Appendix A - Non-Potable Demand Assessment Methodology

Appendix A: Non-Potable Demand Assessment

Landscape Irrigation

Landscape irrigation demands were the primary recycled water use identified within the study area. In developing these demands, each customer's landscaped area was estimated using recent aerial imagery from Google Earth, as well as GIS-compatible aerial imagery. From the aerial review, the percentage of each customer's site that is landscaped was estimated and applied this percentage to the total parcel area. In addition, recent aerial imagery was used to check that each site's perceived irrigated space did not include artificial turf. Parcel areas that had artificial turf fields were removed from the total irrigated acreage.

In order to calculate demand, an annual average irrigation factor of 3.4 acre-feet per year (AFY) per acre of landscaped area was applied based on: annual evapotranspiration (ET_o) of 44.8 inches; total annual precipitation of 15.3 inches; and effective precipitation (Eppt) of 25% of total annual precipitation:

Annual Average Irrigation Demand
$$\left[\frac{AFY}{acre}\right] = \frac{ET_o\left[\frac{in}{yr}\right] - Eppt\left[\frac{in}{yr}\right]}{12\left[\frac{in}{ft}\right]}$$

$$=\frac{44.8\frac{in}{yr} - 0.25 \times 15.3\frac{in}{yr}}{12\frac{in}{ft}}$$
$$= 3.4\frac{AFY}{acre}$$

The ET_o and precipitation values are taken from the climate data presented in Palo Alto's 2015 Urban Water Management Plan (UWMP) and summarized below in Table 1.

Table 1: City of Palo Alto Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Standard Monthly Average ET _o 1	1.4	1.9	3.4	4.4	5.5	6.0	6.2	5.5	4.4	3.1	1.7	1.3	44.8
Average Rainfall ² (in)	3.2	2.9	2.3	1.0	0.4	0.1	0.0	0.1	0.2	0.7	1.7	2.7	15.3

Source: City of Palo Alto 2015 Urban Water Management Plan

Notes:

 $1. \ Average \ ET_o \ data \ for \ closest \ active \ station \ (Hayward) \ reported \ by \ CIMIS \ website \ http://www.cimis.water.ca.gov/$

2. Average rainfall data for Palo Alto reported by NOAA website http://www.wrcc.dri.edu/

July is the maximum demand month for landscape irrigation, with a maximum day peaking factor of 1.7. This maximum day peaking factor was applied for all landscape irrigation demands throughout the study area. The peak hour landscape irrigation demands were calculated using an hourly peaking factor of 3.0 assuming an 8-hour irrigation window at night. These peaking factors are summarized in Table 5.

Dual Plumbing

The first step to determining dual-plumbing demands was to estimate the total building square footage. For future developments where site-specific details were not yet known, information was gathered on anticipated building density from developers and architects. If this information was not available, the likely building density was estimated using allowable floor area ratios (FARs) in the development's respective zoning code. The estimated total building square footage was found with the following calculation:

Total Building Area [Sq Ft] = Total Parcel Area [Sq Ft] * FAR * FAR Reduction Factor

It was assumed that not all buildings would be calculated to the maximum FAR over the entire parcel area, so a FAR reduction factor of 0.75 was applied to find the most likely building density. Any comments from developers on likely development density were incorporated into the estimate.

After determining total building square footage, the total potential daily water demand for urinal and toilet fixtures was determined using the following calculation:

$$\begin{aligned} & Total \ Daily \ Water \ Demand \ \left[\frac{Gallons}{Day}\right] \\ & = Flow \ Rate \ \left[\frac{Gallons}{Flush}\right] * Duration \ [Flush] * Average \ Daily \ Use * \ No. \ of \ FTEs \\ & + \ Flow \ Rate \ \left[\frac{Gallons}{Flush}\right] * Duration \ [Flush] * Average \ Transient \ Daily \ Use * \ No. \ of \ Transient \ FTEs \end{aligned}$$

Full Time Equivalents (FTEs) are defined as the occupants who spend at least 40 hours per week (8 hours per day) in the building. Transient FTEs represent occupants that do not utilize the building services on a regular basis, such as visitors, customers, or delivery persons. The number of FTEs and Transient FTEs were estimated from the total building footprint square footage and the space type metrics outlined in Table 2. Space types for existing buildings were determined based on known information about the site. Future developments were categorized as "General Office," "Service," "R&D or Laboratory," "Hotel," or "Mixed Use High" based on developer input and zoning descriptions.

Space Type	Gross Square Feet per Occupant – FTE	Gross Square Feet Per Occupant – Transient FTE
General Office	250	0
Retail, general	550	130
Service (e.g. financial, auto)	600	130
Restaurant	435	95
Grocery Store	550	115
Medical Office	225	330
R&D or Laboratory	400	0
Warehouse, distribution	2500	0
Warehouse, storage	20000	0
Hotel	1500	700
Education, daycare	630	105
Educational, K–12	1300	140
Education, postsecondary	2100	150
Mixed Use Corridor ¹	480	90
Mixed Use High ²	460	80

Table 2: Space Type Default Occupancy Numbers

Source: LEED Reference for Building Operations and Maintenance, Version 4Error! Reference source not found.. Appendix 2-Table 1. Default Occupancy Numbers.

Notes:

1. Developed based on zoning description, which averages General Office, Retail, Service, Restaurant, and Grocery Store occupancy numbers.

2. Developed based on zoning description, which averages General Office, Retail, Service, Restaurant, Grocery Store, and R&D/Laboratory occupancy numbers.

Water fixture metrics that were used for flow rate, duration and average daily use are summarized in Table 3.

Table 3: Water Fixture Metrics

Fixture Type	Flow Rate ¹ (gallons/flush)	Duration (flush)	Avg Daily Use – FTE ¹	Avg Daily Use – Transient FTE ²
Urinals	0.5	1	2	0.4
Toilet (Water Closet)	1.28	1	2	0.5

Notes:

1. Source: 2011 CalGreen Green Building Requirements. (Table 13C.5.303.2.2).

2. Source: LEED 2009 Water Use Reduction Additional Guidance (Version 7). Table 1. Non-residential Default Fixture Uses.

IKEA and the Mitchell Park Library and Community Center are the two customers in the service area known to have dual plumbing. Since IKEA's site-specific meter data was not available, its demands were estimated using the methodology outlined above. For the Mitchell Park facilities, the demand was taken

from the Phase 3 Business Plan in which it was assumed that 30% of the water measured by the site's W4 meter is used for toilet flushing that could be converted to recycled water.

In order to adjust each site's total daily water demand to an annual average demand, the daily demand was multiplied by the customer's assumed number of days of operation. The values used for days of operation for different customer types are summarized in Table 4.

Space Type	Days of Operation
Retail, general	365
Hotel	365
Mixed Use High	365
General Office	260
Service (e.g. financial, auto)	260
R&D or Laboratory	260

Table 4: Days of Operation

The peak hour dual-plumbing demands were calculated using an hourly peaking factor of 2.0, assuming the average occupancy of the buildings is 12 hours during the day. Peaking factors are summarized in Table 5.

Cooling Towers

Demands for cooling towers included customers previously identified as having cooling towers and customers assumed to have cooling towers through review of building characteristics. In addition, certain future developments were identified as potential cooling tower users through specific conversations with developers and architects.

The magnitude of cooling tower demand was determined using the following equation:

$$Cooling Tower Demand (AFY) = \frac{Total Building Area [Sq Ft]}{330 \left[\frac{Sq Ft}{Ton of Load}\right] * 4.1} * 0.02 \left[\frac{AFY}{Ton of Load}\right]$$

This demand calculation was based on historical cooling tower use data from southern California, adjusted for the climate in Palo Alto. The historical data from several office buildings in Burbank, California showed about 330 square feet per ton of cooling tower load and about .02 AF of water use per ton of cooling tower load. This resulted in an average cooling tower water demand of 0.073 AF per 1,000 square feet of building area. This demand metric was then adjusted to Palo Alto's climate using Cooling Degree Days – the number of degrees that a day's average temperature is above 65°F (which is assumed to be when air conditioning is needed), summed over an entire year. Since Burbank has approximately 4.1 times as many CDDs as Palo Alto, the Burbank cooling tower use factor was divided by 4.1 to yield a cooling tower use factor of 0.018 AF per 1,000 square feet for the Palo Alto area. This factor was applied to all developments assumed to have cooling towers in the service area.

Based on the total number of cooling degree days per month in Palo Alto, August is the maximum demand month for cooling tower demands, with a maximum day peaking factor of 2.7. The peak hour cooling tower

demands were calculated using an hourly peaking factor of 2.0, assuming the average occupancy of the buildings is 12 hours during the day.

These peaking factors are summarized in Table 5.

Table 5: Demand Peaking Factors

Demand Type Pea	Peaking Factor				
Maximum Day					
Irrigation	1.7				
Cooling Tower	2.7				
Hourly					
Irrigation	3.0				
Dual Plumbing	2.0				
Cooling Tower	2.0				

Appendix B - Recycled Water Customers and Demand Estimates [Confidential – Not Included] Appendix C - Potential Uses Considered but Not Included

Appendix C: Users Considered but Eliminated

Appendix A identifies potential non-potable recycled water customers throughout the Strategic Plan study area whereas this appendix identifies customers that were considered but not included in the study.

The 1992 Palo Alto Recycled Water Master Plan (RWMP) was used as the starting point for identifying potential recycled water demands. Additional uses were then identified through review of available recycled water feasibility studies, Urban Water Management Plans, General and Specific Plans and aerials of the study area. The City and District then reached out to the Regional Water Quality Control Plan (RWQCP) Partner Agencies and other stakeholders to verify if the customers identified in their areas could realistically be expected to accept recycled water and whether additional customers should be considered.

Customers from the 1992 RWMP that are not included in this Strategic Plan include:

- East Palo Alto Greenhouses In the 1990s there were a number of functioning greenhouses in East Palo Alto, but now there are not many greenhouses known to be operating in the area. Those that are still operating are not anticipated to have significant demand.
- Medians and Streetscapes The State Water Resources Control Board has proposed regulations
 prohibiting the irrigation of ornamental turf in publicly owned medians and streetscapes (i.e. the
 landscaped area between the street and sidewalk). The prohibition includes recycled water
 irrigation systems unless the system was installed prior to 2018. While irrigation of trees within
 medians and streetscapes are exempt from the proposed regulation, the default assumption for the
 Strategic Plan was not to include medians and streetscapes unless stakeholders provided
 information confirming the type of vegetation and associated water use for specific areas.

Stakeholders suggested that medians along Foothill Expressway be considered. However, through field investigations, Palo Alto determined that the portion of Foothill Expressway in its service area is not irrigated and verification of irrigation of the portion within Los Altos could not be obtained. As such, Foothill Expressway was dropped from further consideration.

• Gate of Heaven Cemetery – This customer, though previously identified as a potential customer in Los Altos's service area, was found to be within Cupertino's service area.

Additional customers considered but not included:

- Cooley Landing Park Recycled water is currently being trucked to this East Palo Alto park to support the establishment period for new native landscaping. Following the establishment period there will be no irrigation demand.
- East Bayshore Redevelopment East Palo Alto staff noted that the area along East Bayshore has potential for significant multi-family residential redevelopment. However, there were no specific redevelopment plans, and the City indicated it would probably not pursue dual-plumbing for residential use.
- East Palo Alto Neighborhood Gardens and Sports Fields Through review of aerials of East Palo Alto, a number of sizeable gardens and what looked like communal sports fields in between

residences were identified. East Palo Alto city staff indicated that these are temporary uses that sprung up on vacant lots. When the building moratorium in East Palo Alto is lifted, the City expects that these sites will be developed.

- Edith Park This park in Los Altos Hills was recently redone to minimize irrigation needs.
- Gateway District Retail Center Redevelopment This potential redevelopment area was in review in East Palo Alto's General Plan, but East Palo Alto city staff noted there are no specific plans for redevelopment of this area.
- Los Altos Redevelopment along El Camino The majority of redevelopment will occur in the next few years. Because the City currently does not require installation of recycled water infrastructure for new developments, incorporating recycled water use within these buildings seems unlikely.
- Ravenswood Family Health Center This facility in East Palo Alto is dual-plumbed. However, review of the facility's plans showed that the dual-plumbing was for on-site rain capture and not designed to have recycled water incorporated.
- San Antonio Redevelopment This redevelopment area in Mountain View received conditions of approval prior to Mountain View's dual-plumbing ordinance and, as a result, is not dual-plumbed for recycled water.
- Single Family Residences Los Altos Hills and Purissima Hills Water District (PHWD) indicated interest in working with large residential irrigators in Los Altos Hills to convert to recycled water use. Review of potential residences focused on parcels along Purissima Road and Fremont Road where PHWD identified the potential to repurpose abandoned or soon to be abandoned potable water pipelines for recycled water distribution. In these areas the residences averaged less than 1 acre-foot per year (AFY) of total water consumption. These volumes are not considered significant enough for residences to willingly undertake conversion of their irrigation systems plus the regulatory complexity involved with using recycled water at single family residences.
- Sobrato Phase I Construction for this site in East Palo Alto, which is also known as Amazon I, was already underway at the time of the demand assessment and was determined not to include purple pipe for recycled water.
- Stanford Shopping Center The General Manager of Stanford Shopping Center contacted the City at the start of the Strategic Planning process inquiring about the possibility of extending recycled water infrastructure to the shopping center. Through subsequent discussions, the shopping center indicated potential for both irrigation use as well as dual-plumbing use in future buildings. However, estimated demands were not provided.

