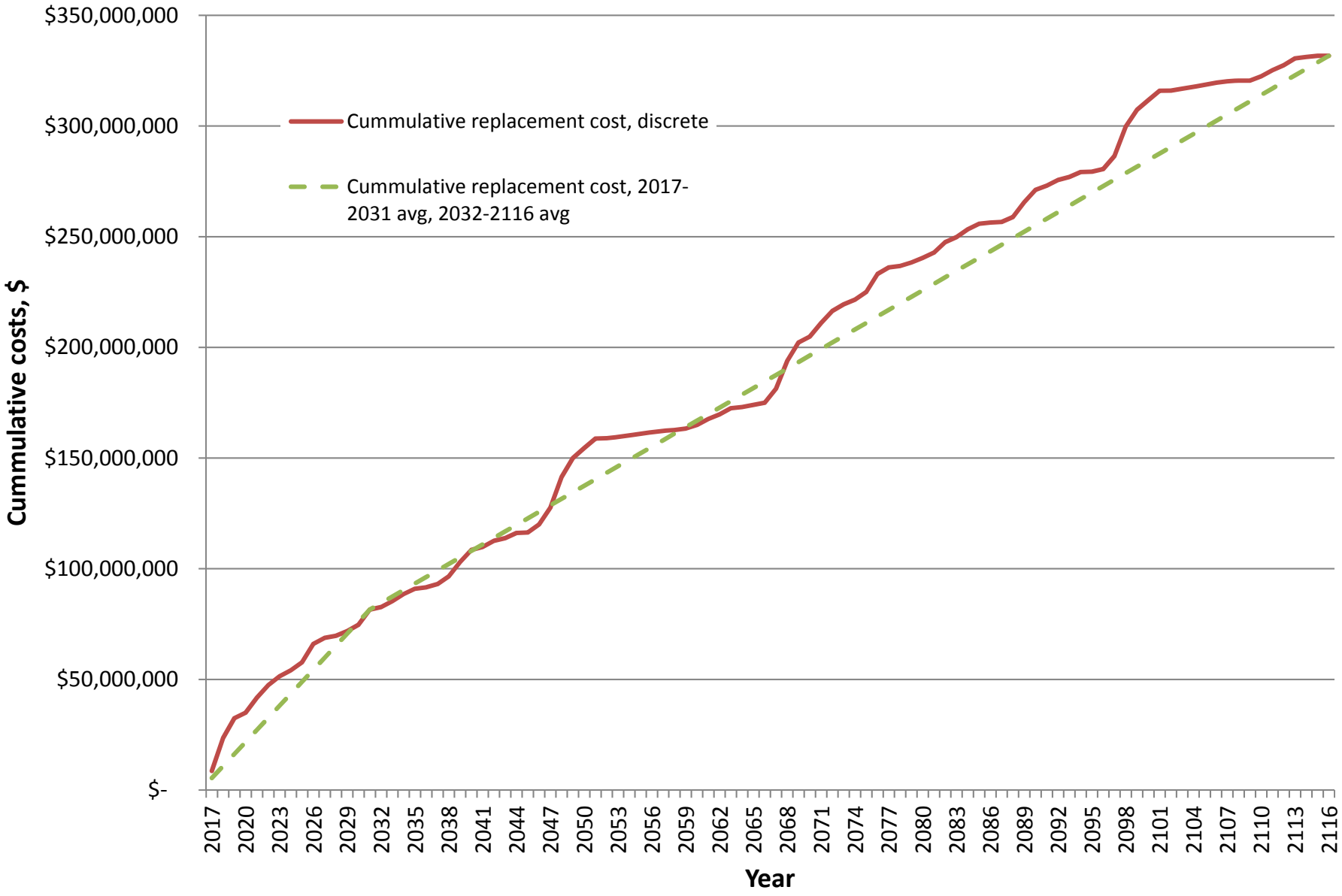

Figure 7. Wells Cummulative Replacement Costs

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Appendix C: New Transmission Mains Cost Calculations

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CIP- Transmission Mains and Distribution Pipelines

TM-01. Marconi TM Extension

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	1,300	LF	$ 227	$ 295,100	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
Butterfly Valves					
16 -inch	2	EA	$ 5,721	$ 11,500	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	2	EA	$ 2,000	$ 4,000	
SUBTOTAL				$ 310,600	
Contingencies	1	LS	25%	$ 77,650	
Engineering	1	LS	25%	$ 97,063	
CMID	1	LS	10%	$ 38,825	
TOTAL				**$ 524,200**	

CIP- Transmission Mains and Distribution Pipelines TM-02. El Camino Ave Extension

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	600	LF	$ 227	$ 136,200	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
Butterfly Valves					
16 -inch	2	EA	$ 5,721	$ 11,500	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 149,700	
Contingencies	1	LS	25%	$ 37,425	
Engineering	1	LS	25%	$ 46,781	
CMID	1	LS	10%	$ 18,713	
TOTAL				**$ 252,700**	

CIP- Transmission Mains and Distribution Pipelines TM-03. Sierra Hills Pipeline

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	5500	LF	$ 370	$ 2,035,000	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	5.5	EA	$ 20,711	$ 113,911	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 2,150,911	
Contingencies	1	LS	25%	$ 537,728	
Engineering	1	LS	25%	$ 672,160	
CMID	1	LS	10%	$ 268,864	
TOTAL				**$ 3,629,700**	

CIP- Transmission Mains and Distribution Pipelines TM-04. Orange Grove Improvements

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	8000	LF	$ 370	$ 2,960,000	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	8	EA	$ 20,711	$ 165,688	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 3,127,688	
Contingencies	1	LS	25%	$ 781,922	
Engineering	1	LS	25%	$ 977,403	
CMID	1	LS	10%	$ 390,961	
TOTAL				**$ 5,278,000**	

CIP- Transmission Mains and Distribution Pipelines TM-05. Mission Ave Extension

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	4000	LF	$ 370	$ 1,480,000	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	4	EA	$ 20,711	$ 82,844	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 1,564,844	
Contingencies	1	LS	25%	$ 391,211	
Engineering	1	LS	25%	$ 489,014	
CMID	1	LS	10%	$ 195,606	
TOTAL				**$ 2,640,700**	

CIP- Transmission Mains and Distribution Pipelines TM-06. Auburn Blvd Area Improv

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	7300	LF	$ 370	$ 2,701,000	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	7.3	EA	$ 20,711	$ 151,191	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 2,854,191	
Contingencies	1	LS	25%	$ 713,548	
Engineering	1	LS	25%	$ 891,935	
CMID	1	LS	10%	$ 356,774	
TOTAL				**$ 4,816,500**	

CIP- Transmission Mains and Distribution Pipelines TM-07. Cypress Ave Improv

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	-	LF	$ 227	$ -	
18 -inch	-	LF	$ 257	$ -	
20 -inch	-	LF	$ 264	$ -	
24 -inch	-	LF	$ 293	$ -	
30 -inch	6,100	LF	$ 370	$ 2,257,000	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	7	EA	$ 20,711	$ 144,977	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	6	EA	$ 2,000	$ 12,000	
SUBTOTAL				$ 2,413,977	
Contingencies	1	LS	25%	$ 603,494	
Engineering	1	LS	25%	$ 754,368	
CMID	1	LS	10%	$ 301,747	
TOTAL				**$ 4,073,600**	

CIP- Transmission Mains and Distribution Pipelines TM-08. Hillsdale Blvd Extension

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	4900	LF	$ 293	$ 1,435,700	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	4.9	EA	$ 10,871	$ 53,268	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 1,490,968	
Contingencies	1	LS	25%	$ 372,742	
Engineering	1	LS	25%	$ 465,928	
CMID	1	LS	10%	$ 186,371	
TOTAL				**$ 2,516,100**	

CIP- Transmission Mains and Distribution Pipelines TM-09. Garfield Ave Extension

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	6400	LF	$ 293	$ 1,875,200	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	6.4	EA	$ 10,871	$ 69,575	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 1,946,775	
Contingencies	1	LS	25%	$ 486,694	
Engineering	1	LS	25%	$ 608,367	
CMID	1	LS	10%	$ 243,347	
TOTAL				**$ 3,285,200**	

CIP- Transmission Mains and Distribution Pipelines

TM-10. Crestview Improv- North

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	5,500	LF	$ 227	$ 1,248,500	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	5.5	EA	$ 5,721	$ 31,500	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 1,282,000	
Contingencies	1	LS	25%	$ 320,500	
Engineering	1	LS	25%	$ 400,625	
CMID	1	LS	10%	$ 160,250	
TOTAL				**$ 2,163,400**	

CIP- Transmission Mains and Distribution Pipelines TM-11. Capehart Connection

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	3,000	LF	$ 227	$ 681,000	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	3	EA	$ 5,721	$ 17,200	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 700,200	
Contingencies	1	LS	25%	$ 175,050	
Engineering	1	LS	25%	$ 218,813	
CMID	1	LS	10%	$ 87,525	
TOTAL				**$ 1,181,600**	