Appendix D - Opinions of Probable Costs

A1				Pa	alo Alto Recyc	led Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital costs		10%	\$2 265 033
Traffic Control			Applied to all capital costs		4%	\$906,373
Treatment						÷===,070
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	\$	323,000	\$0
MF/UF system	0.0		MGD	\$	1,317,000	\$0
RO System	0.0		MGD	Ş	1,586,000	ŞC
RO Concentrate Treatment	0.0		MGD	Ş	1,510,000	Şü
Advanced Oxidation and Disinfection	0.0		MGD	Ş	470,000	\$U ¢0
Chemicale (Starage and Lice)	0.0		MGD	ې د	124.000	\$U ¢0
Sitework / Diping / Structures	0.0		MGD	ç	3 4 27 000	\$U \$0
	0.0		Mab	Ş	3,427,000	ŞU
High-Density Urban Pineline HDPF						
6 Inch		0	LF	Ś	186	ŚO
8 Inch		18,494	LF	\$	200	\$3,699,008
10 Inch		9,029	LF	\$	212	\$1,914,318
12 Inch		6,873	LF	\$	254	\$1,747,873
16 Inch		22,301	LF	\$	277	\$6,178,938
18 Inch		0	LF	\$	290	\$0
20 Inch		0	LF	\$	334	\$0
24 Inch		0	LF	\$	381	\$0
30 Inch		0	LF	\$	462	\$0
Repurposing Pipe						
6 Inch		0	LF	\$	55	\$0
8 Inch	201 . 1 2	0	LF	\$	66	\$0
Sheeting and Shoring (Open Cut)	3% of Open C	ut Pipeline Co	st		3%	\$406,204
Microtunneling						
i unnel and Casing (36")		800	LF	\$	1,728	\$1,382,400
Jacking Shaft		3	EA	Ş	300,000	\$900,000
Receiving Shart Horizontal Directional Drilling		3	EA	Ş	150,000	\$450,000
24 Inch Bore Diameter		350	15	ć	5.20	¢104 000
		350	LP	Ş	528	\$164,600
6 Inch		0	15	¢	375	ŚO
8 Inch		0	IF	ś	500	50 \$0
10 Inch		ő	IF	ŝ	625	\$0 \$0
12 Inch		0	LF	ŝ	750	\$0
16 Inch		0	LF	ŝ	1.000	\$0
20 Inch		0	LF	\$	1,250	\$0
Jacking Shafts		0	EA	\$	258,000	\$0
Receiving Shafts		0	EA	\$	148,000	\$0
Pipe Bridge						
Pipe Bridge Support		8	LF	\$	5,000	\$40,000
Pipe Bridge Pipe						
6 Inch		0	LF	\$	66	\$0
8 Inch		0	LF	\$	86	\$0
10 Inch		0	LF	\$	108	\$0
12 Inch		65	LF	\$	139	\$9,049
16 Inch		0	LF	\$	175	\$0
Potholing		579	EA	Ş	500	\$289,560
Cathodic Protection	3% of Pipelin	e Installation (Cost		3%	\$506,178
Customer Services (no meter replacement)		62	EA	Ş	10,000	\$620,000
Customer Services (with meter replacement)		132	EA	Ş	15,000	\$1,980,000
Planter Box (Housing Pipe on Bridge Sidewaik)		6	CY Davi	Ş	2,000	\$12,000
Planter Box (Installation Labor)		8	Day	Ş	4,000	\$32,000
Pump Station #1	0	Total	installed HP including standby	¢		Śŋ
Pump Station #2	0	Total	installed HD including standby	ې د	-	\$U 60
Pump Station #3	0	Total	installed HP, including standby	ç	-	\$U ¢n
Pump Station #4	n	Total	installed HP, including standby	ç	-	50 ¢n
Pump Station #5	0	Total	installed HP, including standby	ç	-	\$0 ¢n
Phase 3 RWQCP Pump Station Improvements	0	1	LS	ś	1,389.000	\$0. \$1.389.000
Phase 3 Booster Pump Station		1	LS	ś	918.000	\$918.000
Hydropneumatic Tank - Pump Station #1	0		Gal	ŝ	-	\$0
Hydropneumatic Tank - Pump Station #2	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #3	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #4	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #5	0		Gal	\$	-	\$0
Storage Tank						
Storage Tank	0.0		MG	\$	1,500,000	\$0
Underground Construction		0.0	LS	\$	1,000,000	
Injection Well						
		0	EA	\$	1,000,000	\$0
Extraction Wellhead Treatment			157		a	
naie Rinconada		0	AFY AEV	ş	2,93/	\$0 ¢0
Peers		0	ΔΕΥ	ç	2,937	\$U ¢n
El Camino		0	AFY	ç	4,538	\$0 ¢n
Eleanor		ō	AFY	ŝ	4,538	\$0 \$0
Library		0	AFY	\$	4,538	\$0
Mountain View Feasibility Study Long-Term Recommend	led Phase					
		0	LS	\$	3,326,000	\$0
Subtotal			1.1			\$25,832,000
Sales Tax	Applied	to half of cap	ntal costs (not including General)		9%	\$1,020,000
Lonstruction Cost Subtotal					100/	\$26,852,000
Market Adjustment Factor					10%	\$2,685,000 \$10,741,000
Construction Contingency Construction Cost Total					40%	\$40,741,000
Engineering and Admin Services (Design)					15%	\$4,028,000
Construction Management					10%	\$2,685,000
Engineering Services During Construction					3%	\$806,000
Property Acquisition (Property Only)		0	SQ FT	\$	500	\$0
Property Acquisition (House on Property)		0	SQ FT	\$	1,000	\$0
Rinconada Land Cost		0	LS	\$	4,500,000	\$0
Peers Land Cost		0	LS	\$	7,000,000	\$0
On-Time Fee		0	LS	\$	75,000	A
Total Capital Cost						\$47,800,000

Line Lighted bit 4*feb:19 Discont fate Project Life Updated by: K. Howes 3% 30 Years CD (5/, June 2018): 12014.72 Teal Cost Total Cost Total Cost ORM Costs (Annual) 0 MGD \$ 560,000 \$ 500 Advanced Water Treatment 0 MGD \$ 560,000 \$ 500 DC Core 0 MGD \$ 540,000 \$ 500 DAG 0 MGD \$ 544,000 \$ 500 DAG 0 MGD \$ 574,000 \$ 500 DAG Concentrate Treatment 0 MGD \$ 226,000 \$ 500 Advanced Datation and binifection 0 MGD \$ 21,000 \$ 800 Chemicals 0 1,040 hntr/MGD \$ 1,000 \$ 800 \$ 800 Convention 0 1,040 hntr/MGD \$ 1,000 \$ 800 \$ 800 Convention 0 1,040 hntr/MGD \$ 1,000 \$ 800 \$ 800 \$ 800 \$ 800 \$ 800 \$ 800 </th <th>A1</th> <th></th> <th></th> <th></th> <th>Pa</th> <th>lo Alto Recycled</th> <th>Water Feasibility Study</th>	A1				Pa	lo Alto Recycled	Water Feasibility Study
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tem Size Qty Unit Unit Cost Total Cost Advanced Water Treatment Advanced Vater Treatment MGD \$ 560,000 \$ 50,000	CCI (SF, June 2018): 12014.72						
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Advanced Vater Treatment.	O&M Costs (Annual)						
MBR MGD \$ 56,000 \$ 50 Orone 0 MGD \$ 33,000 \$ 50 BAC 0 MGD \$ 131,000 \$ 50 BAC 0 MGD \$ 131,000 \$ 50 RO System 0 MGD \$ 232,000 \$ 50 RO System 0 MGD \$ 222,600 \$ 50 Advanced Oxidation and Disinfection 0 MGD \$ 22,000 \$ 50 Advanced Oxidation and Disinfection 0 MGD \$ 23,000 \$ 50 Chemicals 0 1,040 hrs/year \$ 100 \$ 50 Labor for Teatment (no MBR) 0 1,040 hrs/year \$ 100 \$ 50 Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$ 50.78 \$ 544,942 Pump Stations 1% \$ 50 1% \$ 50 Edectrical/Instrumentation 1% \$ 50 1% \$ 50 Deray Charge 444,385 W/n/year \$ 0.15 \$ 566,658	Advanced Water Treatment						
cone 0 MGD \$ 93,000 \$ 90 BAC 0 MGD \$ 13,000 \$ 50 MF/UF system 0 MGD \$ 342,000 \$ 50 RO Concentrate Treatment 0 MGD \$ 226,000 \$ 50 RO Concentrate Treatment 0 MGD \$ 226,000 \$ 50 RO Concentrate Treatment 0 MGD \$ 32,000 \$ 50 Advanced Oxidation and Disinfection 0 MGD \$ 32,000 \$ 50 Labor for Treatment (no MBR) 0 1,040 hrs/MGD \$ 1,000,000 \$ 50 Conveyance 0 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	MBR	0		MGD	\$	560,000	\$0
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MF/UF system 0 MGD \$ 342,000 \$0 RO System 0 MGD \$ 574,000 \$0 RO Concentrate Treatment 0 MGD \$ 225,000 \$0 RO Concentrate Treatment 0 MGD \$ 225,000 \$0 Advanced Oxidation and Disinfection 0 MGD \$ 225,000 \$0 Chemicals 0 MGD \$ 121,000 \$0 Labor for Treatment (no MBR) 0 1,040 hrs/MGD \$ 1,000,000 \$0 Conveyance 0 S/year \$ 1,000,000 \$0 Consumables 0 S/year \$ 1,000,000 \$0 Consumables 0 S/year \$ 0,00,000 \$0 Consumables 1 S \$ 0,0,000 \$0 Consumables 1 S \$ 0,0,000 \$0 Electricity instrumentation 1% \$ 0 \$ 1% \$ 0 Electricity instrumentation 1% \$ 0 \$ 1% \$ 0 Stations 0 No. \$ 20,000 \$ 5,000 \$ 5,000	BAC	0		MGD	\$	131,000	\$0
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NC Concentrate Treatment 0 MGD \$ 225,000 \$0 Advanced Oxidation and Disinfection 0 MGD \$ 225,000 \$0 Free Chlorine 0 MGD \$ 32,000 \$0 Labor for Treatment (no MBR) 0 1,040 hrs/MGD \$ 1100 \$0 Labor for MBR 0 1,040 hrs/MGD \$ 1,000,000 \$0 Monitoring 0 1,040 hrs/MGD \$ 1,000,000 \$0 Monitoring 0 1,040 hrs/MGD \$ 1,000,000 \$0 Monitoring 0 1,040 hrs/MGD \$ 1,000,000 \$0 Consumables 1 1% \$0 1% \$0 Equipment 1% \$0 1% \$0 1% \$0 Electrical/instrumentation 1% \$0 1% \$0 1% \$0 Electrical/instrumentation 1 1% \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0	RO System	0		MGD	\$	574,000	\$0
Advanced Oxidation and Disinfection Advanced Oxidation and Disinfection 0 MGD \$ 73,000 \$ \$ 500 Chemicals 0 MGD \$ 12,000 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	RO Concentrate Treatment	0		MGD	\$	226,000	\$0
Free Chlorine 0 MGD S 32,000 S0 Labor for Treatment (no MBR) 0 1,040 hrs/MGD S 100 S0 Labor for MBR 0 1,040 hrs/MGD S 100 S0 Monitoring 0 S/year S 1,000,000 S0 Consumation 0 S/year S 1,000,000 S0 Electrical/Instrumentation 1% S0 1% S0 Electrical/Instrumentation 1% S0 1% S0 Electrical/Instrumentation 0 No. No. No. Average Annual Operators 0 No. No. S0 Phace 3 Booster Pump Station 1 LS S 95,000 S96,000 Phace 3 Booster Pump Station 1 LS S 95,000 <t< td=""><td>Advanced Oxidation and Disinfection</td><td>0</td><td></td><td>MGD</td><td>\$</td><td>73,000</td><td>\$0</td></t<>	Advanced Oxidation and Disinfection	0		MGD	\$	73,000	\$0
Chemicals U MGD S 121,000 S0 Labor for Yeatment (no MBR) 0 1,040 hrs/NGD S 100 S0 Labor for MBR 0 1,040 hrs/NGD S 100 S0 Monitoring 0 S/year S 1,000,000 S0 Convergence Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$0.78 \$444,942 Pump Stations 1% S0 1% \$0 Consumables 1% \$0 1% \$0 Equipment 1% \$0 1% \$0 Electricit/Requirement 1% \$0 1% \$0 Electricit/Requirement 0 No. Average Annual Operators 0 No. Average Annual Operator Hours per Year 0 Hours \$99.81 \$0 Phase 3 NUCCP Pump Station Improvements 1 L5 \$95,600 \$56,000 Phase 3 NUCCP Pump Station Improvements 1 L5 \$1,000<	Free Chlorine	0		MGD	ş	32,000	\$0
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Punp Stations Consumables Equipment Acconsumables Equipment Seconsumables Equipment Seconsumables Equipment Seconsumables Equipment Seconsumables Equipment Seconsumables Equipment Seconsumables Equipment Seconsumables Equipment Seconsumables Equipment Seconsumables Equipment Seconsumables Electrical/Instrumentation Electrical/Instrumentation Electrical/Instrumentation Electrical/Instrumentation Electrical/Instrumentation Electrical/Instrumentation Electrical/Instrumentation Electrical/Instrumentation Electrical/Instrumentation Electrical/Instrumentation Seconsumables Electrical/Instrumentation Electrical/Instrumentation Seconsumables Electrical/Instrumentation Electrical/Instrumentation Seconsumables Electrical/Instrumentation Seconsumables Electrical/Instrumentation Electrical/Instrumen	Conveyance Annual Inspection and Maintenance of Pipeline - Average	Annual Onera	tor Hours ner	IF		\$0.78	\$44 947
Pump Stations	Annual inspection and maintenance of ripeline "Average		tor nours per	-		<i>Q</i> 0 .70	\$11,512
Consumables 1% \$0 Equipment 1% \$0 Electrical/Instrumentation 1% \$0 Electrical/Instrumentation 1% \$0 Energy Charge 444,385 kWh/year \$0.15 \$666,58 Energy Charge 0 No. No. No. No. Average Annual Operator Hours per Year 0 Hours \$99,81 \$0 Total Operator Hours per Year 0 Hours \$99,81 \$0 Phase 3 Boxter Pump Station Improvements 1 L5 \$96,000 \$86,000 Storage Tanks 1 L5 \$81,000 \$81,000 Annual O&M 0 EA \$15,000 \$0 Extraction Wells 1 0 APry \$265 \$0 Groundwater Pumping Charge 0 APry \$265 \$0 \$0 Hale Extraction Well/Wellhead Treatment 0 APry \$265 \$0 \$0 El Camino Extraction Well/Wellhead Treatment 0 APry	Pump Stations						
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Electricial/instrumentation 1% \$0 Electricial/instrumentation 444,385 kWh/year \$0.15 \$66,658 Labor Costs 0 No. Average Annual Operator Hours per Year 520 Hours Total No. Operator Hours per Year 0 No. Average Annual Operator Hours per Year 0 Hours 50 \$99,81 \$0 Total Operator Hours per Year 0 Hours \$99,81 \$0 Strage Tanks 1 L5 \$96,000 \$86,000 Storage Tanks 1 L5 \$15,000 \$81,000 Annual O&M 0 EA \$15,000 \$0 Extraction Wells 0 EA \$15,000 \$0 Faircoand Attraction Well/Wellhead Treatment 0 AFY \$265 \$0 Peers Extraction Well/Wellhead Treatment 0 AFY \$226 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$226 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$226 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY	Mechanical					1%	\$0
Electricity Requirement 444,385 kWh/year \$ 0.15 \$66,658 Labor Costs 0 No. Average Annual Operator Hours per Year 5200 Hours Total Operator Hours per Year 0 Hours S 99,811 \$00 Average Annual Operator Hours per Year 0 Hours \$ 99,811 \$00 Phase 3 RWQCP Pump Station Improvements 1 LS \$ 96,000 \$56,000 Storage Tanks 1 LS \$ 96,000 \$566,000 Annual O&M 1 LS \$ 96,000 \$56,000 Storage Tanks - - 1% \$0 Annual O&M 0 EA \$ 15,000 \$0 Annual O&M 0 EA \$ 15,000 \$0 Roroundwater Pumping Charge 0 AFY \$ 1,960 \$0 Groundwater Pumping Charge 0 AFY \$ 2263 \$0 Peers Extraction Well/Wellhead Treatment 0	Electrical/Instrumentation					1%	\$0
Energy Charge 444,385 kWh/year \$0.15 \$566,558 Total No. Operators 0 No. Average Annual Operator Hours per Year 520 Hours Total Operator Hours per Year 00 Hours \$99,81 \$00 Total Operator Hours per Year 00 Hours \$99,81 \$00 \$86,000 \$36,000 \$36,000 \$36,000 \$36,000 \$81,000 \$81,000 \$81,000 \$81,000 \$81,000 \$81,000 \$81,000 \$81,000 \$81,000 \$81,000 \$81,000 \$81,000 \$80 \$00 EA \$15,000 \$50 \$00 \$6	Electricity Requirement						
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Total No. Operators 0 No. Average Annual Operator Hours per Year 520 Hours \$ 99.81 \$0 Phase 3 RWQCP Pump Station Improvements 1 L5 \$ 96,000 \$96,000 Phase 3 RWQCP Pump Station Improvements 1 L5 \$ 96,000 \$96,000 Storage Tanks 1 L5 \$ 81,000 \$81,000 Annual 0&M 1 L5 \$ 15,000 \$0 Annual 0&M 0 EA \$ 15,000 \$0 Annual 0&M 0 EA \$ 15,000 \$0 Rinconda Extraction Well/Wellhead Treatment 0 APY \$ 265 \$0 Rinconda Extraction Well/Wellhead Treatment 0 APY \$ 226 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 226 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 226 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 226 \$0 Li Carino Extraction Well/Wellhead Treatment 0 APY \$ 226 \$0 Li Carino Extraction Well/Wellhead Treatment 0 APY \$ 226 \$0 Li Carino Extraction Well/Wellhead Treatment 0 APY \$ 226 <t< td=""><td>Labor Costs</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Labor Costs						
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O Hours S 99.81 SO Phase 3 RWCP Pump Station Improvements 1 LS \$ 96,000 \$66,000 Phase 3 RWCP Pump Station 1 LS \$ 81,000 \$81,000 Storage Tanks 1 LS \$ 81,000 \$81,000 \$81,000 Annual 0&M 0 EA \$ 15,000 \$00 \$00 Annual 0&M 0 EA \$ 15,000 \$00 Extraction Wells - - 1,960 \$00 Groundwater Pumping Charge 0 AFY \$ 1,960 \$00 Hale Extraction Well/Wellhead Treatment 0 AFY \$ 2263 \$00 Peers Extraction Well/Wellhead Treatment 0 AFY \$ 2256 \$00 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$00 Mountain View Feasibility Study Long Term Recommended Phase 0 LS \$ 100,000 \$00 Mounta	Average Annual Operator Hours per Year		520	Hours			
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Storage Tanks 1% \$0 Annual 0&M 1% \$0 Injection Wells 0 EA \$ 15,000 \$0 Groundwater Pumping Charge 0 APY \$ 1,960 \$0 Hale Extraction Well/Wellhead Treatment 0 APY \$ 2,653 \$0 Rinconada Extraction Well/Wellhead Treatment 0 APY \$ 2263 \$0 Peers Extraction Well/Wellhead Treatment 0 APY \$ 2256 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2256 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 224 \$0 Library Extraction Well/Wellhead Treatment 0 APY \$ 2256 \$0 Library Extraction Well/Wellhead Treatment 0 APY \$ 224 \$0 Mountain View Feasibility Study Long Term Recommended Phase 0 LS \$ 100,000 \$ \$ Mountain View Feasibility Study Long Term Recommen	Phase 3 Booster Pump Station		1	LS	\$	81,000	\$81,000
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Annual O&M 0 EA 5 15,000 S0 Branch OWBIS 0 APY 5 1,500 S0 Groundwater Pumping Charge 0 APY \$ 1,960 S0 Hale Extraction Well/Wellhead Treatment 0 APY \$ 2,265 S0 Rinconada Extraction Well/Wellhead Treatment 0 APY \$ 2,263 S0 Peers Extraction Well/Wellhead Treatment 0 APY \$ 2,265 \$ \$ El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2,265 \$ \$ El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2,256 \$ \$ Mountain View Feasibility Study Long-Term Recommended Phase 0 APY \$ 2,42 \$ Mountain View Feasibility Study Long-Term Recommended Phase 0 LIS \$ 100,000 \$ \$ Annual C&K Costs (\$/Year) 0 De payment per year, spread over Project Life \$ \$,2290,000 \$	Injection Wells						
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Groundwater Pumping Charge 0 AFY \$ 1,960 \$00 Hale Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$00 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 263 \$00 Peers Extraction Well/Wellhead Treatment 0 AFY \$ 263 \$00 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 Library Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 Mountain View Feasibility Study Long Term Recommended Phase 0 LS \$ 100,000 \$0 Mountain View Feasibility Study Long Term Recommended Phase 0 LS \$ 100,000 \$0 Annualized Costs (\$ / Year) 0 Del payment per year, spread over Project Life \$ 2,439,000 Annual Cost (\$/FYer) 0 Del payment per year, spread over Project Life \$ 2,243,000 Annual Cost (Sot (Sot S) 5290,000 \$ 2290,000 \$ 2,2729,000 Total Annualized Cost (S/YF)	Extraction Wells						
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Ninconada ktraction Well/Weilhead Treatment 0 APY 5 2.63 SU Perrs Extraction Well/Weilhead Treatment 0 APY 5 2.24 \$0 El Camino Extraction Well/Weilhead Treatment 0 APY \$ 2.256 \$0 El Camino Extraction Well/Weilhead Treatment 0 APY \$ 2.256 \$0 Library Extraction Well/Weilhead Treatment 0 APY \$ 2.26 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 AFY \$ 2.24 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 L5 \$ 100,000 \$0 Total 0&M Costs (\$/Year) 0 L5 \$ 100,000 \$0 Annual ICast ICosts (\$/Year) 0ne payment per year, spreed over Project Life \$2,439,000 \$20,000 Annual O&M Costs 5 220,000 \$2,2729,000 \$2,2729,000 \$2,2729,000 \$2,2729,000 \$2,2729,000 \$2,2729,000 \$2,2729,000 \$2,2729,000 \$2,2729,000 \$2,2729,000 \$2,2729,	Hale Extraction Well/Wellhead Treatment		0	AFY	Ş	265	\$0 \$0
Peers Extraction Well/Wellnead Ireatment 0 APY 5 2.24 SU El Camino Extraction Well/Wellnead Treatment 0 APY 5 2.256 \$0 Eleanor Extraction Well/Wellnead Treatment 0 APY \$ 2.256 \$0 Library Extraction Well/Wellnead Treatment 0 APY \$ 2.24 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 APY \$ 2.42 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 LS \$ 100,000 \$0 Annualized Costs (\$ / Year) 0 LS \$ 100,000 \$0 \$0 Annual Costs (\$/Year) 0 LS \$ 100,000 \$0	Rinconada Extraction Well/Wellhead Treatment		0	AFY	Ş	263	\$0 \$0
Li Camino Extraction Well/Wellhead Treatment 0 APY 5 2.56 S0 Eleanor Extraction Well/Wellhead Treatment 0 APY 5 2.56 50 Library Extraction Well/Wellhead Treatment 0 APY 5 2.56 50 Mountain View Feasibility Study Long-Term Recommended Phase 0 LS 5 100,000 50 Total O&M Costs (\$/Yer) 0 LS \$ 100,000 \$0 Annualized Costs (\$ / Year) 0 performance \$2290,000 Annual O&M Costs \$2290,000 Total Annualized Cost \$22,729,000 S20,000 Total Annualized Cost \$22,729,000 Deliveries of Recycled Water \$23,400	Peers Extraction Well/Wellhead Treatment		0	AFY	ş	224	\$0
Lieanor Extraction Well/Well/Read Treatment 0 AFY 5 256 SU Library Extraction Well/Well/Read Treatment 0 AFY 5 242 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 L5 \$ 100,000 \$0 Total 0&M Costs (\$/year) 0 L5 \$ 100,000 \$0 Annualized Costs (\$/ Year) One payment per year, spread over Project Life \$2,24,30,000 \$20,000 Annual O&M Costs 5 \$2,20,000 \$200,000 \$200,000 \$200,000 Total Annualized Cost (\$/ Year) One payment per year, spread over Project Life \$2,243,000 \$200,000 Total Annualized Cost \$200,000 \$200,000 \$2,2729,000 <	El Camino Extraction Well/Wellhead Treatment		0	AFY	Ş	256	\$0 \$0
Library Extraction Well/Wellnead Ireatment 0 APY 5 242 SU Mountain View Feasibility Study Long-Term Recommended Phase 0 LIS \$ 100,000 \$00 Total O&M Costs (\$/Year) 0 LIS \$ 100,000 \$00 Annualized Costs (\$ / Year) 0 0 \$ \$290,000 Annual O&M Costs (\$/Year) 0 0 \$ \$290,000 Annual O&M Costs (\$/Year) 0 0 \$ \$290,000 Total Annualized Costs (\$/Year) 0 \$200,000 \$200,000 Total Annualized Cost \$2290,000 \$200,000 \$200,000 Total Annualized Cost \$2200,000 \$200,000 \$200,000 Total Annualized Cost \$220,000 \$220,000 \$220,000 Total Annualized Cost \$220,000 \$220,000 \$220,000 Total Annualized Cost \$220,000 \$220,000 \$220,000 Deliveries of Recycled Water \$22,729,000 \$22,729,000 Deliveries of Recycled Water \$22,729,000 \$23,400	Eleanor Extraction Well/Wellhead Treatment		0	AFY	ş	256	\$0
Mountain View Feasibility Study Long Term Recommended Phase 0 LS \$ 100,000 \$0 Total O&M Costs (\$/yr) \$290,000 Annualized Costs (\$/vear) One payment per year, spread over Project Life \$2,439,000 Annual O&M Costs \$290,000 Total Annualized Costs (\$/Year) One payment per year, spread over Project Life \$2,2,39,000 Total Annualized Costs \$290,000 Total Annualized Cost \$290,000 Deliveries of Recycled Water \$20,2729,000 Estimated Unit Cost (\$/AF) \$3,400	Library Extraction Well/Wellhead Treatment		0	AFY	Ş	242	ŞU
O LS S 100,000 S0 Standal Costs (\$/Year) S290,000 Annualized Costs (\$/Year) S290,000 Annualized Costs (\$/Year) One payment per year, spread over Project Life S290,000 Annual Costs (\$/Year) One payment per year, spread over Project Life S290,000 Total Annualized Cost S220,000 Total Annualized Cost S220,000 Deliveries of Recycled Water S3,400	Mountain View Feasibility Study Long-Term Recommen	ded Phase					
Annualized Costs (\$ / Year) Annualized Capital Costs (\$/Year) One payment per year, spread over Project Life \$2,439,000 Annual D&M Costs \$2290,000 \$2290,000 Total Annualized Cost \$2,729,000 Deliveries of Recycled Water \$2,729,000 Estimated Unit Cost (\$/AF) \$3,400	Total O&M Costs (\$/yr)	0	ß	Ş	100,000	ېن \$290.000
Annualized Capital Costs (\$/Year) One payment per year, spread over Project Life \$2,439,000 Annual 0&M Costs \$290,000 Total Annualized Cost Deliveries of Recycled Water Estimated Unit Cost (\$/AF) \$3,400	Annualized Costs (\$ / Year)						1
Annual O&M Costs \$290,000 Total Annualized Cost \$2,729,000 Deliveries of Recycled Water \$200 AFY Estimated Unit Cost (\$/AF) \$3,400	Annualized Capital Costs (\$/Year)	One paymen	t per year, spre	ead over Project Life			\$2,439,000
Total Annualized Cost \$2,729,000 Deliveries of Recycled Water 800 AFY Stimated Unit Cost (\$/AF) \$3,400	Annual O&M Costs						\$290,000
Deliveries of Recycled Water 800 AFY Estimated Unit Cost (\$/AF) \$3,400	Total Annualized Cost						\$2,729,000
Estimated Unit Cost (\$/AF) \$3,400	Deliveries of Recycled Water	800) AFY				
	Estimated Unit Cost (\$/AF)						\$3,400