CIP- Transmission Mains and Distribution Pipelines TM-12. Antelope Loop

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	7,000	LF	$ 227	$ 1,589,000	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	7	EA	$ 5,721	$ 40,100	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 1,631,100	
Contingencies	1	LS	25%	$ 407,775	
Engineering	1	LS	25%	$ 509,719	
CMID	1	LS	10%	$ 203,888	
TOTAL				**$ 2,752,500**	

CIP- Transmission Mains and Distribution Pipelines TM-13. Capehart Connection - Watt

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	2,200	LF	$ 227	$ 499,400	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	1	EA	$ 5,721	$ 5,800	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 507,200	
Contingencies	1	LS	25%	$ 126,800	
Engineering	1	LS	25%	$ 158,500	
CMID	1	LS	10%	$ 63,400	
TOTAL				**$ 855,900**	

CIP- Transmission Mains and Distribution Pipelines TM-14. Crestview Improv- South

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	7,800	LF	$ 227	$ 1,770,600	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	1	EA	$ 5,721	$ 5,800	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 1,778,400	
Contingencies	1	LS	25%	$ 444,600	
Engineering	1	LS	25%	$ 555,750	
CMID	1	LS	10%	$ 222,300	
TOTAL				**$ 3,001,100**	

CIP- Transmission Mains and Distribution Pipelines
Sacramento Suburban Water District

TM-15. Watt and Georgia Drive Connection

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	6,700	LF	$ 227	$ 1,520,900	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	6.7	EA	$ 5,721	$ 38,400	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 1,561,300	
Contingencies	1	LS	25%	$ 390,325	
Engineering	1	LS	25%	$ 487,906	
CMID	1	LS	10%	$ 195,163	
TOTAL				**$ 2,634,700**	

CIP- Transmission Mains and Distribution Pipelines TM-16. N13 Well TM Improv

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	1,600	LF	$ 227	$ 363,200	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	2	EA	$ 5,721	$ 11,500	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 376,700	
Contingencies	1	LS	25%	$ 94,175	
Engineering	1	LS	25%	$ 117,719	
CMID	1	LS	10%	$ 47,088	
TOTAL				**$ 635,700**	

CIP- Transmission Mains and Distribution Pipelines

TM-17. Madison Connection

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	600	LF	$ 227	$ 136,200	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	1	EA	$ 5,721	$ 5,800	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 144,000	
Contingencies	1	LS	25%	$ 36,000	
Engineering	1	LS	25%	$ 45,000	
CMID	1	LS	10%	$ 18,000	
TOTAL				**$ 243,000**	

CIP- Transmission Mains and Distribution Pipelines TM-18. Garfield Ave- North Improv

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	10,300	LF	$ 227	$ 2,338,100	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	1	EA	$ 5,721	$ 5,800	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 2,345,900	
Contingencies	1	LS	25%	$ 586,475	
Engineering	1	LS	25%	$ 733,094	
CMID	1	LS	10%	$ 293,238	
TOTAL				**$ 3,958,800**	

CIP- Transmission Mains and Distribution Pipelines TM-19. Indian River Loop

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	4,500	LF	$ 227	$ 1,021,500	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	1	EA	$ 5,721	$ 5,800	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 1,029,300	
Contingencies	1	LS	25%	$ 257,325	
Engineering	1	LS	25%	$ 321,656	
CMID	1	LS	10%	$ 128,663	
TOTAL				**$ 1,737,000**	

CIP- Transmission Mains and Distribution Pipelines TM-20. SSA Connector

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	2,600	LF	$ 227	$ 590,200	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	1	EA	$ 5,721	$ 5,800	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 598,000	
Contingencies	1	LS	25%	$ 149,500	
Engineering	1	LS	25%	$ 186,875	
CMID	1	LS	10%	$ 74,750	
TOTAL				**$ 1,009,200**	

CIP- Transmission Mains and Distribution Pipelines TM-21 34th St Intertie

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	500	LF	$ 293	$ 146,500	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	2	EA	$ 10,871	$ 21,742	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	1	EA	$ 2,000	$ 2,000	
SUBTOTAL				$ 170,242	
Contingencies	1	LS	25%	$ 42,561	
Engineering	1	LS	25%	$ 53,201	
CMID	1	LS	10%	$ 21,280	
TOTAL				**$ 287,300**	

CIP- Transmission Mains and Distribution Pipelines TM-22. MBP 1

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	3300	LF	$ 227	$ 749,100	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	200	LF	$ 293	$ 58,600	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	4	EA	$ 5,721	$ 22,900	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	2	EA	$ 10,871	$ 21,742	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	3	EA	$ 2,000	$ 6,000	
SUBTOTAL				$ 858,342	
Contingencies	1	LS	25%	$ 214,586	
Engineering	1	LS	25%	$ 268,232	
CMID	1	LS	10%	$ 107,293	
TOTAL				**$ 1,448,500**	

CIP- Transmission Mains and Distribution Pipelines TM- 23. MBP 2

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	4,300	LF	$ 293	$ 1,259,900	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	5	EA	$ 10,871	$ 54,355	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	5	EA	$ 2,000	$ 10,000	
SUBTOTAL				$ 1,324,255	
Contingencies	1	LS	25%	$ 331,064	
Engineering	1	LS	25%	$ 413,830	
CMID	1	LS	10%	$ 165,532	
TOTAL				**$ 2,234,700**	

CIP- Transmission Mains and Distribution Pipelines TM- 24. MBP 3

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	0	LF	$ 227	$ -	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	4,000	LF	$ 293	$ 1,172,000	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	0	EA	$ 5,721	$ -	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	4	EA	$ 10,871	$ 43,484	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	4	EA	$ 2,000	$ 8,000	
SUBTOTAL				$ 1,223,484	
Contingencies	1	LS	25%	$ 305,871	
Engineering	1	LS	25%	$ 382,339	
CMID	1	LS	10%	$ 152,936	
TOTAL				**$ 2,064,700**	

CIP- Transmission Mains and Distribution Pipelines TM- 25. MBP 4

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	7,500	LF	$ 227	$ 1,702,500	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	8	EA	$ 5,721	$ 45,800	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	8	EA	$ 2,000	$ 16,000	
SUBTOTAL				$ 1,764,300	
Contingencies	1	LS	25%	$ 441,075	
Engineering	1	LS	25%	$ 551,344	
CMID	1	LS	10%	$ 220,538	
TOTAL				**$ 2,977,300**	

CIP- Transmission Mains and Distribution Pipelines TM- 26. MBP 5

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	7,300	LF	$ 227	$ 1,657,100	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	8	EA	$ 5,721	$ 45,800	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	8	EA	$ 2,000	$ 16,000	
SUBTOTAL				$ 1,718,900	
Contingencies	1	LS	25%	$ 429,725	
Engineering	1	LS	25%	$ 537,156	
CMID	1	LS	10%	$ 214,863	
TOTAL				**$ 2,900,700**	

CIP- Transmission Mains and Distribution Pipelines TM- 27. MBP 6

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	2,700	LF	$ 227	$ 612,900	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	3	EA	$ 5,721	$ 17,200	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	3	EA	$ 2,000	$ 6,000	
SUBTOTAL				$ 636,100	
Contingencies	1	LS	25%	$ 159,025	
Engineering	1	LS	25%	$ 198,781	
CMID	1	LS	10%	$ 79,513	
TOTAL				**$ 1,073,500**	

CIP- Transmission Mains and Distribution Pipelines TM- 28. MBP 7

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	3,700	LF	$ 227	$ 839,900	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	4	EA	$ 5,721	$ 22,900	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	4	EA	$ 2,000	$ 8,000	
SUBTOTAL				$ 870,800	
Contingencies	1	LS	25%	$ 217,700	
Engineering	1	LS	25%	$ 272,125	
CMID	1	LS	10%	$ 108,850	
TOTAL				**$ 1,469,500**	

CIP- Transmission Mains and Distribution Pipelines TM- 29. MBP 8

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	3,500	LF	$ 227	$ 794,500	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	4	EA	$ 5,721	$ 22,900	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	4	EA	$ 2,000	$ 8,000	
SUBTOTAL				$ 825,400	
Contingencies	1	LS	25%	$ 206,350	
Engineering	1	LS	25%	$ 257,938	
CMID	1	LS	10%	$ 103,175	
TOTAL				**$ 1,392,900**	

CIP- Transmission Mains and Distribution Pipelines TM- 30. MBP 9

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	2,700	LF	$ 227	$ 612,900	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	3	EA	$ 5,721	$ 17,200	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	3	EA	$ 2,000	$ 6,000	
SUBTOTAL				$ 636,100	
Contingencies	1	LS	25%	$ 159,025	
Engineering	1	LS	25%	$ 198,781	
CMID	1	LS	10%	$ 79,513	
TOTAL				**$ 1,073,500**	

CIP- Transmission Mains and Distribution Pipelines TM- 31. MBP 10

Sacramento Suburban Water District

Project Element	Quantity	Unit	Unit Cost	Total	Remarks
Pipelines					Assume paved
16 -inch	1900	LF	$ 227	$ 431,300	
18 -inch	0	LF	$ 257	$ -	
20 -inch	0	LF	$ 264	$ -	
24 -inch	0	LF	$ 293	$ -	
30 -inch	0	LF	$ 370	$ -	
Butterfly Valves					
16 -inch	2	EA	$ 5,721	$ 11,500	
18 -inch	0	EA	$ 6,866	$ -	
20 -inch	0	EA	$ 7,896	$ -	
24 -inch	0	EA	$ 10,871	$ -	
30 -inch	0	EA	$ 20,711	$ -	
Horizontal Drilling					
30 -inch Casir	0	LF	$ 1,361	$ -	No horizontal drilling needed
36 -inch Casir	0	LF	$ 1,361	$ -	
42 -inch Casir	0	LF	$ 1,902	$ -	
Blow-Off Assembly	2	EA	$ 2,000	$ 4,000	
SUBTOTAL				$ 446,800	
Contingencies	1	LS	25%	$ 111,700	
Engineering	1	LS	25%	$ 139,625	
CMID	1	LS	10%	$ 55,850	
TOTAL				**$ 754,000**	

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Appendix D: Capital Needs Assessment Escalated Costs

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Sacramento Suburban Water District

Funding Projections

Capital Needs Assessment Annual Cost (Escalated at 3%)

Project Number	Project Name	Project Total	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Supply Projects																	
W-Replace-01	Replacement Wells	$ 67,056,000	$ 3,605,000	$ 3,714,000	$ 3,825,000	$ 3,940,000	$ 4,058,000	$ 4,180,000	$ 4,305,000	$ 4,434,000	$ 4,567,000	$ 4,704,000	$ 4,845,000	$ 4,991,000	$ 5,140,000	$ 5,295,000	$ 5,453,000
W-Land-01	Replacement Well Land Acquisition	$ 7,001,000	$ 515,000	$ 531,000	$ 2,735,000	$ -	$ -	$ 1,794,000	$ -	$ -	$ -	$ -	$ -	$ 1,426,000	$ -	$ -	$ -
W-Destroy-01	Well Site Destruction	$ 6,649,000	$ 358,000	$ 368,000	$ 379,000	$ 391,000	$ 402,000	$ 414,000	$ 427,000	$ 440,000	$ 453,000	$ 466,000	$ 480,000	$ 495,000	$ 510,000	$ 525,000	$ 541,000
W-Rehab-01	Well Light and Heavy Rehab	$ 7,730,000	$ 416,000	$ 428,000	$ 441,000	$ 454,000	$ 468,000	$ 482,000	$ 496,000	$ 511,000	$ 526,000	$ 542,000	$ 559,000	$ 575,000	$ 593,000	$ 610,000	$ 629,000
	Supply Projects Subtotal	$ 88,436,000	$ 4,894,000	$ 5,041,000	$ 7,380,000	$ 4,785,000	$ 4,928,000	$ 6,870,000	$ 5,228,000	$ 5,385,000	$ 5,546,000	$ 5,712,000	$ 5,884,000	$ 7,487,000	$ 6,243,000	$ 6,430,000	$ 6,623,000
	Supply Projects Cumulative Subtotal		$ 4,894,000	$ 9,935,000	$ 17,315,000	$ 22,100,000	$ 27,028,000	$ 33,898,000	$ 39,126,000	$ 44,511,000	$ 50,057,000	$ 55,769,000	$ 61,653,000	$ 69,140,000	$ 75,383,000	$ 81,813,000	$ 88,436,000
Transmission Projects																	
TM-New-01	New Transmission Mains	$ 85,523,000	$ 4,598,000	$ 4,736,000	$ 4,878,000	$ 5,025,000	$ 5,175,000	$ 5,331,000	$ 5,491,000	$ 5,655,000	$ 5,825,000	$ 6,000,000	$ 6,180,000	$ 6,365,000	$ 6,556,000	$ 6,753,000	$ 6,955,000
TM-Replace-01	Transmission Mains Replacement	$ 9,782,000	$ 526,000	$ 542,000	$ 558,000	$ 575,000	$ 592,000	$ 610,000	$ 628,000	$ 647,000	$ 666,000	$ 686,000	$ 707,000	$ 728,000	$ 750,000	$ 772,000	$ 795,000
	Transmission Projects Subtotal	$ 95,305,000	$ 5,124,000	$ 5,278,000	$ 5,436,000	$ 5,600,000	$ 5,767,000	$ 5,941,000	$ 6,119,000	$ 6,302,000	$ 6,491,000	$ 6,686,000	$ 6,887,000	$ 7,093,000	$ 7,306,000	$ 7,525,000	$ 7,750,000
	Transmission Projects Cumulative Subtotal		$ 5,124,000	$ 10,402,000	$ 15,838,000	$ 21,438,000	$ 27,205,000	$ 33,146,000	$ 39,265,000	$ 45,567,000	$ 52,058,000	$ 58,744,000	$ 65,631,000	$ 72,724,000	$ 80,030,000	$ 87,555,000	$ 95,305,000
Distribution Projects																	
DM-Replace-01	Distribution Mains Replacement	$ 259,119,000	$ 13,932,000	$ 14,350,000	$ 14,780,000	$ 15,224,000	$ 15,681,000	$ 16,151,000	$ 16,635,000	$ 17,135,000	$ 17,649,000	$ 18,178,000	$ 18,723,000	$ 19,285,000	$ 19,864,000	$ 20,459,000	$ 21,073,000
	Distribution Projects Subtotal	$ 259,119,000	$ 13,932,000	$ 14,350,000	$ 14,780,000	$ 15,224,000	$ 15,681,000	$ 16,151,000	$ 16,635,000	$ 17,135,000	$ 17,649,000	$ 18,178,000	$ 18,723,000	$ 19,285,000	$ 19,864,000	$ 20,459,000	$ 21,073,000
	Distribution Projects Cumulative Subtotal		$ 13,932,000	$ 28,282,000	$ 43,062,000	$ 58,286,000	$ 73,967,000	$ 90,118,000	$ 106,753,000	$ 123,888,000	$ 141,537,000	$ 159,715,000	$ 178,438,000	$ 197,723,000	$ 217,587,000	$ 238,046,000	$ 259,119,000
Storage Projects																	
S-Destroy-01	Remove MBP Elevated Tank#216	$ 226,000	$ -	$ -	$ -	$ 226,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
S-Destroy-02	Remove MBP Elevated Tank#769	$ 226,000	$ -	$ -	$ -	$ 226,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
S-RR-01	Antelope Ground Reservoir - BPS	$ 1,900,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 963,000	$ -	$ 937,000	$ -	$ -
S-RR-02	Capehart Elevated Tank	$ 428,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 428,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
S-RR-03	Enterprise/Northrop Ground Reservoir - BPS	$ 762,000	$ -	$ -	$ -	$ -	$ -	$ 762,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
S-RR-06	Walnut Yard Elevated Tank	$ 468,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 468,000	$ -	$ -	$ -	$ -	$ -
S-RR-07	Watt/Elkhorn Ground Reservoir - BPS	$ 1,451,000	$ 657,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 794,000	$ -	$ -	$ -
S-RR-08	McClellan BPS #1	$ 364,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 364,000	$ -	$ -	$ -	$ -	$ -	$ -
S-RR-09	McClellan BPS #2	$ 182,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 182,000	$ -	$ -	$ -	$ -	$ -	$ -
S-RR-10	Inspections and Cleaning	$ 454,000	$ 24,000	$ 25,000	$ 26,000	$ 27,000	$ 27,000	$ 28,000	$ 29,000	$ 30,000	$ 31,000	$ 32,000	$ 33,000	$ 34,000	$ 35,000	$ 36,000	$ 37,000
	Storage Projects Subtotal	$ 6,461,000	$ 681,000	$ 25,000	$ 26,000	$ 479,000	$ 27,000	$ 790,000	$ 457,000	$ 30,000	$ 577,000	$ 500,000	$ 996,000	$ 828,000	$ 972,000	$ 36,000	$ 37,000
	Storage Projects Cumulative Subtotal		$ 681,000	$ 706,000	$ 732,000	$ 1,211,000	$ 1,238,000	$ 2,028,000	$ 2,485,000	$ 2,515,000	$ 3,092,000	$ 3,592,000	$ 4,588,000	$ 5,416,000	$ 6,388,000	$ 6,424,000	$ 6,461,000
Special Projects																	
SCADA																	
SP-SCADA-S2	Radio Replacement Pilot Study	$ 177,000	$ -	$ -	$ -	$ 158,000	$ 19,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-S3	ODMS Readiness Assessment	$ 38,000	$ 38,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-S4	HMI Evaluation	$ 58,000	$ -	$ 58,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-S5	Optimization Feasibility Analysis	$ 31,000	$ 2,000	$ 29,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-S6	SCADA System Documentation Upgrade	$ 53,000	$ -	$ 53,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-S7	Alarm Management Plan	$ 56,000	$ -	$ 56,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-S9	SCADA Governance Implementation	$ 57,000	$ -	$ 57,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-L1	SCADA System completion	$ 120,000	$ 120,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-L2	RTU Upgrade Program	$ 4,159,000	$ -	$ -	$ -	$ 783,000	$ 807,000	$ 831,000	$ 856,000	$ 882,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-L3	HMI Upgrade	$ 664,000	$ -	$ -	$ -	$ -	$ 664,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-L4	Standards Expansion	$ 36,000	$ -	$ -	$ 36,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-L5	ODMS Implementation	$ 269,000	$ -	$ -	$ 269,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-01	Communication Equipment	$ 540,000	$ -	$ 266,000	$ 274,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA-02	Data Management Plan	$ 113,000	$ -	$ -	$ -	$ 113,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-SCADA RR-01	Ongoing SCADA R/R	$ 3,837,000	$ 206,000	$ 213,000	$ 219,000	$ 226,000	$ 232,000	$ 239,000	$ 246,000	$ 254,000	$ 261,000	$ 269,000	$ 277,000	$ 286,000	$ 294,000	$ 303,000	$ 312,000
	SCADA Subtotal	$ 10,208,000	$ 366,000	$ 732,000	$ 798,000	$ 1,280,000	$ 1,722,000	$ 1,070,000	$ 1,102,000	$ 1,136,000	$ 261,000	$ 269,000	$ 277,000	$ 286,000	$ 294,000	$ 303,000	$ 312,000
Buildings and Structures																	
SP-Buildings RR-01	Buildings and Structures R/R	$ 1,961,000	$ 57,000	$ -	$ -	$ 7,000	$ 40,000	$ 9,000	$ 908,000	$ 7,000	$ 10,000	$ 602,000	$ 16,000	$ 18,000	$ 65,000	$ 90,000	$ 132,000
SP-Buildings RR-02	Admin/Opps Facility Bldg Replacement	$ 15,353,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,563,000	$ 7,790,000
	Buildings and Structures Subtotal	$ 17,314,000	$ 57,000	$ -	$ -	$ 7,000	$ 40,000	$ 9,000	$ 908,000	$ 7,000	$ 10,000	$ 602,000	$ 16,000	$ 18,000	$ 65,000	$ 7,653,000	$ 7,922,000
Meters																	
P-Meter Retrofit-0	Water Meters Retrofits	$ 16,160,000	$ 2,498,000	$ 2,573,000	$ 2,651,000	$ 2,730,000	$ 2,812,000	$ 2,896,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SP-Meter RR-01	Water Meters Replacements	$ 11,758,000	$ 632,000	$ 651,000	$ 671,000	$ 691,000	$ 712,000	$ 733,000	$ 755,000	$ 777,000	$ 801,000	$ 825,000	$ 850,000	$ 875,000	$ 901,000	$ 928,000	$ 956,000
	Meters Subtotal	$ 27,918,000	$ 3,130,000	$ 3,224,000	$ 3,322,000	$ 3,421,000	$ 3,524,000	$ 3,629,000	$ 755,000	$ 777,000	$ 801,000	$ 825,000	$ 850,000	$ 875,000	$ 901,000	$ 928,000	$ 956,000
	Special Projects subtotal	$ 55,440,000	$ 3,553,000	$ 3,956,000	$ 4,120,000	$ 4,708,000	$ 5,286,000	$ 4,708,000	$ 2,765,000	$ 1,920,000	$ 1,072,000	$ 1,696,000	$ 1,143,000	$ 1,179,000	$ 1,260,000	$ 8,884,000	$ 9,190,000
	Special Project Cumulative Subtotal		$ 3,553,000	$ 7,509,000	$ 11,629,000	$ 16,337,000	$ 21,623,000	$ 26,331,000	$ 29,096,000	$ 31,016,000	$ 32,088,000	$ 33,784,000	$ 34,927,000	$ 36,106,000	$ 37,366,000	$ 46,250,000	$ 55,440,000
Debt Service																	
Debt-1	Debt payments	$ 101,673,000	$ 7,825,000	$ 7,824,000	$ 7,783,000	$ 7,818,000	$ 7,823,000	$ 7,899,000	$ 6,173,000	$ 6,154,000	$ 6,158,000	$ 6,136,000	$ 6,163,000	$ 6,126,000	$ 5,923,000	$ 5,942,000	$ 5,926,000
All Projects																	
	Total	$504,761,000	$36,009,000	$36,474,000	$39,525,000	$38,614,000	$39,512,000	$42,359,000	$37,377,000	$36,926,000	$37,493,000	$38,908,000	$39,796,000	$41,998,000	$41,568,000	$49,276,000	$50,599,000
	Cumulative Total		$36,009,000	$72,483,000	$ 112,008,000	$ 150,622,000	$ 190,134,000	$ 232,493,000	$ 269,870,000	$ 306,796,000	$ 344,289,000	$ 383,197,000	$ 422,993,000	$ 464,991,000	$ 506,559,000	$ 555,835,000	$ 606,434,000