A2				Pa	lo Alto Recyc	led Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72				_		
Item	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital costs		1.0%	¢2.097.744
Traffic Control			Applied to all capital costs		4%	\$2,587,744
Treatment						+=,===,===.
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	\$	323,000	\$0
MF/UF system	0.0		MGD	\$	1,317,000	\$0
RO System	0.0		MGD	ş	1,586,000	\$0
RO Concentrate Treatment	0.0		MGD	ş	1,510,000	\$0
Advanced Oxidation and Disinfection	0.0		MGD	Ş	470,000	\$0
Free Chlorine	0.0		MGD	Ş	271,000	\$U ¢0
Chemicals (Storage and Use)	0.0		MGD	Ş	2 4 2 7 000	\$U ¢0
Conveyance	0.0		MGD	Ş	3,427,000	ŞU
High-Density Urban Pineline, HDPF						
6 Inch		0	IE	Ś	186	\$0
8 Inch		50.383	LF	ŝ	200	\$10.077.166
10 Inch		8,600	LF	ŝ	212	\$1.823.362
12 Inch		5,500	LF	\$	254	\$1,398,705
16 Inch		1,000	LF	\$	277	\$277,070
18 Inch		0	LF	\$	290	\$0
20 Inch		7,115	LF	\$	334	\$2,375,058
24 Inch		0	LF	\$	381	\$0
30 Inch		0	LF	\$	462	\$0
Repurposing Pipe						
6 Inch		2,200	LF	\$	55	\$120,839
8 Inch		1,850	LF	\$	66	\$121,540
Sheeting and Shoring (Open Cut)	3% of Open C	Cut Pipeline Co	st		3%	\$478,541
Microtunneling						
Lunnel and Casing (36")		820	LF	\$	1,728	\$1,416,960
Jacking Shaft		3	EA	Ş	300,000	\$900,000
Receiving Shaft		3	EA	Ş	150,000	\$450,000
Horizontal Directional Drilling		250			530	ć 40.4.000
24 Inch Bore Diameter		350	LF	Ş	528	\$184,800
E lach		0	15	ć	275	ćo
8 Inch		226	15	ç	5/3	30 6119 075
10 Inch		230	LF IF	ç	625	\$118,023
12 Inch		0	IF	ś	750	50 \$0
16 Inch		ő	L.	ŝ	1.000	\$0
20 Inch		0	LF	ŝ	1,250	\$0
Jacking Shafts		2	EA	ŝ	258.000	\$516.000
Receiving Shafts		2	EA	ŝ	148.000	\$296.000
Pipe Bridge						
Pipe Bridge Support		56	LF	\$	5,000	\$280,000
Pipe Bridge Pipe						
6 Inch		431	LF	\$	66	\$28,252
8 Inch		0	LF	\$	86	\$0
10 Inch		50	LF	\$	108	\$5,424
12 Inch		0	LF	\$	139	\$0
16 Inch		65	LF	\$	175	\$11,387
Potholing		746	EA	\$	500	\$372,750
Cathodic Protection	3% of Pipelin	e Installation (Cost		3%	\$593,614
Customer Services (no meter replacement)		62	EA	ş	10,000	\$620,000
Customer Services (with meter replacement)		137	EA	ş	15,000	\$2,055,000
Planter Box (Housing Pipe on Bridge Sidewalk)		6	CY	ş	2,000	\$12,000
Planter Box (Installation Labor)		8	Day	Ş	4,000	\$32,000
Pump Stations	200	Tatal	installed UD including standby	<i>.</i>	7 444	Ć1 400 030
Pump Station #1	200	i otal	installed HD including standby	\$	7,444	\$1,488,839
Fump Station #3	300	I otal	installed HP, including standby	ş	6,433 12 200	\$1,929,951
Pump Station #4	40	Tot-I	installed HD including standby	ç	11 492	\$331,505 6600 070
Pump Station #5	0	Total	installed HP_including standby	ç	11,465	\$088,978
Phase 3 RWOCP Pump Station Improvements	U	n n	IS I	ç	1.389.000	\$U ¢n
Phase 3 Booster Pump Station		0	15	ć	918 000	¢n.
Hydropneumatic Tank - Pump Station #1	9.100	3	Gal	ć	210,000	ېن ۲۶۶۶ م
Hydropneumatic Tank - Pump Station #2	8,500		Gal	ŝ	30	\$258.258
Hydropneumatic Tank - Pump Station #3	2,900		Gal	ŝ	41	\$117.657
Hydropneumatic Tank - Pump Station #4	700		Gal	\$	45	\$31,202
Hydropneumatic Tank - Pump Station #5	0		Gal	\$	-	\$0
Storage Tank						
Storage Tank	0.0		MG	\$	1,500,000	\$0
Underground Construction		0.0	LS	\$	1,000,000	
Injection Well						
		0	EA	\$	1,000,000	\$0
Extraction Wellhead Treatment						
Hale		0	AFY	ş	2,937	\$0
Rinconada Peers		0	AFY AEV	ې د	2,93/	\$0 ¢0
El Camino		0	AFT	¢ ¢	3,353	\$0 ¢0
Eleanor		0	AFY	ŝ	4.538	50 \$0
Library		0	AFY	ŝ	4,538	ŝo
Mountain View Feasibility Study Long-Term Recommend	led Phase					
		0	LS	\$	3,326,000	\$0
Subtotal						\$34,060,000
Sales Tax	Applied	d to half of cap	ital costs (not including General)		9%	\$1,344,000
Construction Cost Subtotal						\$35,404,000
Market Adjustment Factor					10%	\$3,540,000
Construction Contingency Construction Cost Total					40%	\$14,162,000 \$53,200,000
Engineering and Admin Services (Design)					15%	\$5.311.000
Construction Management					10%	\$3,540.000
Engineering Services During Construction					3%	\$1,062,000
Property Acquisition (Property Only)		0	SQ FT	\$	500	\$0
Property Acquisition (House on Property)		0	SQ FT	, \$	1,000	\$0
Rinconada Land Cost		0	LS	\$	4,500,000	\$0
Peers Land Cost		0	LS	\$	7,000,000	\$0
On-Time Fee		0	LS	\$	75,000	
Total Capital Cost						\$63,000,000
1						

A2				Pa	alo Alto Recycled	Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate Project Life			
Updated by:	K. Howes		3%		30	Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit	I	Unit Cost	Total Cost
O&M Costs (Annual)						
Advanced Water Treatment						
MBR	0		MGD	\$	560,000	\$0
Ozone	0		MGD	\$	93,000	\$0
BAC	0		MGD	\$	131,000	\$0
MF/UF system	0		MGD	\$	342,000	\$0
RO System	0		MGD	\$	574,000	\$0
RO Concentrate Treatment	0		MGD	ş	226,000	\$0
Advanced Oxidation and Disinfection	0		MGD	ş	73,000	\$0
Free Chlorine	0		MGD	ş	32,000	\$0 ¢0
Labor for Treatment (no MRR)	0	1.040	MGD brs/MGD	ş	121,000	\$0 ¢0
Labor for MPR	0	1,040	hrs/wab	د د	100	50 ¢0
Monitoring	0	1,040	\$/year	د ه	1 000 000	90 \$0
Conversions		0	\$/year	ç	1,000,000	ŞU
Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	tor Hours per	LF		\$0.78	\$58,100
Pump Stations						
<u>Consumables</u>				_		
Equipment					1%	\$46,393
Mechanical					1%	\$46,393
Electrical/Instrumentation					1%	\$46,393
Electricity Requirement						
Energy Charge		794,111	kWh/year	Ş	0.15	\$119,117
Labor Costs		-				
Total No. Operators		4	NO.			
Average Annual Operator Hours per Year		520	Hours	<i>.</i>	00.01	¢207.010
Phase 2 RWOCB Rump Station Improvements		2,080	Hours	ç	99.81	\$207,610
Phase 3 RwdcP Pump Station Improvements		0	LS	ç	96,000	\$0 ¢0
Storage Tanks		U	LS	Ş	81,000	ŞU
Annual O&M					1%	\$0
Injection Wells						
Annual O&M		0	EA	\$	15,000	\$0
Extraction Wells						
Groundwater Pumping Charge		0	AFY	\$	1,960	\$0
Hale Extraction Well/Wellhead Treatment		0	AFY	\$	265	\$0
Rinconada Extraction Well/Wellhead Treatment		0	AFY	\$	263	\$0
Peers Extraction Well/Wellhead Treatment		0	AFY	\$	224	\$0
El Camino Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Eleanor Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Library Extraction Well/Wellhead Treatment		0	AFY	\$	242	\$0
Mountain View Feasibility Study Long-Term Recommend	led Phase					
Total O&M Costs (\$/yr)		0	LS	\$	100,000	\$0 \$520,000
Annualized Costs (\$ / Year)						
Annualized Capital Costs (\$/Year)	One payment	t per year, spre	ad over Project Life			\$3,214,000
Annual O&M Costs						\$520,000
Total Annualized Cost						\$3,734,000
Deliveries of Recycled Water	1,10	0 AFY				
Estimated Unit Cost (\$/AF)						\$3,400

A3				Pa	ilo Alto Recycl	ed Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate		F	Project Life
Updated by:	K. Howes		3%		3	30 Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital costs		10%	\$4.033.005
Traffic Control			Applied to all capital costs		4%	\$1,613,202
Treatment						+-,3,202
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	\$	323,000	\$0
MF/UF system	0.0		MGD	\$	1,317,000	\$0
RO System	0.0		MGD	Ş	1,586,000	\$0 \$0
RO Concentrate Treatment	0.0		MGD	Ş	1,510,000	ŞU
Advanced Oxidation and Disinfection	0.0		MGD	Ş	470,000	\$U ¢0
Chemicals (Storage and Lice)	0.0		MGD	ç	124.000	\$U ¢0
Sitework / Diping / Structures	0.0		MGD	ç	3 4 27 000	şu
	0.0		Mab	Ş	3,427,000	ŞU
High-Density Urban Pineline HDPF						
6 Inch		0	LF	Ś	186	ŚO
8 Inch		60,148	LF	ŝ	200	\$12,030,275
10 Inch		32,577	LF	ŝ	212	\$6,906,936
12 Inch		3,550	LF	\$	254	\$902,801
16 Inch		5,500	LF	\$	277	\$1,523,885
18 Inch		0	LF	\$	290	\$0
20 Inch		8,115	LF	\$	334	\$2,708,868
24 Inch		0	LF	\$	381	\$0
30 Inch		0	LF	\$	462	\$0
Repurposing Pipe						
6 Inch		2,200	LF	\$	55	\$120,839
8 Inch	201 . 1 -	1,850	LF	\$	66	\$121,540
Sheeting and Shoring (Open Cut)	3% of Open C	ut Pipeline Co	st		3%	\$722,183
Microtunneling						
Lunnel and Casing (36")		820	LF	Ş	1,728	\$1,416,960
Jacking Shaft		3	EA	Ş	300,000	\$900,000
Receiving Shart Horizontal Directional Drilling		3	EA	Ş	150,000	\$450,000
24 Inch Bore Diameter		350	15	ć	5.70	¢104 000
		550	LF	Ş	528	\$164,800
6 Inch		0	15	¢	375	ŚO
8 Inch		236	IF	ś	500	\$118.025
10 Inch		0	IF	š	625	\$0
12 Inch		0	IE	ŝ	750	\$0
16 Inch		0	LF	ŝ	1.000	\$0
20 Inch		0	LF	\$	1,250	\$0
Jacking Shafts		2	EA	ŝ	258,000	\$516,000
Receiving Shafts		2	EA	\$	148,000	\$296,000
Pipe Bridge						
Pipe Bridge Support		87	LF	\$	5,000	\$435,000
Pipe Bridge Pipe						
6 Inch		566	LF	\$	66	\$37,101
8 Inch		123	LF	\$	86	\$10,631
10 Inch		50	LF	\$	108	\$5,424
12 Inch		50	LF	\$	139	\$6,961
16 Inch		65	LF	\$	175	\$11,387
Potholing		1,122	EA	Ş	500	\$560,750
Cathodic Protection	3% of Pipelin	e Installation (Cost		3%	\$845,358
Customer Services (no meter replacement)		62	EA	ş	10,000	\$620,000
Customer Services (with meter replacement)		147	EA	Ş	15,000	\$2,205,000
Planter Box (Housing Pipe on Bridge Sidewaik)		6	CY Davi	Ş	2,000	\$12,000
Planter Box (Installation Labor)		8	Day	Ş	4,000	\$32,000
Pump Stations	200	Total	installed HR including standby	ć	6 422	¢1.020.051
rump Station #2	300		installed HD including standby	\$	0,433	\$1,929,951
Pump Station #3	40	Total	installed HP, including standby	ç	13,999	¢č31 EUE \$1,953/321
Pump Station #4	60	Total	installed HP, including standby	ç	11 483	\$331,303 \$688 078
Pump Station #5	69	Total	installed HP, including standby	ç	10.970	\$000,978 \$753,446
Phase 3 RWQCP Pump Station Improvements	35	0	LS	ŝ	1,389.000	0»»، در ب ۵۷
Phase 3 Booster Pump Station		0	LS	ś	918.000	\$0 \$0
Hydropneumatic Tank - Pump Station #1	11,200		Gal	ŝ	25	\$285.278
Hydropneumatic Tank - Pump Station #2	10,500		Gal	ŝ	27	\$280,820
Hydropneumatic Tank - Pump Station #3	2,900		Gal	\$	41	\$117,657
Hydropneumatic Tank - Pump Station #4	700		Gal	\$	45	\$31,202
Hydropneumatic Tank - Pump Station #5	1,900		Gal	\$	42	\$80,542
Storage Tank						
Storage Tank	0.0		MG	\$	1,500,000	\$0
Underground Construction		0.0	LS	\$	1,000,000	
Injection Well						
		0	EA	\$	1,000,000	\$0
Extraction Wellhead Treatment						
Hale		0	AFY	Ş	2,937	\$0
Kinconada Peers		0	AFY	ş	2,937	\$0
El Camino		0	AFT	ç	3,353 2,529	\$0 ¢0
Eleanor		0	AFY	ŝ	4.538	\$0 \$0
Library		0	AFY	ŝ	4,538	\$0 \$0
Mountain View Feasibility Study Long-Term Recommend	led Phase					
		0	LS	\$	3,326,000	\$0
Subtotal						\$45,976,000
Sales Tax	Applied	l to half of cap	ital costs (not including General)		9%	\$1,815,000
Construction Cost Subtotal					1001	\$47,791,000
Market Adjustment Factor					10%	\$4,779,000
Construction Contingency					40%	\$19,116,000 \$71 700 000
Engineering and Admin Services (Design)					15%	\$7 169 000
Construction Management					10%	\$4,779.000
Engineering Services During Construction					3%	\$1,434,000
Property Acquisition (Property Only)		0	SQ FT	\$	500	\$0
Property Acquisition (House on Property)		0	SQ FT	\$	1,000	\$0
Rinconada Land Cost		0	LS	\$	4,500,000	\$0
Peers Land Cost		0	LS	\$	7,000,000	\$0
On-Time Fee		0	LS	\$	75,000	
Total Capital Cost						\$85,100,000
1						

A3				Pa	lo Alto Recycleo	d Water Feasibility Study
Last Updated:	4-Feb-19 Discount Rate Pi			oject Life		
Updated by:	K. Howes		3%		30	Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit		Unit Cost	Total Cost
O&M Costs (Annual)						
Advanced Water Treatment						
MBR	0		MGD	\$	560,000	\$0
Ozone	0		MGD	\$	93,000	\$0
BAC	0		MGD	\$	131,000	\$0
MF/UF system	0		MGD	\$	342,000	\$0
RO System	0		MGD	\$	574,000	\$0
RO Concentrate Treatment	0		MGD	Ş	226,000	\$0
Advanced Oxidation and Disinfection	0		MGD	ş	73,000	\$0 **
Free Chlorine	0		MGD	ş	32,000	\$0 ¢0
Chemicals	0	1.040	MGD	Ş	121,000	\$0 ¢0
Labor for MDD	0	1,040	has (vere	د د	100	30 ¢0
Labor for MBR	0	1,040	firs/year	ç	1 000 000	\$0 ¢0
Conversion		0	\$/year	ş	1,000,000	ŞU
Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	tor Hours per	LF		\$0.78	\$87,864
Pump Stations						
Consumables						
Equipment					1%	\$58,338
Mechanical					1%	\$58,338
Electrical/Instrumentation					1%	\$58,338
Electricity Requirement						
Energy Charge		1,040,732	kWh/year	\$	0.15	\$156,110
Labor Costs						
Total No. Operators		5	No.			
Average Annual Operator Hours per Year		520	Hours			
Total Operator Hours per Year		2,600	Hours	\$	99.81	\$259,513
Phase 3 RWQCP Pump Station Improvements		0	LS	\$	96,000	\$0
Phase 3 Booster Pump Station		0	LS	\$	81,000	\$0
Storage Tanks Annual O&M					1%	\$0
Injection Wells						
Annual O&M		0	EA	\$	15,000	\$0
Extraction Wells						
Groundwater Pumping Charge		0	AFY	\$	1,960	\$0
Hale Extraction Well/Wellhead Treatment		0	AFY	\$	265	\$0
Rinconada Extraction Well/Wellhead Treatment		0	AFY	\$	263	\$0
Peers Extraction Well/Wellhead Treatment		0	AFY	\$	224	\$0
El Camino Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Eleanor Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Library Extraction Well/Wellhead Treatment		0	AFY	\$	242	\$0
Mountain View Feasibility Study Long-Term Recommend	led Phase					
Total O&M Costs (\$/yr)		0	LS	\$	100,000	\$0 \$680,000
Annualized Costs (\$ / Year)				_		
Annualized Capital Costs (\$/Year)	One payment	t per year, spre	ad over Project Life			\$4,342,000
Annual O&M Costs						\$680,000
Total Annualized Cost						\$5,022,000
Deliveries of Recycled Water	1,25	0 AFY				
Estimated Unit Cost (\$/AF)						\$4,000