NOTES: Costs for future years are escalated using 3% per year inflation.

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Appendix E: Hydraulic Model Data

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Table 1. Buildout Well Facilities in Model

	Model well information			Model pump information					
Well (Reservoir ID) name	Type	Groundwater level , ft (relative to mean sea level)	Pattern	Pump ID	Type (Int)	Ground elevation at facility, ft	Diameter, in	Design Head (ft)	Design Flow (gpm)
Existing wells									
W-31A	0: Fixed Head	-53	0	PMP-31A	3: Multiple Point Curve	86	12	304	1,292
W-32A	0: Fixed Head	-60	0	PMP-32A	3: Multiple Point Curve	94	14	160	2,000
W-33A	0: Fixed Head	-80	WELL_33A_PATN	PMP-33A	3: Multiple Point Curve	74	15	300	2,250
W-40A	0: Fixed Head	-121	0	PMP-40A	3: Multiple Point Curve	68	15	300	2,500
W-4B	0: Fixed Head	-121	WELL_4B_PATN	PMP-4B	3: Multiple Point Curve	58	16	275	3,000
W-55A	0: Fixed Head	-87	0	PMP-55A	1: Design Point Curve	74	12	274	2,025
W-56A	0: Fixed Head	-40	WELL_56A_PATN	PMP-56A	3: Multiple Point Curve	94	15	300	2,500
W-59A	0: Fixed Head	-30	0	PMP-59A	1: Design Point Curve	129	15	291	2,075
W-68	0: Fixed Head	-89	0	PMP-68	1: Design Point Curve	35	-	265	1,939
W-71	0: Fixed Head	-20	WELL_71_PATN	PMP-71	1: Design Point Curve	58	14	222	2,080
W-72	0: Fixed Head	-171	0	PMP-72	3: Multiple Point Curve	50	14	280	2,000
W-73	0: Fixed Head	-79	0	PMP-73	3: Multiple Point Curve	50	16	275	3,500
W-74	0: Fixed Head	-74	0	PMP-74	1: Design Point Curve	50	14	254	2,911
W-N23	0: Fixed Head	-47	0	PMP-N23	1: Design Point Curve	104	-	332	1,021
W-N26	0: Fixed Head	-68	0	PMP-N26	1: Design Point Curve	172	10	340	400
W-N32A	0: Fixed Head	-100	0	PMP-N32A	3: Multiple Point Curve	150	12	317	1,700
W-N32B	0: Fixed Head	-100	0	PMP-N32B	3: Multiple Point Curve	150	15	317	2,220
W-N33	0: Fixed Head	-63	0	PMP-N33	3: Multiple Point Curve	139	-	410	1,150
W-N34	0: Fixed Head	-35	0	PMP-N34	1: Design Point Curve	126	14	315	2,500
W-N35	0: Fixed Head	-32	0	PMP-N35	1: Design Point Curve	131	12	321	2,340
W-N36	0: Fixed Head	-42	0	PMP-N36	3: Multiple Point Curve	144	12	-	-
W-N38	0: Fixed Head	-25	0	PMP-N38	3: Multiple Point Curve	100	12	-	-
W-N39	0: Fixed Head	-25	0	PMP-N39	3: Multiple Point Curve	100	12	-	-
NSA replacement wells									
WELL-F1	0: Fixed Head	-40	0	PMP-F1	1: Design Point Curve	143	12	300	1,500
WEFF-F10	0: Fixed Head	-40	0	PMP-F10	1: Design Point Curve	122	12	280	1,500
WELL-F11	0: Fixed Head	-45	0	PMP-F11	1: Design Point Curve	85	12	250	1,500
WELL-F12	0: Fixed Head	-45	0	PMP-F12	1: Design Point Curve	85	12	250	1,500
WELL-F13	0: Fixed Head	-42	0	PMP-F13	1: Design Point Curve	85	12	245	1,500
WELL-F2	0: Fixed Head	-40	0	PMP-F2	1: Design Point Curve	145	12	305	1,500
WELL-F3	0: Fixed Head	-25	0	PMP-F3	1: Design Point Curve	110	12	255	1,500
WELL-F4	0: Fixed Head	-25	0	PMP-F4	1: Design Point Curve	110	12	255	1,500
WELL-F6	0: Fixed Head	-38	0	PMP-F6	1: Design Point Curve	100	12	255	1,500
WELL-F7	0: Fixed Head	-30	0	PMP-F7	1: Design Point Curve	105	12	255	1,500
WELL-F8	0: Fixed Head	-30	0	PMP-F8	1: Design Point Curve	105	12	255	1,500
WELL-F9	0: Fixed Head	-40	0	PMP-F9	1: Design Point Curve	80	12	240	1,500
SSWD replacement wells									
WELL-SSAF1	0: Fixed Head	-90	0	PMP-SSAF1	1: Design Point Curve	65	12	275	1,500
WELL-SSAF2	0: Fixed Head	-90	0	PMP-SSAF2	1: Design Point Curve	64	12	270	1,500
WELL-SSAF3	0: Fixed Head	-85	0	PMP-SSAF3	1: Design Point Curve	55	12	260	1,500
WELL-SSAF4	0: Fixed Head	-70	0	PMP-SSAF4	1: Design Point Curve	90	12	280	1,500
WELL-SSAF5	0: Fixed Head	-70	0	PMP-SSAF5	1: Design Point Curve	52	12	240	1,500
WELL-SSAF6	0: Fixed Head	-80	0	PMP-SSAF6	1: Design Point Curve	39	12	235	1,500
WELL-SSAF7	0: Fixed Head	-80	0	PMP-SSAF7	1: Design Point Curve	39	12	235	1,500