A4				Pa	lo Alto Recyc	led Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72				_		
Item	Size	Qty	Unit		Jnit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital costs		1.0%	¢0
Traffic Control			Applied to all capital costs		4%	50 \$0
Treatment			,,		70	Ű
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	\$	323,000	\$0
MF/UF system	0.0		MGD	\$	1,317,000	\$0
RO System	0.0		MGD	\$	1,586,000	\$0
RO Concentrate Treatment	0.0		MGD	\$	1,510,000	\$0
Advanced Oxidation and Disinfection	0.0		MGD	ş	470,000	\$0
Free Chlorine	0.0		MGD	ş	271,000	\$0
Chemicals (Storage and Use)	0.0		MGD	Ş	134,000	\$0 ¢0
Sitework/Piping/Structures	0.0		MGD	Ş	3,427,000	ŞU
Lonveyance High-Density Urban Pineline HDPE						
6 Inch		0	IF	Ś	186	\$0
8 Inch		0	LF	ŝ	200	\$0
10 Inch		0	LF	ŝ	212	\$0
12 Inch		0	LF	\$	254	\$0
16 Inch		0	LF	\$	277	\$0
18 Inch		0	LF	\$	290	\$0
20 Inch		0	LF	\$	334	\$0
24 Inch		0	LF	\$	381	\$0
30 Inch		0	LF	\$	462	\$0
Repurposing Pipe						
6 Inch		0	LF	\$	55	\$0
8 Inch		0	LF	\$	66	\$0
Sheeting and Shoring (Open Cut)	3% of Open (ut Pipeline Co	st		3%	\$0
Microtunneling		0			4 700	60
runnei and Casing (36")		0	Lt-	Ş	1,728	\$0
Jacking Shaft		0	EA	Ş	300,000	\$0
Receiving Statt		U	EA	ş	150,000	Ş0
24 Inch Bore Diameter		0	16	ć	528	Śŋ
PTGAB		U	LF	ç	520	ŞU
6 Inch		0	IE	Ś	375	ŚO
8 Inch		0	IF	ś	500	\$0 \$0
10 Inch		ő	LF	ś	625	\$0 \$0
12 Inch		0	LF	ŝ	750	ŚO
16 Inch		0	LF	ŝ	1,000	\$0
20 Inch		0	LF	ŝ	1,250	\$0
Jacking Shafts		0	EA	\$	258,000	\$0
Receiving Shafts		0	EA	\$	148,000	\$0
Pipe Bridge						
Pipe Bridge Support		0	LF	\$	5,000	\$0
Pipe Bridge Pipe						
6 Inch		0	LF	\$	66	\$0
8 Inch		0	LF	\$	86	\$0
10 Inch		0	LF	\$	108	\$0
12 Inch		0	LF	\$	139	\$0
16 Inch		0	LF	\$	175	\$0
Potholing		0	EA	Ş	500	\$0
Cathodic Protection	3% of Pipelin	e Installation C	.ost		3%	\$0
Customer Services (no meter replacement)		0	EA	ş	10,000	\$0
Customer Services (with meter replacement)		0	EA	Ş	15,000	\$U
Planter Box (Housing Pipe on Bridge Sidewaik)		0	CY Davi	Ş	2,000	\$U ¢0
Planter Box (Installation Labor)		0	Day	Ş	4,000	\$0
Rump Station #1	0	Total	installed HP including standby	¢		ŚO
Pump Station #2	0	Total	installed HP_including standby	ç	-	\$U ¢0
Pump Station #3	0	Total	installed HP, including standby	ç		\$U ¢0
Pump Station #4	0	Total	installed HP, including standby	ç		50 ¢0
Pump Station #5	0	Total	installed HP, including standby	ç	-	¢0 50
Phase 3 RWQCP Pump Station Improvements	0	0	LS	ŝ	1,389.000	¢0
Phase 3 Booster Pump Station		0	LS	ś	918.000	50
Hydropneumatic Tank - Pump Station #1	0		Gal	ŝ	-	\$0
Hydropneumatic Tank - Pump Station #2	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #3	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #4	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #5	0		Gal	\$		\$0
Storage Tank						
Storage Tank	0.0		MG	\$	1,500,000	\$0
Underground Construction		0.0	LS	\$	1,000,000	
Injection Well					4 005	
Extraction Wollhood Tractment		0	EA	Ş	1,000,000	\$0
Extraction Weilnead Treatment			A.5V		2 0 2 7	
nale Rinconada		0	AFY	ş	2,937	\$0 ¢0
Peers		0	AFY	ŝ	3.353	50 \$0
El Camino		0	AFY	ś	4,538	50
Eleanor		0	AFY	\$	4,538	\$0
Library		0	AFY	\$	4,538	\$0
Mountain View Feasibility Study Long-Term Recommend	led Phase					
		1	LS	\$	3,326,000	\$3,326,000
Subtotal	, <u>a</u>	d to b-lf . (.	ital costs (not including Commit			\$3,326,000
Sales Tax Construction Cost Subtotal	Applie	u to naif of cap	nui costs (not including General)		9%	\$150,000 \$3.476.000
Market Adjustment Factor	•				10%	\$3,470,000 \$242,000
Construction Contingency	,				10%	\$346,000 \$1 390 000
Construction Cost Total					40/0	\$5,300,000
Engineering and Admin Services (Design)					15%	\$521,000
Construction Management	:				10%	\$348,000
Engineering Services During Construction					3%	\$104,000
Property Acquisition (Property Only)		0	SQ FT	\$	500	\$0
Property Acquisition (House on Property)		0	SQ FT	\$	1,000	\$0
Rinconada Land Cost		0	LS	\$	4,500,000	\$0
Peers Land Cost		0	LS	Ş	7,000,000	\$0
Un-Time Fee		0	LS	Ş	/5,000	\$c 200 000
iotai capital Cost						÷0,200,000

A4				Pa	alo Alto Recycleo	Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate		Pro	oject Life
Updated by:	K. Howes		3%		30	Years
CCI (SF, June 2018): 12014.72						
Item	Size	Otv	Unit		Unit Cost	Total Cost
O&M Costs (Annual)						
Advanced Water Treatment						
MBR	0		MGD	\$	560,000	\$0
Ozone	0		MGD	\$	93,000	\$0
BAC	0		MGD	\$	131,000	\$0
MF/UF system	0		MGD	\$	342,000	\$0
RO System	0		MGD	\$	574,000	\$0
RO Concentrate Treatment	0		MGD	Ş	226,000	\$0
Advanced Oxidation and Disinfection	0		MGD	ş	73,000	\$0
Free Chlorine	0		MGD	ş	32,000	\$0 ¢0
Chemicals	0	1.040	MGD	Ş	121,000	\$0 ¢0
Labor for Treatment (no MBR)	0	1,040	his/WGD	Ş	100	\$0 ¢0
Labor for WBR	0	1,040	firs/year	ç	1 000 000	\$U ¢0
Conversion		U	\$/year	Ş	1,000,000	ŞU
Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	tor Hours per	LF		\$0.78	\$0
Pump Stations						
Consumables						
Equipment					1%	\$0
Mechanical					1%	\$0
Electrical/Instrumentation					1%	\$0
Electricity Requirement						
Energy Charge		-	kWh/year	\$	0.15	\$0
Labor Costs						
Total No. Operators		0	No.			
Average Annual Operator Hours per Year		520	Hours			
Total Operator Hours per Year		0	Hours	\$	99.81	\$0
Phase 3 RWQCP Pump Station Improvements		0	LS	\$	96,000	\$0
Phase 3 Booster Pump Station		0	LS	\$	81,000	\$0
Storage Tanks						
Annual O&M					1%	\$0
Injection Wells						
Annual O&M		0	EA	\$	15,000	\$0
Extraction Wells						
Groundwater Pumping Charge		0	AFY	\$	1,960	\$0
Hale Extraction Well/Wellhead Treatment		0	AFY	\$	265	\$0
Rinconada Extraction Well/Wellhead Treatment		0	AFY	\$	263	\$0
Peers Extraction Well/Wellhead Treatment		0	AFY	\$	224	\$0
El Camino Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Eleanor Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Library Extraction Well/Wellhead Treatment		0	AFY	Ş	242	Ş0
Mountain View Feasibility Study Long-Term Recommend	led Phase			,		
Total O&M Costs (\$/yr)		1	LS	Ş	100,000	\$100,000 \$100,000
Annualized Costs (\$ / Year)						
Annualized Capital Costs (\$/Year)	One payment	t per year, spre	ad over Project Life			\$316,000
Annual O&M Costs						\$100,000
Total Annualized Cost						\$416,000
Deliveries of Recycled Water	200	AFY				
Estimated Unit Cost (\$/AF)						\$2,100

A5				Pa	ilo Alto Recyc	led Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital casts		1.0%	¢2 442 427
IVIODILIZATION Traffic Control			Applied to all capital costs		10%	\$3,443,427 \$1.377 371
Treatment			supplied to an expital costs		476	<i>q</i> 2,577,572
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	\$	323,000	\$0
MF/UF system	0.0		MGD	\$	1,317,000	\$0
RO System	0.0		MGD	\$	1,586,000	\$0
RO Concentrate Treatment	0.0		MGD	\$	1,510,000	\$0
Advanced Oxidation and Disinfection	0.0		MGD	\$	470,000	\$0
Free Chlorine	0.0		MGD	ş	271,000	\$0
Chemicals (Storage and Use)	0.0		MGD	Ş	134,000	\$0 \$0
Sitework/Piping/Structures	0.0		MGD	Ş	3,427,000	ŞU
Lonveyance						
6 loch		0	IE	¢	186	śn
8 Inch		21 500	IF	ś	200	\$4 300 241
10 Inch		14 500	IF	ś	200	\$3 074 272
12 Inch		5.500	IF	ś	254	\$1,398,705
16 Inch		0	LE	ŝ	277	\$0
18 Inch		0	LF	ŝ	290	\$0
20 Inch		44,714	LF	ŝ	334	\$14,925.980
24 Inch		0	LF	ŝ	381	ŚO
30 Inch		0	LF	\$	462	\$0
Repurposing Pipe						
6 Inch		0	LF	\$	55	\$0
8 Inch		0	LF	\$	66	\$0
Sheeting and Shoring (Open Cut)	3% of Open (Cut Pipeline Co	st		3%	\$710,976
Microtunneling						
Tunnel and Casing (36")		0	LF	\$	1,728	\$0
Jacking Shaft		0	EA	\$	300,000	\$0
Receiving Shaft		0	EA	\$	150,000	\$0
Durizontal Directional Drilling		0			500	
24 Inch Bore Diameter		0	LF	Ş	528	\$0
Clash		0	15	ć	275	ćo
6 Inch		0	LF	ç	3/5	\$U \$0
8 Inch		122	LF	ç	500	30 676 266
12 Inch		122	LF	ç	750	\$70,200 \$0
12 men		0	IF	ś	1 000	50 \$0
20 Inch		114	IF	ś	1 250	\$142 530
Jacking Shafts		2	FA	ŝ	258.000	\$516.000
Receiving Shafts		2	EA	ś	148,000	\$296.000
Pipe Bridge				Ŧ	2,225	÷===3,000
Pipe Bridge Support		61	LF	\$	5,000	\$305,000
Pipe Bridge Pipe						
6 Inch		92	LF	\$	66	\$6,031
8 Inch		240	LF	\$	86	\$20,744
10 Inch		91	LF	\$	108	\$9,871
12 Inch		0	LF	\$	139	\$0
16 Inch		172	LF	\$	175	\$30,132
Potholing		870	EA	\$	500	\$435,225
Cathodic Protection	3% of Pipelin	e Installation (Cost		3%	\$736,597
Customer Services (no meter replacement)		0	EA	\$	10,000	\$0
Customer Services (with meter replacement)		106	EA	Ş	15,000	\$1,590,000
Planter Box (Housing Pipe on Bridge Sidewalk)		0	CY	\$	2,000	\$0
Planter Box (Installation Labor)		0	Day	\$	4,000	\$0
Pump Stations	200	*	installed UD instruction of		6 105	64 000 CT
Pump Station #1	300	Total	installed HP, including standby	\$	6,433	\$1,929,951
Pump Station #2	225	Total	installed HP, including standby	Ş	7,135	\$1,605,408
rump Station #4	0	I otal	installed HP, including standby	ş	-	\$0
rump Station #5	0	I otal	installed HP, including standby	ş	-	\$0
Phase 3 RWOCP Pump Station Improvements	0	i otal	installed me, including standby	ç	1 380 000	\$0
Phase 3 Rooster Pump Station		0	15	ç	1,505,000 918 000	\$U ¢n
Hydronneumatic Tank - Pump Station #1	12 200	U	63l	ç	710,000	\$U ¢788 EE #
Hydropneumatic Tank - Pump Station #2	7.200		Gal	ç	24	\$200,334 \$335 720
Hydropneumatic Tank - Pump Station #3	0		Gal	ś	-	\$0. \$0
Hydropneumatic Tank - Pump Station #4	0		Gal	ŝ		\$0 \$0
Hydropneumatic Tank - Pump Station #5	0		Gal	\$		\$0
Storage Tank						
Storage Tank	1.2		MG	\$	1,500,000	\$1,800,000
Underground Construction		0.0	LS	\$	1,000,000	
Injection Well						
		0	EA	\$	1,000,000	\$0
Extraction Wellhead Treatment						
Hale		0	AFY	\$	2,937	\$0
Rinconada		0	AFY	\$	2,937	\$0
Peers El Camino		0	AFY	Ş	3,353	\$0
El Camino Eleanor		0	AFY	ş	4,538	\$0 ¢0
Library		0	ΔFV	ç	+,036 4 538	\$U ¢n
Mountain View Feasibility Study Long-Term Recommend	led Phase	U		Ş	-,350	\$0
the state of the s		0	LS	\$	3,326,000	ŚO
Subtotal				-		\$39,255,000
Sales Tax	Applied	d to half of cap	ital costs (not including General)		9%	\$1,550,000
Construction Cost Subtotal						\$40,805,000
Market Adjustment Factor					10%	\$4,081,000
Construction Contingency	1				40%	\$16,322,000
Construction Cost Total					1 5 0/	\$61,300,000
Construction Management					10%	0,121,000 \$4 021 000
Engineering Services During Construction					3%	\$4,081,000
Property Acquisition (Property Only)		0	SO FT	Ś	500	\$1,22-,000
Property Acquisition (House on Property)		0	SQ FT	ś	1,000	30 ¢0
Rinconada Land Cost		0	LS	ŝ	4,500,000	\$0 \$0
Peers Land Cost		0	LS	\$	7,000,000	\$0
On-Time Fee		0	LS	\$	75,000	
Total Capital Cost						\$72,600,000

A5				Pa	alo Alto Recycled	Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate		Pro	ject Life
Updated by:	K. Howes		3%		30	Years
CCI (SF, June 2018): 12014.72						
item	Size	Otv	Unit		Unit Cost	Total Cost
O&M Costs (Annual)						
Advanced Water Treatment						
MBR	0		MGD	\$	560,000	\$0
Ozone	0		MGD	ŝ	93,000	\$0
BAC	0		MGD	Ś	131,000	\$0
MF/UF system	0		MGD	\$	342,000	\$0
RO System	0		MGD	\$	574,000	\$0
RO Concentrate Treatment	0		MGD	\$	226,000	\$0
Advanced Oxidation and Disinfection	0		MGD	\$	73,000	\$0
Free Chlorine	0		MGD	\$	32,000	\$0
Chemicals	0		MGD	ş	121,000	\$0
Labor for Treatment (no MBR)	0	1,040	hrs/MGD	ş	100	\$0
Labor for MBR	0	1,040	hrs/year	ş	100	\$0
Monitoring		0	Ş/year	Ş	1,000,000	\$0
Conveyance						
Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	tor Hours per	LF		\$0.78	\$68,908
Pump Stations						
Consumables						
Equipment					1%	\$35,354
Mechanical					1%	\$35,354
Electrical/Instrumentation					1%	\$35,354
Electricity Requirement						
Energy Charge		668,276	kWh/year	\$	0.15	\$100,241
Labor Costs						
Total No. Operators		2	No.			
Average Annual Operator Hours per Year		520	Hours			
Total Operator Hours per Year		1,040	Hours	\$	99.81	\$103,805
Phase 3 RWQCP Pump Station Improvements		0	LS	\$	96,000	\$0
Phase 3 Booster Pump Station		0	LS	\$	81,000	\$0
Storage Tanks						
Annual O&M					1%	\$18,000
Injection Wells						
Annual O&M		0	EA	\$	15,000	\$0
Extraction Wells						
Groundwater Pumping Charge		0	AFY	\$	1,960	\$0
Hale Extraction Well/Wellhead Treatment		0	AFY	Ş	265	\$0
Rinconada Extraction Well/Wellhead Treatment		0	AFY	\$	263	\$0
Peers Extraction Well/Wellhead Treatment		0	AFY	\$	224	\$0
El Camino Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Eleanor Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Library Extraction Well/Wellhead Treatment		0	AFY	Ş	242	Ş0
Mountain View Feasibility Study Long-Term Recommend	led Phase					
Total O&M Costs (\$/vr)		0	LS	Ş	100,000	\$0 \$400.000
Annualized Costs (\$ / Year)		_		_		÷ .: 5)000
Annualized Capital Costs (\$/Year)	One payment	t per year, spre	ad over Project Life			\$3,704,000
Annual O&M Costs						\$400,000
Total Annualized Cost						\$4,104,000
Deliveries of Recycled Water	900	AFY				
Estimated Unit Cost (\$/AF)						\$4,600

A6				Pa	ilo Alto Recyc	led Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72				_		
Item	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital costs		1.0%	¢090.415
Traffic Control			Applied to all capital costs		4%	\$392.166
Treatment						+,
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	\$	323,000	\$0
MF/UF system	0.0		MGD	\$	1,317,000	\$0
RO System	0.0		MGD	\$	1,586,000	\$0
RO Concentrate Treatment	0.0		MGD	\$	1,510,000	\$0
Advanced Oxidation and Disinfection	0.0		MGD	Ş	470,000	\$0
Free Chlorine	0.0		MGD	ş	271,000	ŞC
Chemicals (Storage and Use)	0.0		MGD	ş	134,000	\$0 ¢0
Conveyance	0.0		MGD	Ş	3,427,000	Şu
High-Density Urban Pineline, HDPF						
6 Inch		0	IE	s	186	śc
8 Inch		14.100	LF	ŝ	200	\$2,820,158
10 Inch		10,200	LF	ŝ	212	\$2,162,592
12 Inch		10,000	LF	\$	254	\$2,543,100
16 Inch		0	LF	\$	277	\$0
18 Inch		0	LF	\$	290	\$0
20 Inch		0	LF	\$	334	\$0
24 Inch		0	LF	\$	381	\$0
30 Inch		0	LF	\$	462	\$0
Repurposing Pipe						
6 Inch		0	LF	ş	55	\$0
o IIICN	20/ -6.2	U	LF	Ş	66	\$0
Sileeung and Shoring (Open Cut)	3% of Upen C	ut ripeline Co	51		3%	\$225,775
Tunnel and Casing (26")		0	15	ć	1 770	ć0
Turnel and Casing (30)		0	LF	ç	1,728	ŞU
Peceiving Shaft		0	EA	¢ ¢	150,000	\$0
Horizontal Directional Drilling		0	EA	Ş	130,000	ŞU
24 Inch Bore Diameter		0	IF	Ś	528	ŚO
PTGAB		Ū	2.	Ŷ	520	ψu
6 Inch		0	LF	Ś	375	\$0
8 Inch		0	LF	ŝ	500	\$0
10 Inch		0	LF	\$	625	\$0
12 Inch		0	LF	\$	750	\$0
16 Inch		0	LF	\$	1,000	\$0
20 Inch		0	LF	\$	1,250	\$0
Jacking Shafts		0	EA	\$	258,000	\$0
Receiving Shafts		0	EA	\$	148,000	\$0
Pipe Bridge						
Pipe Bridge Support		0	LF	\$	5,000	\$0
Pipe Bridge Pipe						
6 Inch		0	LF	Ş	66	\$0
8 Inch		0	LF	ş	86	\$0
10 Inch		0	LF	ş	108	ŞU
12 Inch		0	LF	ş	139	ŞU
16 Inch		242	LF	Ş	1/5	\$U 6171.500
Polnoling Cathodic Brotaction	2% of Dipolin	343	EA	Ş	500	\$171,500
Customer Services (no motor replacement)	378 UJ FIPEIIII	17	-051 EA	ć	10.000	\$232,345
Customer Services (with meter replacement)		16	EA	ç	15,000	\$170,000
Planter Box (Housing Pipe on Bridge Sidewalk)		0	CY	ŝ	2.000	\$0
Planter Box (Installation Labor)		ő	Dav	ŝ	4.000	\$0 \$0
Pump Stations		-	,		.,	
Pump Station #1	150	Total	installed HP, including standby	\$	8,256	\$1,238,474
Pump Station #2	0	Total	installed HP, including standby	Ś	-	ŚO
Pump Station #3	0	Total	installed HP, including standby	\$	-	\$0
Pump Station #4	0	Total	installed HP, including standby	\$	-	\$0
Pump Station #5	0	Total	installed HP, including standby	\$	-	\$0
Phase 3 RWQCP Pump Station Improvements		0	LS	\$	1,389,000	\$0
Phase 3 Booster Pump Station		0	LS	\$	918,000	\$0
Hydropneumatic Tank - Pump Station #1	0		Gal	\$		\$0
Hydropneumatic Tank - Pump Station #2	0		Gal	Ş	-	\$0
Hydroppeumatic Tank - Pump Station #3	0		Gal	ş	-	\$0
Hydroppeumatic Tank - Pump Station #5	0		Gal	¢ ¢	-	\$0
Storage Tank	U		Gai	Ş		ŞU
Storage Tank	0.0		MG	s	1,500.000	¢∩
Underground Construction		0.0	LS	ŝ	1,000,000	φo
Injection Well					,	
		0	EA	\$	1,000,000	\$0
Extraction Wellhead Treatment						
Hale		0	AFY	\$	2,937	\$0
Rinconada		0	AFY	\$	2,937	\$0
Peers		0	AFY	\$	3,353	\$0
El Camino		0	AFY	ş	4,538	\$0
Library		0	AFY	ş	4,538 1 = 20	\$0
Mountain View Feasibility Study Long-Term Recommend	led Phase	J	AFT	Ş	4,538	ŞU
wountain view reasonity study congrienn neconiniend	icu i nase	0	LS	\$	3,326,000	\$0
Subtotal				-	,	\$11,177,000
Sales Tax	Applied	d to half of cap	ital costs (not including General)		9%	\$441,000
Construction Cost Subtotal						\$11,618,000
Market Adjustment Factor					10%	\$1,162,000
Construction Contingency					40%	\$4,647,000
Engineering and Admin Services (Design)					15%	\$17,500,000 \$1,742,000
Construction Management					10%	\$1,743,000
Engineering Services During Construction					3%	\$349,000
Property Acquisition (Property Only)		0	SQ FT	Ś	500	\$0.5,000 \$0
Property Acquisition (House on Property)		0	SQ.FT	ŝ	1,000	ŚC
Rinconada Land Cost		0	LS	Ş	4,500,000	\$0
Peers Land Cost		0	LS	\$	7,000,000	\$0
On-Time Fee		0	LS	\$	75,000	-
Total Capital Cost						\$20,700,000
1						

A6				Pa	alo Alto Recycled	Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate		Pro	oject Life
Updated by:	K. Howes		3%		30	Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit		Unit Cost	Total Cost
O&M Costs (Annual)						
Advanced Water Treatment						
MBR	0		MGD	\$	560,000	\$0
Ozone	0		MGD	\$	93,000	\$0
BAC	0		MGD	\$	131,000	\$0
MF/UF system	0		MGD	\$	342,000	\$0
RO System	0		MGD	\$	574,000	\$0
RO Concentrate Treatment	0		MGD	ş	226,000	\$0
Advanced Oxidation and Disinfection	0		MGD	ş	73,000	\$0
Free Chlorine	0		MGD	Ş	32,000	\$0 ¢0
Labor for Treatment (no MRR)	0	1.040	MGD brs/MGD	ç	121,000	\$U ¢0
Labor for MPR	0	1,040	hrs/wab	ç	100	30
Monitoring	0	1,040	\$/year	ç	1 000 000	30 \$0
Conveyance		Ū	\$/ year	Ŷ	1,000,000	ψŪ
Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	tor Hours per	LF		\$0.78	\$27,152
Pump Stations						
Consumables						
Equipment					1%	\$12,385
Mechanical					1%	\$12,385
Electrical/Instrumentation					1%	\$12,385
Electricity Requirement						
Energy Charge		201,615	kWh/year	\$	0.15	\$30,242
Labor Costs						
Total No. Operators		1	No.			
Average Annual Operator Hours per Year		520	Hours			
Total Operator Hours per Year		520	Hours	Ş	99.81	\$51,903
Phase 3 RWQCP Pump Station Improvements		0	LS	Ş	96,000	\$0
Phase 3 Booster Pump Station		0	LS	Ş	81,000	ŞO
Annual O&M					1%	\$0
Injection Wells						
Annual O&M		0	EA	\$	15,000	\$0
Extraction Wells						
Groundwater Pumping Charge		0	AFY	ş	1,960	\$0
Hale Extraction Well/Wellhead Treatment		0	AFY	Ş	265	\$0
Rinconada Extraction Well/Wellhead Treatment		0	AFY	Ş	263	\$0
Peers Extraction Well/Wellhead Treatment		0	AFY	Ş	224	\$0
El Camino Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$U
Library Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$U ¢0
Library Extraction Well/ Wellnead Treatment	ad Dhase	0	AFT	Ş	242	ŞU
information view reasibility study Long-Term Recommend	ieu Phase	0	15	ć	100.000	ćo
Total O&M Costs (\$/yr)		Ū	В	Ş	100,000	پن \$150,000
Annualized Costs (\$ / Year)						
Annualized Capital Costs (\$/Year)	One payment	t per year, spre	ad over Project Life			\$1,056,000
Annual O&M Costs						\$150,000
Total Annualized Cost						\$1,206,000
Deliveries of Recycled Water	500	AFY				
Estimated Unit Cost (\$/AF)						\$2,400

B1				Pa	lo Alto Recy	cled Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72				_		
Item Consider Contro	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
Mobilization			Applied to all capital costs		10%	\$4 956 940
Traffic Control			Applied to all capital costs		4%	\$1,982,776
Treatment						
MBR	1.5		MGD	\$	16,125,000	\$24,000,000
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	\$	323,000	\$0
MF/UF system	0.0		MGD	\$	1,317,000	\$0
RO System	0.0		MGD	ş	1,586,000	\$0
RO Concentrate Treatment	0.0		MGD	ş	1,510,000	\$0
Advanced Oxidation and Disinfection	0.0		MGD	Ş	470,000	ŞU
Free Chlorine	0.0		MGD	Ş	271,000	\$U ¢0
Chemicals (Storage and Use)	0.0		MGD	ş	134,000	ŞU
Conveyance	0.0		MGD	Ş	3,427,000	ŞU
Lonveyance High-Density Urban Pineline, HDPF						
6 Inch		0	IE	Ś	186	ŚO
8 Inch		39,500	LF	ŝ	200	\$7.900.443
10 Inch		4,000	LF	ŝ	212	\$848.075
12 Inch		6,000	LF	ŝ	254	\$1,525,860
16 Inch		11,500	LF	\$	277	\$3,186,305
18 Inch		0	LF	\$	290	\$0
20 Inch		6,000	LF	\$	334	\$2,002,860
24 Inch		0	LF	\$	381	\$0
30 Inch		0	LF	\$	462	\$0
Repurposing Pipe						
6 Inch		0	LF	\$	55	\$0
8 Inch		0	LF	\$	66	\$0
Sheeting and Shoring (Open Cut)	3% of Open (ut Pipeline Co	st		3%	\$463,906
Microtunneling						
Lunnel and Casing (36")		0	LF	Ş	1,728	\$0
Jacking Shaft		0	EA	Ş	300,000	\$0
Receiving Shart		0	EA	Ş	150,000	\$0
24 Jash Boro Diameter		250	16	ć	E 70	¢104 000
PTGAB		330	LF	ç	320	\$104,000
6 Inch		0	IE	Ś	375	ŚO
8 Inch		179	IF	ś	500	\$89 519
10 Inch		0	IF	š	625	\$05,515
12 Inch		0	LE LE	ŝ	750	\$0
16 Inch		0	LF	ŝ	1.000	\$0
20 Inch		0	LF	ŝ	1,250	\$0
Jacking Shafts		0	EA	s	258,000	\$0
Receiving Shafts		0	EA	s	148,000	\$0
Pipe Bridge						
Pipe Bridge Support		14	LF	\$	5,000	\$70,000
Pipe Bridge Pipe						
6 Inch		123	LF	\$	66	\$8,063
8 Inch		0	LF	\$	86	\$0
10 Inch		0	LF	\$	108	\$0
12 Inch		0	LF	\$	139	\$0
16 Inch		0	LF	\$	175	\$0
Potholing		677	EA	\$	500	\$338,260
Cathodic Protection	3% of Pipelin	e Installation (Cost		3%	\$486,295
Customer Services (no meter replacement)		62	EA	ş	10,000	\$620,000
Customer Services (with meter replacement)		139	EA	Ş	15,000	\$2,085,000
Planter Box (Housing Pipe on Bridge Sidewaik)		0	CY Davi	Ş	2,000	\$U ¢0
Planter Box (Installation Labor)		0	Day	Ş	4,000	ŞU
Pump Stations	200	Total	installed HR including standby	ć	7 444	¢1 400 000
Pump Station #2	60	Total	installed HP including standby	ç	11 /122	\$1,400,833 \$1,400,833
Pump Station #3	60	Total	installed HP, including standby	ç	11.482	\$000,978 \$688 979
Pump Station #4	6	Total	installed HP, including standby	Ś	26.306	\$157 826
Pump Station #5	0	Total	installed HP, including standby	ś		¢0،516 10)
Phase 3 RWQCP Pump Station Improvements	Ū	0	LS	ś	1,389,000	30 \$0
Phase 3 Booster Pump Station		0	LS	ŝ	918,000	\$0
Hydropneumatic Tank - Pump Station #1	6,800		Gal	ŝ	33	\$227.638
Hydropneumatic Tank - Pump Station #2	5,500		Gal	\$	36	\$197,127
Hydropneumatic Tank - Pump Station #3	1,400		Gal	\$	43	\$60,621
Hydropneumatic Tank - Pump Station #4	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #5	0		Gal	\$	-	\$0
Storage Tank						
Storage Tank	1.5		MG	\$	1,500,000	\$2,250,000
Underground Construction		0.0	LS	\$	1,000,000	
Injection Well						
		0	EA	Ş	1,000,000	\$0
Extraction Wellhead Treatment						
ndie Rinconada		0	AFY	ş	2,937	\$0
Peers		0	AFY	ç	3,352	şu ¢n
El Camino		0	AFY	ŝ	4.538	\$0 ¢n
Eleanor		0	AFY	š	4,538	\$0 \$0
Library		0	AFY	\$	4,538	\$0
Mountain View Feasibility Study Long-Term Recommend	ed Phase					
		0	LS	\$	3,326,000	\$0
Subtotal			1.1			\$56,509,000
Sales Tax	Applied	a to half of cap	ital costs (not including General)		9%	\$2,231,000
Construction Cost subtotal					100/	\$58,740,000
Market Adjustment Factor					10%	\$5,8/4,000 \$33,404,000
Construction Contingency					40%	\$88,200.000
Engineering and Admin Services (Design)					15%	\$8,811,000
Construction Management					10%	\$5,874,000
Engineering Services During Construction					3%	\$1,762,000
Property Acquisition (Property Only)		50,000	SQ FT	\$	500	\$25,000,000
Property Acquisition (House on Property)		0	SQ FT	\$	1,000	\$0
Rinconada Land Cost		0	LS	\$	4,500,000	\$0
Peers Land Cost		0	LS	\$	7,000,000	\$0
On-Time Fee		0	LS	\$	75,000	A
Total Capital Cost						\$129,600,000