Table 2. Pump Flows - Scenario 1 Existing MDD, All Groundwater

Pump ID in Model	Maximum Flow (gpm)	Time at Maximum Flow (hrs.)	Minimum Flow (gpm)	Time at Minimum Flow (hrs.)	Average Flow (gpm)	Maximum minus Minimum Flow (gpm)
PMP-12	395.19	7:30	275.29	16:00	330.8	119.9
PMP-13	0	0:00	0	0:00	0	0
PMP-14	419.21	7:30	236.43	16:00	324.11	182.78
PMP-18	555.79	4:50	0	5:50	121.29	555.79
PMP-20A	879.06	7:30	762.48	16:00	813.51	116.58
PMP-22	598.99	7:30	489.11	16:00	538.14	109.87
PMP-23	382.81	7:30	317.59	16:00	346.85	65.23
PMP-24	501.27	7:30	363.29	16:00	424.25	137.99
PMP-25	439.28	7:30	295.2	16:00	361.44	144.08
PMP-26	0	0:00	0	0:00	0	0
PMP-27	0	0:00	0	0:00	0	0
PMP-28	526.94	7:30	0	10:00	194.05	526.94
PMP-2A	71.24	7:30	0	0:00	3.9	71.24
PMP-30	399.67	7:30	0	0:00	272.63	399.67
PMP-31A	1,315.10	20:20	1,116.72	3:00	1,251.55	198.38
PMP-32A	2,204.27	9:30	133.69	15:40	1,860.89	2,070.58
PMP-32A-BOOSTER	1,325.70	7:00	589.26	16:00	885.4	736.44
PMP-33A	2,031.47	7:30	1,685.49	16:00	1,823.97	345.98
PMP-35	630.88	7:30	0	10:50	257.79	630.88
PMP-37	479.27	7:30	202.76	16:00	340.99	276.51
PMP-38	0	0:00	0	0:00	0	0
PMP-3A	0	0:00	0	0:00	0	0
PMP-40	533.79	7:30	51.87	16:00	323.56	481.92
PMP-40A	1,850.12	7:30	1,460.15	16:00	1,615.30	389.96
PMP-41	174.47	7:30	0	13:50	85.18	174.47
PMP-43	382.12	7:30	86.5	16:00	245.66	295.62
PMP-45	0	0:00	0	0:00	0	0
PMP-47	721.72	7:30	570.66	16:00	638.18	151.07
PMP-4B	0	0:00	0	0:00	0	0
PMP-5	0	0:00	0	0:00	0	0
PMP-52	700.41	20:20	384.48	3:00	611.76	315.93
PMP-55A	1,508.40	7:30	1,160.01	16:00	1,316.66	348.38
PMP-56A	1,669.06	22:00	0	0:00	257.58	1,669.06
PMP-58	846.77	20:20	0	0:50	375.09	846.77
PMP-59A	2,286.85	20:20	1,258.28	3:00	1,998.52	1,028.58
PMP-60	0	0:00	0	0:00	0	0
PMP-64	1,111.56	20:20	497.04	3:00	951.12	614.51
PMP-65	607.66	7:30	481.15	16:00	538.28	126.51
PMP-66	1,076.93	7:30	0	10:40	625.3	1,076.93
PMP-68	1,302.79	7:30	895.41	16:00	1,084.72	407.38
PMP-69	332.04	7:30	165.04	16:00	246.89	167
PMP-70	258.59	7:30	0	0:00	52.22	258.59
PMP-71	1,710.54	7:30	1,296.59	16:00	1,483.21	413.95
PMP-72	837.49	7:30	0	0:00	130.65	837.49
PMP-73	3,073.74	7:00	2,642.52	16:00	2,839.34	431.21
PMP-74	1,708.19	6:00	0	0:00	911.19	1,708.19
PMP-76	0	0:00	0	0:00	0	0
PMP-77	253.6	7:30	204.28	16:00	226.51	49.31
PMP-9	526.49	7:30	428.36	16:00	471.95	98.13
PMP-ANTE-A	0	0:00	0	0:00	0	0
PMP-ANTE-B	0	0:00	0	0:00	0	0
PMP-ANTE-C	0	0:00	0	0:00	0	0
PMP-ANTE-D	0	0:00	0	0:00	0	0

PMP-ANTE-E	0	0:00	0	0:00	0	0
PMP-ENTR-A	0	0:00	0	0:00	0	0
PMP-ENTR-B	0	0:00	0	0:00	0	0
PMP-ENTR-C	0	0:00	0	0:00	0	0
PMP-ENTR-D	0	0:00	0	0:00	0	0
PMP-ENTR-E	0	0:00	0	0:00	0	0
PMP-ENTR-F	0	0:00	0	0:00	0	0
PMP-ENTR-G	0	0:00	0	0:00	0	0
PMP-ENTR-H	0	0:00	0	0:00	0	0
PMP-ENTR-I	0	0:00	0	0:00	0	0
PMP-ENTR-J	0	0:00	0	0:00	0	0
PMP-MC-C1	604.7	5:00	0	11:50	390.05	604.7
PMP-MC10	861.19	1:00	0	7:00:00	246.21	861.19
PMP-MP-BP-1A	0	0:00	0	0:00:00	0	0
PMP-MP-BP-1B	0	0:00	0	0:00:00	0	0
PMP-MP-BP-2A	0	0:00	0	0:00	0	0
PMP-N03	1,095.70	5:00	0	10:20	449.59	1,095.70
PMP-N05	827.93	23:00	717.21	16:00	790.93	110.72
PMP-N07	1,243.13	20:30	1,027.59	16:00	1,164.43	215.54
PMP-N08	1,189.99	20:30	935.37	16:00	1,098.33	254.62
PMP-N09	0	0:00	0	0:00	0	0
PMP-N10	0	0:00	0	0:00	0	0
PMP-N12	1,290.21	23:00	0	11:50	764.21	1,290.21
PMP-N14	736.71	23:00	616.95	16:00	688.62	119.76
PMP-N15	0	0:00	0	0:00	0	0
PMP-N17	1,093.55	23:00	954.81	16:00	1,043.12	138.75
PMP-N20	1,354.61	20:30	1,126.79	16:00	1,234.98	227.82
PMP-N22	1,181.03	5:00	0	10:20	494.11	1,181.03
PMP-N23	1,134.16	23:00	965.87	16:00	1,070.14	168.29
PMP-N24	1,277.34	23:00	1,175.15	16:00	1,240.80	102.18
PMP-N25	1,911.90	23:00	1,674.40	16:00	1,834.36	237.5
PMP-N26	416.08	23:00	354.85	16:00	396.33	61.24
PMP-N27	0	0:00	0	0:00	0	0
PMP-N29	824.99	20:30	663.64	16:00	762.22	161.35
PMP-N30	0	0:00	0	0:00	0	0
PMP-N32A	0	0:00	0	0:00	0	0
PMP-N32B	0	0:00	0	0:00	0	0
PMP-N32_AB	2,794.21	23:00	0	10:00	1,379.22	2,794.21
PMP-N33	0	0:00	0	0:00	0	0
PMP-N34	1,890.69	23:00	0	0:00	312.33	1,890.69
PMP-N35	2,586.13	23:00	2,240.49	16:00	2,474.81	345.64
PMP-N36	0	0:00	0	0:00	0	0
PMP-N38	1,798.06	20:30	1,619.69	16:00	1,730.09	178.37
PMP-N39	1,808.80	20:30	1,651.19	16:00	1,747.64	157.61
PMP-WATT-A	0	0:00	0	0:00	0	0
PMP-WATT-B	0	0:00	0	0:00	0	0
PMP-WATT-C	0	0:00	0	0:00	0	0
PMP-WATT-D	0	0:00	0	0:00	0	0
PMP-WATT-E	0	0:00	0	0:00	0	0

Table 3. Pump Flows - Scenario 2 Buidout MDD, All Groundwater

Pump ID in Model	Maximum Flow (gpm)	Time at Maximum Flow (hrs.)	Minimum Flow (gpm)	Time at Minimum Flow (hrs.)	Average Flow (gpm)	Maximum minus Minimum Flow (gpm)
PMP-31A	1,347	-	-	0.01	136	1,347
PMP-32A	2,291	0.28	1,080	0.65	1,861	1,211
PMP-32A-BOOSTER	2,006	0.23	539	0.63	1,318	1,468
PMP-33A	2,430	0.23	1,688	0.63	2,094	742
PMP-40A	2,319	0.23	1,446	0.63	1,886	873
PMP-4B	-	-	-	-	-	-
PMP-55A	1,917	0.23	-	-	464	1,917
PMP-56A	2,705	0.83	625	0.01	1,922	2,079
PMP-59A	2,428	0.83	2,201	0.98	2,226	227
PMP-68	1,740	0.23	860	0.63	1,319	880
PMP-71	2,190	0.23	1,289	0.63	1,751	902
PMP-72	1,152	0.23	650	0.63	887	503
PMP-73	-	-	-	-	-	-
PMP-74	2,642	0.23	1,299	0.63	2,006	1,344
PMP-ANTE-A	-	-	-	-	-	-
PMP-ANTE-B	-	-	-	-	-	-
PMP-ANTE-C	-	-	-	-	-	-
PMP-ANTE-D	-	-	-	-	-	-
PMP-ANTE-E	-	-	-	-	-	-
PMP-ENTR-A	-	-	-	-	-	-
PMP-ENTR-B	-	-	-	-	-	-
PMP-ENTR-C	-	-	-	-	-	-
PMP-ENTR-D	-	-	-	-	-	-
PMP-ENTR-E	-	-	-	-	-	-
PMP-ENTR-F	-	-	-	-	-	-
PMP-ENTR-G	713	0.25	-	-	37	713
PMP-ENTR-H	713	0.25	-	-	37	713
PMP-ENTR-I	2,068	0.25	-	-	140	2,068
PMP-ENTR-J	-	-	-	-	-	-
PMP-F1	1,489	0.88	904	0.63	1,252	584
PMP-F10	1,338	0.88	503	0.63	1,018	835
PMP-F11	940	0.88	-	0.38	391	940
PMP-F12	941	0.88	-	0.38	391	941
PMP-F13	692	0.88	-	0.40	289	692
PMP-F2	1,523	0.88	974	0.63	1,300	549
PMP-F3	1,207	0.88	-	0.55	746	1,207
PMP-F4	1,208	0.88	-	0.55	747	1,208
PMP-F6	1,118	0.88	-	0.42	573	1,118
PMP-F7	1,163	0.88	-	0.49	670	1,163
PMP-F8	1,164	0.88	-	0.49	670	1,164
PMP-F9	863	0.88	-	0.02	252	863
PMP-MP-BP-1A	-	-	-	-	-	-
PMP-MP-BP-1B	-	-	-	-	-	-
PMP-MP-BP-2A	-	-	-	-	-	-
PMP-N23	1,142	0.88	830	0.63	1,004	312
PMP-N26	421	0.88	296	0.63	369	125
PMP-N32A	1,737	0.88	-	-	246	1,737
PMP-N32B	1,905	0.88	-	-	501	1,905

PMP-N32_AB	-	-	-	-	-	-
PMP-N33	1,451	0.88	1,221	0.63	1,339	230
PMP-N34	2,440	0.88	-	-	178	2,440
PMP-N35	2,608	0.88	1,910	0.63	2,316	698
PMP-N36	1,825	0.88	1,521	0.63	1,697	304
PMP-N36ADD	1,822	0.88	1,517	0.63	1,694	305
PMP-N38	1,822	0.88	1,503	0.63	1,675	319
PMP-N39	1,835	0.88	1,553	0.63	1,704	282
PMP-NSA5	1,707	0.88	1,239	0.63	1,497	468
PMP-SSAF1	1,463	0.23	861	0.63	1,167	601
PMP-SSAF2	1,462	0.23	861	0.63	1,167	601
PMP-SSAF3	1,370	0.23	637	0.63	1,024	733
PMP-SSAF4	1,647	0.23	1,170	0.63	1,408	477
PMP-SSAF5	1,489	0.23	884	0.63	1,194	605
PMP-SSAF6	1,122	0.23	-	0.50	559	1,122
PMP-SSAF7	1,123	0.23	-	0.50	560	1,123
PMP-WATT-A	645	0.88	-	-	19	645
PMP-WATT-B	2,219	0.83	-	-	330	2,219
PMP-WATT-C	2,247	-	-	0.33	727	2,247
PMP-WATT-D	-	-	-	-	-	-
PMP-WATT-E	-	-	-	-	-	-

Table 4. Pump Flows - Scenario 3 Buildout MDD, Maximize Surface Water

Pump ID in Model	Maximum Flow (gpm)	Time at Maximum Flow (hrs.)	Minimum Flow (gpm)	Time at Minimum Flow (hrs.)	Average Flow (gpm)	Maximum minus Minimum Flow (gpm)
NEWWELLSSA2	-	0:00	-	0:00	-	-
NEW_WELL_SSA1	2,054	5:50	-	11:50	1,438	2,054
PMP-31A	1,344	0:00	-	0:10	72	1,344
PMP-32A	2,061	3:40	-	0:00	2,012	2,061
PMP-32A-BOOSTER	2,388	5:00	1,967	11:40	2,078	421
PMP-33A	2,564	5:50	2,435	15:00	2,499	129
PMP-40A	2,534	5:50	2,353	15:00	2,455	181
PMP-4B	-	0:00	-	0:00	-	-
PMP-55A	2,112	5:50	1,936	15:00	2,025	176
PMP-56A	2,547	21:10	-	0:00	124	2,547
PMP-59A	2,223	20:50	1,182	15:00	1,860	1,041
PMP-68	-	0:00	-	0:00	-	-
PMP-71	2,421	5:50	2,221	15:00	2,322	200
PMP-72	-	0:00	-	0:00	-	-
PMP-73	-	0:00	-	0:00	-	-
PMP-74	2,993	5:50	2,707	15:00	2,851	286
PMP-ANTE-A	3,002	20:50	-	0:00	207	3,002
PMP-ANTE-B	3,003	20:50	-	0:00	208	3,003
PMP-ANTE-C	-	0:00	-	0:00	-	-
PMP-ANTE-D	-	0:00	-	0:00	-	-
PMP-ANTE-E	-	0:00	-	0:00	-	-
PMP-ENTR-A	-	0:00	-	0:00	-	-
PMP-ENTR-B	-	0:00	-	0:00	-	-
PMP-ENTR-C	-	0:00	-	0:00	-	-
PMP-ENTR-D	-	0:00	-	0:00	-	-
PMP-ENTR-E	-	0:00	-	0:00	-	-
PMP-ENTR-F	-	0:00	-	0:00	-	-
PMP-ENTR-G	1,408	0:00	-	12:10	671	1,408
PMP-ENTR-H	1,408	0:00	-	12:10	671	1,408
PMP-ENTR-I	3,220	0:00	-	12:20	1,565	3,220
PMP-ENTR-J	-	0:00	-	0:00	-	-
PMP-F1	1,530	5:50	-	9:20	549	1,530
PMP-F10	1,459	20:50	-	0:40	636	1,459
PMP-F11	-	0:00	-	0:00	-	-
PMP-F12	-	0:00	-	0:00	-	-
PMP-F13	784	20:50	-	11:30	404	784
PMP-F2	1,599	20:50	928	15:00	1,370	671
PMP-F3	1,452	20:50	-	13:20	956	1,452
PMP-F4	-	0:00	-	0:00	-	-
PMP-F6	-	0:00	-	0:00	-	-
PMP-F7	-	0:00	-	0:00	-	-
PMP-F8	1,388	20:50	-	12:10	875	1,388
PMP-F9	-	0:00	-	0:00	-	-
PMP-MP-BP-1A	-	0:00	-	0:00	-	-
PMP-MP-BP-1B	-	0:00	-	0:00	-	-
PMP-MP-BP-2A	-	0:00	-	0:00	-	-
PMP-N23	1,232	20:50	814	15:00	1,066	418
PMP-N26	439	20:50	286	15:00	385	153
PMP-N32A	1,812	8:00	-	0:10	771	1,812
PMP-N32B	2,025	20:50	-	9:20	1,123	2,025
PMP-N32_AB	-	0:00	-	0:00	-	-
PMP-N33	1,507	20:50	1,210	15:00	1,377	298
PMP-N34	2,795	19:30	-	0:10	766	2,795
PMP-N35	2,695	20:50	1,849	15:00	2,402	846
PMP-N36	1,870	20:50	1,490	15:00	1,735	380
PMP-N36ADD	1,866	20:50	1,485	15:00	1,732	381
PMP-N38	1,911	20:50	1,474	15:00	1,734	438