List Updated by: Updated by: CU (SF, June 2018): 12014-72 Size Oty Unit Unit Cost Foreint Life CO (SF, June 2018): 12014-72 Size Oty Unit Unit Cost ford Ots COM Costs (Annual) Common Costs (Annual) Size Oty Unit Unit Cost ford Ots MBR 2 MGD \$ 540,000 \$ 510,000 \$ 500,000	B1				Pa	alo Alto Recycle	d Water Feasibility Study
Updated by: (15/J.une 2014.72) Site Oty Unit Out Cost Fold Cost Cost (5/J.une 2012.01.72) Site Oty Unit Out Cost Fold Cost Advanced Water Treatment 0 MGD \$ 540,000 \$ 500,000	Last Updated:	4-Feb-19		Discount Rate		Pr	oject Life
Carl (SF, June 2018): 12014.72 Size Oty Unit Unit Cost Total Cost OBM Costs (Annual) 2 MGD \$ 540,000 \$81,000 \$ 540,000 \$81,000 \$ 500,000 \$ 581,000 \$ 500,000	Updated by:	K. Howes		3%		30	Years
Item Size Oty Unit Unit Cost Total Cost Advanced Water Treatment. Advanced Water Treatment. MGD \$ 540,000 \$\$131,000 \$\$00 Ozone 0 MGD \$ 93,000 \$\$131,000 \$\$00 Ozone 0 MGD \$ 342,000 \$\$0 \$\$0 MFUF System 0 MGD \$ 742,000 \$\$0 \$\$0 NVFUF System 0 MGD \$ 742,000 \$\$0 \$\$0 Advanced Oxidation and Usinfection 0 MGD \$ 722,000 \$\$0 Chemicals 0 1,040 hrs/yeers \$ 1.00 \$\$0 Advanced Oxidation and Usinfection 0 1,040 hrs/yeers \$ 1.00 \$\$0 Convergance 0 1,040 hrs/yeers \$ 1.000,000 \$\$0 Convergance 0 \$\$0 \$\$0 \$\$0 \$\$0 \$\$0 Convergance 1 1,040 hrs/yeers \$ 1.000,000 \$\$0 Convergance <t< td=""><td>CCI (SF, June 2018): 12014.72</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	CCI (SF, June 2018): 12014.72						
Obt Standard Advanced Vater Treatment MGD \$ 540,000 \$\$81,000 MKR 0 MGD \$ 93,000 \$\$0 BAC 0 MGD \$ 342,000 \$\$0 BAC 0 MGD \$ 342,000 \$\$0 BAC Stream 0 MGD \$ 225,000 \$\$0 BAC Stream 0 MGD \$ 225,000 \$\$0 Advanced Vaidston and Disinfection 0 MGD \$ 221,000 \$\$0 Advanced Vaidston and Disinfection 0 MGD \$ 221,000 \$\$0 Advanced Vaidston and Disinfection 0 MGD \$ 221,000 \$\$0 Advanced Vaidston and Disinfection 0 JA40 htts/MGD \$ 121,000 \$\$0 Advanced Vaidston and Disinfection 0 S/year \$ 1,000,000 \$\$0 \$\$0 Advanced Vaidston and Dispection and Maintenance of Pipeline - Average Annual Operator Hours per T LF \$ 50,78 \$ 532,278 Constrainables 1% \$ 530,266 1% \$ 530,266 1% \$ 53	Item	Size	Qty	Unit	I	Unit Cost	Total Cost
Advanced Valer Treatment VMGD \$ 540,000 \$ \$60,000 Ocone 0 MGD \$ 93,000 \$ \$60,000 DAC 0 MGD \$ 93,000 \$ \$60,000 DAC 0 MGD \$ 93,000 \$ \$60,000 \$ \$61,000 \$ \$61,000 \$ \$61,000 \$ \$61,000 \$ \$61,000 \$ \$60,000	O&M Costs (Annual)						
MBR 2 MGD 5 540,000 St0,000 Orone 0 MGD 5 33,000 St0,000 St0,000,00 St0,000,000 St0,000,000,000 St0,000,000,000 St0,000,000,000 St0,000,000,000,000 St0,000,000,000,000,000,000,000,000,000,	Advanced Water Treatment						
cone 0 MGD \$ 93,000 \$ 90 BAC 0 MGD \$ 13,000 \$ 50 MF/UF system 0 MGD \$ 342,000 \$ 50 RO System 0 MGD \$ 342,000 \$ 50 RO Concentrate Treatment 0 MGD \$ 226,000 \$ 50 RO Concentrate Treatment 0 MGD \$ 32,000 \$ 50 Advanced Oxidation and Disinfection 0 MGD \$ 32,000 \$ 50 Labor for Treatment (no MBR) 0 1,040 hrs/MGD \$ 1,000,000 \$ 50 Conveyance 0 \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	MBR	2		MGD	\$	540,000	\$810,000
BAC 0 MGD \$ 131,000 \$ 50 MF/UF system 0 MGD \$ 342,000 \$ 50 RO System 0 MGD \$ 574,000 \$ 50 RO Concentrate Treatment 0 MGD \$ 574,000 \$ 50 Advanced Oxidation and Disinfection 0 MGD \$ 73,000 \$ 50 Advanced Oxidation and Disinfection 0 MGD \$ 32,000 \$ 50 Chemicals 0 MGD \$ 12,000 \$ 50 Labor for Teatment (no MBR) 0 1,040 hrs/year \$ 100 \$ 50,080 Conveyance Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per IF \$ 50.78 \$ 533,246 Equipment 1% \$ 530,246 1% \$ 530,246 Electrical/Instrumentation 1% \$ 530,246 1% \$ 530,246 Electrical/Instrumentation 1% \$ 530,246 1% \$ 530,246 Electrical/Instrumentation 1% \$ 530,246 1% \$ 530,246 Electr	Ozone	0		MGD	\$	93,000	\$0
MF/UF system 0 MGD \$ 342,000 \$0 RO System 0 MGD \$ 574,000 \$0 RO Concentrate Treatment 0 MGD \$ 225,000 \$0 RO Concentrate Treatment 0 MGD \$ 225,000 \$0 Advanced Oxidation and Disinfection 0 MGD \$ 32,000 \$0 Chemicals 0 MGD \$ 121,000 \$0 Labor for Treatment (no MBR) 0 1,040 hrs/MGD \$ 100 \$0.00 Monitoring 0 \$/year \$ 100 \$0.00 \$0 Conveyance 0 \$/year \$ 1,000,000 \$0 Consumables 1% \$30,246 1% \$30,246 Exertical/instrumentation 1% \$30,246 1% \$30,246 Elertrical/instrumentation 5 \$50,080 kWh/year \$ 0.15 \$ 822,512 Labor Costs 7 \$2,00 Hours \$ 99,81 \$207,610 Phase 3 Boxter Pump Station Improvements 0 L5 \$ 95,000 \$0 Shace 3 boxter Pump Station Impro	BAC	0		MGD	\$	131,000	\$0
NO System 0 MGD \$ 574,000 \$0 Advanced Oxidation and Disinfection 0 MGD \$ 222,000 \$0 Advanced Oxidation and Disinfection 0 MGD \$ 222,000 \$0 Free Chiorine 0 MGD \$ 222,000 \$0 Labor for Treatment (no MR) 0 1,040 hrs/MGD \$ 100 \$00 Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$0.78 \$53,279 Pump Stations 0 Sylvear \$ 1,000,000 \$00 Consumables 1% \$30,246 1% \$30,246 Equipment Mechanical 1% \$30,246 1% \$30,246 Electricity Requirement 1% \$30,246 1% \$30,246 1% \$30,246 Electricity Requirement 500,080 kWh/year \$ 0.15 \$82,512 Labor Cost 1% \$30,246 Electricity Requirement 2,080 Hours 5 9,911 \$207,610 Pase 3 BWOCP Thurs per Year 5,20 Hours \$ 9,6000 \$0 \$0 \$5	MF/UF system	0		MGD	\$	342,000	\$0
NO Concentrate Treatment 0 MGD \$ 225,000 \$0 Advanced Oxidation and Disinfection 0 MGD \$ 32,000 \$0 Free Chlorine 0 MGD \$ 32,000 \$0 Labor for Treatment (no MBR) 0 1,040 hrs/MGD \$ 121,000 \$0 Labor for MR 2 1,040 hrs/MGD \$ 1,000,000 \$0 Consumables 0 \$/year \$ 1,000,000 \$0 Consumables 0 \$/year \$ 1,000,000 \$0 Electrical/Instrumentation 1% \$30,246 1% \$30,246 Integrity Requirement	RO System	0		MGD	\$	574,000	\$0
Advanced Oxidation and Disinfection Advanced Oxidation and Disinfection 0 MGD 5 73,000 S0 Chemicals 0 MGD 5 12,000 S0 Labor for Treatment (no MBR) 0 1,040 hrs/MGD 5 100 S0 Labor for MBR 2 1,040 hrs/MGD 5 100 S0 Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$0.78 \$53,279 Pamp Stations 1% \$30,246 1% \$30,246 Equipment 1% \$30,246 1% \$30,246 Electricity Requirement 1% \$30,246 1% \$30,246 Energy Charge 550,080 kWh/year \$0.15 \$22,512 Labor Cost 4 No. Average Annual Operator Hours per Year \$2,080 Hours \$98,81 \$207,610 Total No. Operators 4 No. Average Annual Operator Hours per Year \$2,080 Hours \$98,81 \$207,610 \$208,000 \$0 \$208,000	RO Concentrate Treatment	0		MGD	ş	226,000	\$0
Prec Chlorine 0 MGD S 32,000 S0 Labor for Treatment (no MBR) 0 1,040 hnrs/MGD S 100 S0 Labor for Treatment (no MBR) 0 1,040 hnrs/MGD S 100 S0 Monitoring 0 S/year S 1,000,000 S0 Consumables 0 S/year S 1,000,000 S0 Consumables 0 S/year S 1,000,000 S0 Equipment 1% S30,246 1% S30,246 1% S30,246 Mechanical 1% S30,246 1% S30,246 <td>Advanced Oxidation and Disinfection</td> <td>0</td> <td></td> <td>MGD</td> <td>ş</td> <td>73,000</td> <td>Ş0</td>	Advanced Oxidation and Disinfection	0		MGD	ş	73,000	Ş0
Chemicals 0 MGU S 12,400 S0 Labor for Yeatment (no MBR) 0 1,040 hrs/NGD S 100 S0 Labor for MBR 2 1,040 hrs/NGD S 100 S0 Monitoring 0 S/year S 100 S0 Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$0.78 \$53,279 Pump Stations 1% \$30,246 1% \$30,246 Equipment 1% \$30,246 1% \$30,246 Electricity Requirement 2,080 Hours 5 9,61 \$207,610 Phase 3 NOCEP Pump Station Improvements 0 LS \$ 99,81	Free Chlorine	0		MGD	ş	32,000	\$0 ¢0
Labor for Heatment (no MeN) 0 1,040 Instruction 5 1.00 50 Monitoring 0 S/year \$ 1.00,000 \$0 Conveyance 0 S/year \$ 1.00,000 \$0 Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$0.78 \$53,279 Pump Stations 1% \$530,246 1% \$30,246 Equipment 1% \$30,246 1% \$30,246 Electrical/Instrumentation 0 LS \$9,81 \$207,610 Phase 3 RNOCO Pump Station Improvements 0 LS \$96,000 \$0	Chemicals	0	1.040	MGD	Ş	121,000	\$0 ¢0
Labor (D) Mink 2 1,040 mis/year 5 1,000 5/1,000,000 S0 Conveyance 0 S/year 5 1,000,000 S0 Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$0.78 \$53,279 Pump Stations 1% \$30,246 1% \$30,246 Equipment 1% \$30,246 1% \$30,246 Bectricity Requirement 1% \$30,246 1% \$30,246 Encry Charge 550,080 kWh/year \$ 0.15 \$82,512 Labor Costs 1 1% \$30,246 1% \$30,246 Total Operators 4 No. Average Annual Operator Hours per Year \$200 Hours Total Operator Hours per Year \$200,00 \$00 Phase 3 Bito Inspreements 0 LS \$9,81 \$207,610 \$200 \$0 Phase 3 Boater Pump Station 0 LS \$9,81,000 \$00 \$0 \$0 Storage Tanks 0 LS \$9,81,000 \$0 \$0 \$0 \$0 \$0 \$0<	Labor for MPD	0	1,040	hrs/wigD	ş	100	\$U ¢104.000
Moliniding 0 0 Sylear S 1,000,000 SU Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$0.78 \$53,279 Pump Stations Consumables Equipment 1% \$30,246 Electrical/Instrumentation 1% \$30,246 Electrical/Instrumentation 1% \$30,246 Electrical/Instrumentation 1% \$30,246 Electrical/Instrumentation 1% \$30,246 Electrical/Instrumentation 1% \$30,246 Electrical/Instrumentation 2% 0.15 \$82,512 Labor Costs Total No. Operator S 0.15 \$82,512 Labor Costs 99,81 \$207,610 Phase 3 RWCP Pump Station Improvements 0 LS \$ 99,81 \$207,610 Phase 3 RWCP Pump Station 100 LS \$ 99,810 \$207,610 Phase 3 RWCP Pump Station 100 LS \$ 81,000 \$0 Storage Tanks Annual O&M 0 EA \$ 15,000 \$0 Finace 10 AFY \$ 1,960 \$0 Hale Extraction Well/Wellhead Treatment 0 AFY \$ 1,960 \$0 Rancal O&AFY \$ 2,255 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Eleanric Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Eleanric Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Eleanric Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Library Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Library Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Eleanric Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Eleanric Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Eleanric Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Library Extraction Well/Wellhead Treatment 0 AFY \$ 2,265 \$0 Eleanric Extraction Well/Wellhead Treatment 0 AFY \$ 2,56	Labor for MBR	2	1,040	nrs/year	Ş	1 000 000	\$104,000 ¢0
Lonveyance Annual Inspection and Maintenance of Pipeline - Average Annual Operator Hours per LF \$0.78 \$53,279 Pump Stations Consumables Equipment Mechanical 1% \$30,246 Educing Ministrumentation Electricity Requirement Energy Charge 550,080 kWh/year \$ 0.15 \$82,512 Educing Ministrumentation Electricity Requirement Energy Charge 550,080 kWh/year \$ 0.15 \$82,512 Labor Costs Total No. Operators 4 No. Average Annual Operator Hours per Year 520 Hours Total No. Operator Hours per Year 2,080 Hours 5 99,81 \$207,610 Phase 3 RWQCP Pump Station Improvements 0 LS \$ 96,000 \$0 Phase 3 Booster Pump Station Improvements 0 LS \$ 96,000 \$0 Sorage Tanks Annual O&M 1% \$22,500 Inlectom Wells Hale Extraction Well/Wellhead Treatment 0 AFY \$ 1,960 \$0 Hale Straction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Peres Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Peres Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Peres Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Detarted Wells Eleanor Extraction Well/Wellhead Treatment 0 AFY \$ 255 \$0 Peres Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Diartor Wells Diartor Well Station 0 AFY \$ 265 \$0 Peres Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$0 Diartor Well Station 0 AFY \$ 256 \$0 Diartor Well/Wellhead Treatment 0 AFY \$ 268 \$0 Diartor Well/Wellhead Treatment 0 AFY \$ 268 \$0 Diartor Well/Wellhead Treatment 0 AFY \$ 256 \$0 Diartor Well/Wellhead Treatment 0 AFY \$ 268 \$0 Diartor Well \$0 Diart	Wontoning		U	\$/year	Ş	1,000,000	ŞU
Pump Stations Consumables Equipment 1% \$30,246 Bectricit/Instrumentation 1% \$30,246 Electricit/Instrumentation 1% \$30,246 Electricit/Instrumentation 1% \$30,246 Electricit/Instrumentation 1% \$30,246 Electricit/Reguirement 1% \$30,246 Discound Costs 4 No. \$30,246 Total No. Operator Hours per Year 2,080 Hours Total Operator Hours per Year \$20,7610 Phase 3 8WQCP Pump Station Improvements 0 L5 \$9,6000 \$0 Sorger Ends 1% \$22,500 \$20 \$0 \$0 \$0 \$0 Annual 0&M 0 EA \$ 1,5,000 \$0 \$0 Betraction Well/Wellhead Treatment 0 AFY \$ 225 \$0 Peers Ext	Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	itor Hours per	LF		\$0.78	\$53,279
Consumables 1% \$\$30,246 Equipment 1% \$\$30,246 Betchrick/Instrumentation 1% \$\$30,246 Electrick/Instrumentation 1% \$\$30,246 Electrick/Instrumentation 1% \$\$30,246 Electrick/Instrumentation 1% \$\$30,246 Electrick/Requirement 1% \$\$30,246 Electrick/Requirement 1% \$\$30,246 Labor Costs 4 No. Total No. Operator Hours per Year 2,080 Hours Total One Thours per Year 2,080 Hours Total One Thours per Year 2,080 Hours Storage Tanks 0 LS \$ 96,000 \$0 Annual 0&M 0 EA \$ 15,000 \$0 Storage Tanks 1% \$225.00 \$0 Rinconda Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Pares Extraction Well/Wellhead Treatment 0 AFY \$ 2256 \$0 Eleanor Extraction Well/Wellhead Treatment 0	Pump Stations						
Equipment 1% \$30,246 Mechanical 1% \$30,246 Electrici/Lynstrumentation 1% \$30,246 Energy Charge 550,080 kWh/year \$ 0.15 \$82,512 Electrici/Lynstrumentation 550,080 kWh/year \$ 0.15 \$82,512 Electrici/Lynstrumentation 4 No. No. No. No. Average Annual Operator Hours per Year 2,080 Hours \$ 99,811 \$207,610 Phase 3 RWQCP Pump Station Improvements 0 L5 \$ 96,000 \$0 Storage Tanks 0 L5 \$ 81,000 \$0 Annual 0&M 0 EA \$ 15,5 \$22,500 Injection Wells 1% \$22,500 \$3 \$22,500 \$3 \$30,000 \$0 Annual 0&M 0 EA \$ 15,000 \$50 \$3 \$30,000 \$30 Pers Extraction Well/Wellhead Treatment 0 AFY \$ 2265 <td>Consumables</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Consumables						