PMP-N39	1,923	20:50	1,538	15:00	1,761	385
PMP-NSA5	-	0:00	-	0:00	-	-
PMP-SSAF1	1,610	5:50	1,488	15:00	1,553	122
PMP-SSAF2	1,609	5:50	1,487	15:00	1,552	122
PMP-SSAF3	1,537	5:50	1,415	15:00	1,481	122
PMP-SSAF4	1,775	5:50	1,662	15:00	1,718	113
PMP-SSAF5	1,645	5:50	1,511	15:00	1,579	133
PMP-SSAF6	-	0:00	-	0:00	-	-
PMP-SSAF7	-	0:00	-	0:00	-	-
PMP-WATT-A	-	0:00	-	0:00	-	-
PMP-WATT-B	-	0:00	-	0:00	-	-
PMP-WATT-C	2,151	6:00	-	8:00	646	2,151
PMP-WATT-D	-	0:00	-	0:00	-	-
PMP-WATT-E	-	0:00	-	0:00	-	-

Note: Other model supply is 10,000 gpm from City of Sacramento into SSA and 6,500 gpm from PCWA into the NSA.

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Appendix F: Long Term Well Plan Evaluation Data

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Table 1. NSA Wells Consequence of Failure Analysis

NSA Wells	2015 well capacity	Capacity % of subarea production	Needed for peak hour production? (Yes - add 50% to COS rating)	Needed for FF? (add 50% to COS rating)	Consequence of failure factor (=capacity % of subarea production)
Capehart 1C	550	0.43			0.43
Capehart 3C	725	0.57			0.57
McClellan Park #10	723	0.18			0.18
Antelope #N35	2570	0.17			0.17
Don Julio #N24	1130	0.08			0.08
Hillsdale #N5	775	0.05			0.05
Monument #N26	780	0.05			0.05
Poker #N32-A	2000	0.13			0.13
Poker #N32-B	2200	0.15			0.15
Poker #N32-C	670	0.04			0.04
Sutter #N25	1590	0.11			0.11
Walerga #N33	1260	0.08			0.08
Cabana #N15	1070	0.26			0.26
Oakdale #N17	1020	0.25			0.25
Orange Grove #N14	1300	0.32			0.32
Barrett Meadows #N31	820	0.05			0.05
Verner #N36 and #N36a (same site)	1500	0.08			0.08
Rutland #N39	1500	0.08			0.08
Cameron #N9	1100	0.06			0.06
Cypress #N20	1100	0.06			0.06
Engle #N3	900	0.05			0.05
Evergreen #N1	800	0.04			0.04
Field #N8	950	0.05			0.05
Freeway #N23	1050	0.06			0.06
Merrihill #N29	860	0.05			0.05
Palm #N6	800	0.04			0.04
Parkoaks #N30	1000	0.06			0.06

River College #N22	860	0.05			0.05
Rosebud #N7	1130	0.06			0.06
St. John #N12	1100	0.06			0.06
Coyle #N38	1350	0.07			0.07
Walnut #N10	1300	0.07			0.07
Bainbridge/Holmes #59A	3000	0.27			0.27
Cottage #N34	2000	0.13			0.13
Fairbairn/Karl #56A	2230	0.20			0.20
Galbrath/Antelope Woods #64	1200	0.11			0.11
La Cienga/Melrose #34	475	0.04			0.04
Melrose/Channing #27	875	0.08			0.08
Thirty Second/Elkhorn #58	920	0.08			0.08
Thomas/Elkhorn #39	530	0.05			0.05
Watt/Elkhorn #31A	900	0.08			0.08
Weddigen/Gothberg #52	900	0.08			0.08

Table 2. SSA Wells Consequence of Failure Analysis

SSA Wells	2015 well capacity	Capacity % of subarea production	Needed for peak hour production? (Yes - add 50% to COS rating)	Needed for FF? (add 50% to COS rating)	Consequence of failure factor (=capacity % of subarea production)
Albatross/Iris #41	530	0.022			0.02
Auburn/Norris #33A	2400	0.101			0.10
Auburn/Yard #40	700	0.029			0.03
Auburn/Yard #40A	2297	0.097			0.10
Becerra/Woodcrest #24	600	0.025			0.03
Bell/El Camino #5	325	0.014			0.01
Bell/Marconi #4B	3000	0.126			0.13
Calderwood/Marconi #13	625	0.026			0.03
Eastern/Woodside Church #66	1300	0.055			0.05
Eden/Root #32A	1645	0.069			0.07
Edison/Traux #43	850	0.036			0.04
El Prado/Park Estates #2A	1000	0.042			0.04
Greenwood/Marconi #26	700	0.029			0.03
Hernando/Santa Anita #12	600	0.025			0.03
Jamestown/Middleberry #45	750	0.032		Yes	0.53
Marconi North/Fulton #23	600	0.025			0.03
Marconi South/Fulton #14	600	0.025			0.03
Merrily/Annadale #65	1100	0.046			0.05
Morse/Cottage Park #37	760	0.032			0.03
Ravenwood/Eastern #9	495	0.021			0.02
Red Robin/Darwin #28	650	0.027			0.03
Rockbridge/Keith #30	560	0.024			0.02
Watt/Auburn #38	450	0.019			0.02
West/Becerra #22	725	0.031			0.03
Whitney/Concetta #60	500	0.021			0.02
Enterprise/Northrop#75	975	0.235			0.23
Riding Club/Ladino #18	671	0.161			0.16

Thor/Mercury #25	730	0.176			0.18
Ulysses/Mercury #35	681	0.164			0.16
Watt/Arden #20A	1100	0.265			0.26
Copenhagen/Arden #47	950	0.072			0.07
River Walk/NETP #72	1380	0.105			0.11
River Walk/NETP East #73	3400	0.259			0.26
River Walk/NETP South #74	2600	0.198			0.20
River Drive/Jacob #71	2700	0.206			0.21
Stewart/Lyndale #55A	2100	0.160			0.16
Fulton/Fair Oaks #76	410	0.095			0.10
Hillsdale/Cooper #69R	465	0.108			0.11
Jonas/Sierra Mills #46	750	0.174			0.17
Kubel/Armstrong 3A	340	0.079			0.08
Larch/Northrop #77	300	0.070			0.07
Northrop/Dornajo #68R	1450	0.336			0.34
Sierra/Blackmer #70	600	0.139			0.14

Table 3. NSA Wells Likelihood of Failure Analysis

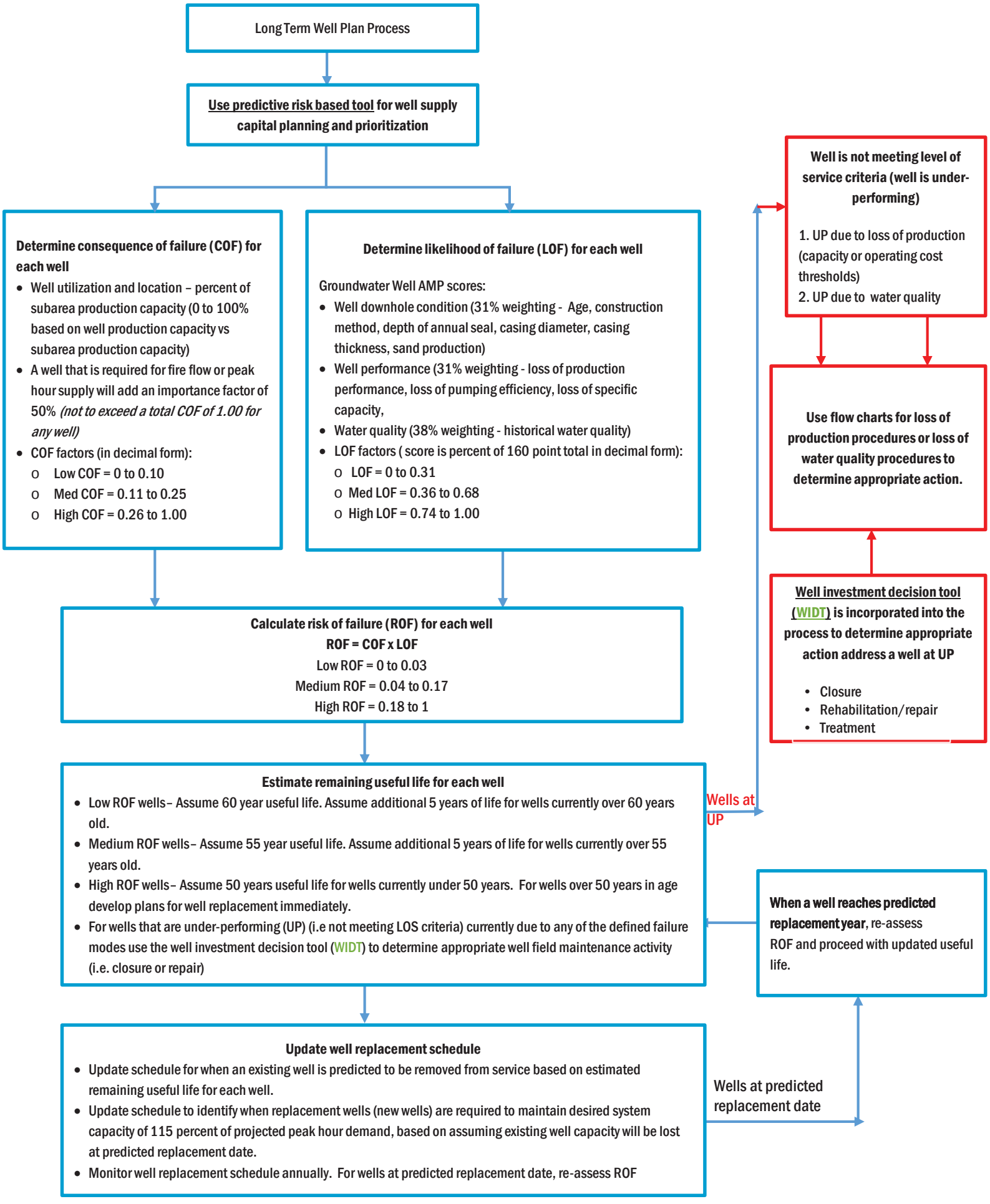
NSA Wells	AMP total points (lower the better - low score=low likelihood of failure) 0 to 160 points possible	Likelihood of failure factor (% of GWAMP score (total=160)
Capehart 1C	44	0.28
Capehart 3C	51	0.32
McClellan Park #10	32	0.20
Antelope #N35	38	0.24
Don Julio #N24	16	0.10
Hillsdale #N5	35	0.22
Monument #N26	8	0.05
Poker #N32-A	42	0.26
Poker #N32-B	46	0.29
Poker #N32-C	80	0.50
Sutter #N25	38	0.24
Walerga #N33	36	0.23
Cabana #N15	74	0.46
Oakdale #N17	34	0.21
Orange Grove #N14	25	0.16
Barrett Meadows #N31	28	0.18
Verner #N36 and #N36a (same site)	43	0.27
Rutland #N39	x	#VALUE!
Cameron #N9	23	0.14
Cypress #N20	37	0.23
Engle #N3	18	0.11
Evergreen #N1	16	0.10
Field #N8	69	0.43
Freeway #N23	36	0.23
Merrihill #N29	69	0.43
Palm #N6	19	0.12
Parkoaks #N30	68	0.43
River College #N22	12	0.08
Rosebud #N7	57	0.36
St. John #N12	44	0.28
Coyle #N38	6	0.04
Walnut #N10	24	0.15
Bainbridge/Holmes #59A	22	0.14
Cottage #N34	6	0.04
Fairbairn/Karl #56A	8	0.05
Galbrath/Antelope Woods #64	21	0.13
La Cienga/Melrose #34	78	0.49
Melrose/Channing #27	48	0.30
Thirty Second/Elkhorn #58	34	0.21
Thomas/Elkhorn #39	44	0.28
Watt/Elkhorn #31A	20	0.13
Weddigen/Gothberg #52	16	0.10

Source SSWD 2015 Groundwater Well Facility AMP, 2015

Table 4. SSA Wells Likelihood of Failure Analysis

SSA Wells	AMP total points (lower the better - low score=low likelihood of failure) 0 to 160 points possible	Likelihood of failure factor (% of GWAMP score (total=160)
Albatross/Iris #41	20	0.13
Auburn/Norris #33A	4	0.03
Auburn/Yard #40	16	0.10
Auburn/Yard #40A	34	0.21
Becerra/Woodcrest #24	81	0.51
Bell/El Camino #5	58	0.36
Bell/Marconi #4B	14	0.09
Calderwood/Marconi #13	34	0.21
Eastern/Woodside Church #66	23	0.14
Eden/Root #32A	39	0.24
Edison/Traux #43	23	0.14
El Prado/Park Estates #2A	21	0.13
Greenwood/Marconi #26	102	0.64
Hernando/Santa Anita #12	51	0.32
Jamestown/Middleberry #45	26	0.16
Marconi North/Fulton #23	40	0.25
Marconi South/Fulton #14	95	0.59
Merrily/Annadale #65	50	0.31
Morse/Cottage Park #37	19	0.12
Ravenwood/Eastern #9	60	0.38
Red Robin/Darwin #28	56	0.35
Rockbridge/Keith #30	38	0.24
Watt/Auburn #38	48	0.30
West/Becerra #22	61	0.38
Whitney/Concetta #60	16	0.10
Enterprise/Northrop#75	42	0.26
Riding Club/Ladino #18	47	0.29
Thor/Mercury #25	69	0.43
Ulysses/Mercury #35	35	0.22
Watt/Arden #20A	23	0.14
Copenhagen/Arden #47	14	0.09
River Walk/NETP #72	26	0.16
River Walk/NETP East #73	8	0.05
River Walk/NETP South #74	16	0.10
River Drive/Jacob #71	12	0.08
Stewart/Lyndale #55A	24	0.15
Fulton/Fair Oaks #76	49	0.31
Hillsdale/Cooper #69R	24	0.15
Jonas/Sierra Mills #46	53	0.33
Kubel/Armstrong 3A	38	0.24
Larch/Northrop #77	43	0.27
Northrop/Dornajo #68R	48	0.30
Sierra/Blackmer #70	28	0.18

Source SSWD 2015 Groundwater Well Facility AMP, 2015


Long Term Well Plan Process
Use predictive risk based tool for well supply capital planning and prioritization
Determine consequence of failure (COF) for each well
Well utilization and location – percent of subarea production capacity (0 to 100% based on well production capacity vs subarea production capacity)
A well that is required for fire flow or peak hour supply will add an importance factor of 50% (not to exceed a total COF of 1.00 for any well)
COF factors (in decimal form):
Low COF = 0 to 0.10
Med COF = 0.11 to 0.25
High COF = 0.26 to 1.00
Determine likelihood of failure (LOF) for each well
Groundwater Well AMP scores:
Well downhole condition (31% weighting - Age, construction method, depth of annual seal, casing diameter, casing thickness, sand production)
Well performance (31% weighting - loss of production performance, loss of pumping efficiency, loss of specific capacity,
Water quality (38% weighting - historical water quality)
LOF factors (score is percent of 160 point total in decimal form):
LOF = 0 to 0.31
Med LOF = 0.36 to 0.68
High LOF = 0.74 to 1.00
Calculate risk of failure (ROF) for each well
ROF = COF x LOF
Low ROF = 0 to 0.03
Medium ROF = 0.04 to 0.17
High ROF = 0.18 to 1
Estimate remaining useful life for each well
Low ROF wells– Assume 60 year useful life. Assume additional 5 years of life for wells currently over 60 years old.
Medium ROF wells– Assume 55 year useful life. Assume additional 5 years of life for wells currently over 55 years old.
High ROF wells– Assume 50 years useful life for wells currently under 50 years. For wells over 50 years in age develop plans for well replacement immediately.
For wells that are under-performing (UP) (i.e not meeting LOS criteria) currently due to any of the defined failure modes use the well investment decision tool (WIDT) to determine appropriate well field maintenance activity (i.e. closure or repair)
Update well replacement schedule
Update schedule for when an existing well is predicted to be removed from service based on estimated remaining useful life for each well.
Update schedule to identify when replacement wells (new wells) are required to maintain desired system capacity of 115 percent of projected peak hour demand, based on assuming existing well capacity will be lost at predicted replacement date.
Monitor well replacement schedule annually. For wells at predicted replacement date, re-assess ROF
Wells at UP
Well is not meeting level of service criteria (well is under-performing)
1. UP due to loss of production (capacity or operating cost thresholds)
2. UP due to water quality
Use flow charts for loss of production procedures or loss of water quality procedures to determine appropriate action.
Well investment decision tool (WIDT) is incorporated into the process to determine appropriate action address a well at UP
Closure
Rehabilitation/repair
Treatment
When a well reaches predicted replacement year, re-assess ROF and proceed with updated useful life.
Wells at predicted replacement date

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