Mechanical Electricit/Instrumentation 1% \$30,246 Electricit/Instrumentation 1% \$30,246 Electricit/Requirement 550,080 kWh/year \$0.15 \$82,512 Energy Charge 550,080 kWh/year \$0.15 \$82,512 Eabor Costs 4 No. No. No. No. Average Annual Operator Hours per Year 2,080 Hours \$99,81 \$207,610 Phase 3 Brox Proposition Improvements 0 LS \$96,000 \$0 Storage Tanis 0 LS \$81,000 \$0 Annual O&M 0 EA \$15,000 \$0 Infection Wells 0 AFY \$225,50 \$0 Annual O&M 0 EA \$15,000 \$0 Feataction Wells 0 AFY \$265 \$0 Groundwater Pumping Charge 0 AFY \$265 \$0 Bel Camino Extraction Well/Wellhead Treatment 0 AFY \$256 \$0 Eleanor Extraction Well/Wellhead	Equipment					1%	\$30,246
Electrical/instrumentation 1% \$30,246 Electrical/instrumentation 1% \$30,246 Electricity Requirement 550,080 kWh/year \$0.15 \$82,512 Eaber Costs 70tal No. Operators 4 No. No. Average Annual Operator Hours per Year 2,080 Hours \$99,81 \$207,610 Phase 3 RWQCP Pump Station Improvements 0 LS \$96,000 \$0 Phase 3 RWQCP Pump Station Improvements 0 LS \$96,000 \$0 Storage Tanks 0 LS \$96,000 \$0 Annual 0&M 0 EA \$15,000 \$0 Annual 0&M 0 EA \$15,000 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$265 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$265 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$2256 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$255 \$0 <td>Mechanical</td> <td></td> <td></td> <td></td> <td></td> <td>1%</td> <td>\$30,246</td>	Mechanical					1%	\$30,246
Electricity Requirement S50,080 kWh/year S 0.15 \$82,512 Labor Costs	Electrical/Instrumentation					1%	\$30,246
Energy Charge 550,080 kWh/year \$ 0.15 \$\$2,512 Labor Costs	Electricity Requirement						,
Labor Costs 4 No. Total No. Operators 4 No. Average Annual Operator Hours per Year 520 Hours Total Operator Hours per Vear 2,080 Hours \$ 99,81 Phase 3 RWQCP Pump Station Improvements 0 LS \$ 96,000 \$0 Phase 3 RWQCP Pump Station Improvements 0 LS \$ 96,000 \$0 Storage Tanks 0 LS \$ 81,000 \$0 Annual 0&M 0 EA \$ 15,000 \$0 Annual 0&M 0 EA \$ 15,000 \$0 Roroundwater Pumping Charge 0 AFY \$ 1,960 \$0 Groundwater Pumping Charge 0 AFY \$ 265 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 225 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 226 \$0 Li Brance Extraction Well/Wellhead Treatment 0 AFY \$ 242 \$0 Mountain View Fasibility Study Ung Term Recommended Phase 0 AFY \$ 242	Energy Charge		550,080	kWh/year	\$	0.15	\$82,512
Total Operators 4 No. Average Annual Operator Hours per Year 520 Hours Total Operator Hours per Year 2,080 Hours \$ 99.81 \$207,610 Phase 38 NWQCP Pump Station Improvements 0 LS \$ 96,000 \$0 Phase 38 obset Pump Station 0 LS \$ 81,000 \$0 Storage Tanks 0 LS \$ 81,000 \$0 Annual O&M 0 EA \$ 1% \$22,500 Infection Wells 0 EA \$ 1,500 \$0 Groundwater Pumping Charge 0 APY \$ 1,960 \$0 Hale Extraction Well/Wellhead Treatment 0 APY \$ 2,65 \$0 Peers Extraction Well/Wellhead Treatment 0 APY \$ 2,26 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2,25 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2,25	Labor Costs						
Average Annual Operator Hours per Year Total Operator Hours per Year 520 Hours \$98.1 \$207,610 Total Operator Hours per Year 2,080 Hours \$99.81 \$207,610 Phase 3 RWQCP Pump Station improvements 0 LS \$96,000 \$0 Storage Tanks 0 LS \$81,000 \$0 Annual 0&M 0 EA \$15,000 \$0 Injection Wells 1% \$222,500 \$22,500 \$0 Annual 0&M 0 EA \$15,000 \$0 Extraction Wells 0 AFY \$1,960 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$265 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$224 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$256 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$256 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$256 \$0 Library Extraction	Total No. Operators		4	No.			
Total Operator Hours per Year 2,080 Hours \$ 99.81 \$207,610 Phase 3 RWQCP Pump Station Improvements 0 LS \$ 96,000 \$0 Phase 3 RWQCP Pump Station Improvements 0 LS \$ 81,000 \$0 Storage Tanks 0 LS \$ 81,000 \$0 Annual 0&M 0 EA \$ 15,000 \$0 Injection Wells 0 EA \$ 15,000 \$0 Annual 0&M 0 EA \$ 15,000 \$0 Hale Extraction Wells 0 AFY \$ 265 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Peers Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 226 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 242 \$0 Ubrary Extraction Well/Wellhead Treatment 0 AFY \$ 242 \$0 Mountain View Feaibility Study Long-Term Recomme	Average Annual Operator Hours per Year		520	Hours			
Phase 3 RWQCP Pump Station Improvements 0 LS \$ 96,000 \$00 Phase 3 Booster Pump Station 0 LS \$ 81,000 \$0 Storage Tanks 1% \$22,500 \$0<	Total Operator Hours per Year		2,080	Hours	\$	99.81	\$207,610
Phase 3 Booster Pump Station 0 LS \$ 81,000 \$0 Storage Tanks Annual 0&M 10 EA \$ 15,000 \$0 Injection Wells Groundwater Pumping Charge 0 AFY \$ 1,960 \$0 Hale Extraction Well/Wellhead Treatment 0 AFY \$ 225 \$00 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 263 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 225 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 225 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 225 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 225 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 255 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 \$0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 \$0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 \$0 AFY \$ 256 \$00 El Camio Extraction Well/Wellhead Treatment 0 \$0 AFY \$ 256 \$00 Extraction Well/Wellhead Treatment 0 \$1,370,000 \$00 Total O&M Costs (\$/Yer) \$00 AFY \$ \$7,982,000 Deliveries of Recycled Water \$00 AFY \$ \$7,982,000 Deliveries of Recycled Water \$00 AFY \$ \$5,900 Extraction Cost \$5/F] \$100,000 \$00 Extraction Cost \$5/F] \$100,000 \$10 Extraction Cost \$5/F] \$100,000 \$10 S00 S00 S00 S00 S00 S00 S00 S	Phase 3 RWQCP Pump Station Improvements		0	LS	\$	96,000	\$0
Storage Tanks 1% \$22,500 Annual 0&M 0 EA \$ 15,000 \$00 Injection Wells 0 EA \$ 15,000 \$00 Extraction Wells 0 APY \$ 1,960 \$00 Hale Extraction Well/Wellhead Treatment 0 APY \$ 2,65 \$00 Rinconada Extraction Well/Wellhead Treatment 0 APY \$ 2,265 \$00 Peers Extraction Well/Wellhead Treatment 0 APY \$ 2,265 \$00 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2,256 \$00 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2,256 \$00 Mountain View Feasibility Study Long-Term Recommended Phase 0 APY \$ 2,242 \$00 Mountain View Feasibility Study Long-Term Recommended Phase 0 LIS \$ 100,000 \$0 Annual 0&R Costs (\$/Year) 0 De payment per year, spread over Project Life \$1,370,000 \$1,370,000 Annual O&R Costs (\$/Year) 0 S00 \$1,370,00	Phase 3 Booster Pump Station		0	LS	\$	81,000	\$0
Annual 0&M 1% \$22,500 Injection Wells 0 EA \$ 15,000 \$0 Extraction Well/Wellhead Treatment 0 AFY \$ 1,960 \$0 Hale Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 263 \$0 Peres Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 2256 \$0 Bleanor Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 2256 \$0 Bleanor Extraction Well/Wellhead Treatment 0 AFY \$ 242 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 LIS \$ 100,000 \$0 Annual 0&M Costs (\$/Year) One payment per year, spread over Project Life \$1,370,000 \$1,370,000 <td>Storage Tanks</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Storage Tanks						
Injection Wells 0 EA \$ 15,000 \$0 Annual 0&M 0 EA \$ 15,000 \$0 Struction Wells 0 APY \$ 1,960 \$0 Groundwater Pumping Charge 0 APY \$ 1,960 \$0 Hale Extraction Well/Wellhead Treatment 0 APY \$ 263 \$0 Peers Extraction Well/Wellhead Treatment 0 APY \$ 224 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2256 \$0 El Camino Extraction Well/Wellhead Treatment 0 APY \$ 2256 \$0 Library Extraction Well/Wellhead Treatment 0 APY \$ 242 \$0 Mountain View Feasibility Study Long Term Recommended Phase 0 APY \$ 242 \$0 Mountain View Feasibility Study Long Term Recommended Phase \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ <td>Annual O&M</td> <td></td> <td></td> <td></td> <td></td> <td>1%</td> <td>\$22,500</td>	Annual O&M					1%	\$22,500
Annual Q&M 0 EA \$ 15,000 \$00 Extraction Wells Groundwater Pumping Charge 0 AFY \$ 1,960 \$00 Hale Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$00 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 2265 \$00 Peers Extraction Well/Wellhead Treatment 0 AFY \$ 2265 \$00 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 2256 \$00 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$ 2256 \$00 Library Extraction Well/Wellhead Treatment 0 AFY \$ 2256 \$00 Mountain View Feasibility Study Long-Term Recommended Phase 0 AFY \$ 242 \$00 Mountain View Feasibility Study Long-Term Recommended Phase 0 LIS \$ 100,000 \$ \$ Annual C& Costs (\$ / Year) 0 De payment per year, spread over Project Life \$ \$ \$	Injection Wells						
Extraction Wells 0 AFY \$ 1,960 \$0 Hale Extraction Well/Wellhead Treatment 0 AFY \$ 2,65 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 2,63 \$0 Peers Extraction Well/Wellhead Treatment 0 AFY \$ 2,24 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 2,25 \$0 Dibrary Extraction Well/Wellhead Treatment 0 AFY \$ 2,25 \$0 Library Extraction Well/Wellhead Treatment 0 AFY \$ 2,25 \$0 Dibrary Extraction Well/Wellhead Treatment 0 AFY \$ 2,25 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 LS \$ 100,000 \$0 Total 0&M Costs (\$/yr) 0 LS \$ 100,000 \$0 Annual Iced Costs (\$/Year) 0 page and over Project Life \$1,370,000 \$1,370,000 Total Annualiced Cost 50 \$7,982,	Annual O&M		0	EA	\$	15,000	\$0
Groundwater Pumping Charge 0 AFY \$ 1,960 \$0 Hale Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 263 \$0 Peers Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$0 Library Extraction Well/Wellhead Treatment 0 AFY \$ 242 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 AFY \$ 242 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 LS \$ 100,000 \$0 Annual ISec Costs (\$ / Year) 0 LS \$ 100,000 \$0 \$1,370,000 Annual O& Costs (\$ / Year) 0 El vario Sec (\$ 5,512,000 \$5,612,000 \$5,13,370,000 \$5,13,370,000 \$5,982,000 \$5,982,000 \$5,982,000 \$5,982,000 \$5,982,000 \$5,982,000 <t< td=""><td>Extraction Wells</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Extraction Wells						
Hale Extraction Well/Wellhead Treatment 0 AFY \$ 265 \$\$0 Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 263 \$\$0 Peers Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$\$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 225 \$\$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 255 \$\$0 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 255 \$\$0 Library Extraction Well/Wellhead Treatment 0 AFY \$ 242 \$\$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 LS \$ 100,000 \$\$0 Annualized Costs (\$ / Year) 0 LS \$ 100,000 \$\$0 \$\$1,370,000 Annual O&M Costs (\$/Year) One payment per year, spread over Project Life \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1,370,000 \$\$1	Groundwater Pumping Charge		0	AFY	\$	1,960	\$0
Rinconada Extraction Well/Wellhead Treatment 0 AFY \$ 263 \$00 Peers Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$00 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$00 El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 2256 \$00 Library Extraction Well/Wellhead Treatment 0 AFY \$ 224 \$00 Mountain View Feasibility Study Long-Term Recommended Phase 0 L5 \$ 100,000 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 L5 \$ 100,000 \$0 Annualized Costs (\$ / Year) 0 L5 \$ 100,000 \$0 Annual Costs (\$/Year) One payment per year, spread over Project Life \$1,370,000 \$0,370,000 Total Oxits One payment per year, spread over Project Life \$1,370,000 \$1,370,000 Total Annualized Cost \$00 AFY \$7,982,000 \$7,982,000 \$7,982,000 Deliveries of Recycled Water	Hale Extraction Well/Wellhead Treatment		0	AFY	\$	265	\$0
Peers Extraction Well/Wellnead Treatment 0 AFY \$ 224 \$00 El Camino Extraction Well/Wellnead Treatment 0 AFY \$ 256 \$00 Eleanor Extraction Well/Wellnead Treatment 0 AFY \$ 256 \$00 Mountain View Feasibility Study Long-Term Recommended Phase 0 AFY \$ 242 \$00 Mountain View Feasibility Study Long-Term Recommended Phase 0 LIS \$ 100,000 \$\$ Annualized Costs (\$ / Year) 0 LIS \$ 100,000 \$\$ Annual OBK Costs (\$/Year) 0 De payment per year, spread over Project Life \$\$ \$\$ Annual OBK Costs (\$/Year) 0 De payment per year, spread over Project Life \$\$ \$\$ Annual OBK Costs (\$/Year) 0 De payment per year, spread over Project Life \$\$ \$\$ Annual OBK Costs (\$/Year) 0 S \$\$ \$\$ \$\$ Total Annualized Cost \$\$ \$\$ \$\$ \$\$ \$\$ Deliveries of Recycled Water \$\$	Rinconada Extraction Well/Wellhead Treatment		0	AFY	\$	263	\$0
El Camino Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$0 Eleanor Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$0 Library Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 LS \$ 100,000 \$0 Total O&M Costs (\$/yrar) 0 LS \$ 100,000 \$0 Annualized Cost (\$/year) 0 De payment per year, spread over Project Life \$6,612,000 Annual O&M Costs 5 \$1,370,000 \$1,370,000 Total Annualized Cost \$7,982,000 \$7,982,000 Deliveries of Recycled Water 900 AFY \$5,900	Peers Extraction Well/Wellhead Treatment		0	AFY	\$	224	\$0
Eleanor Extraction Well/Wellhead Treatment 0 AFY \$ 256 \$0 Library Extraction Well/Wellhead Treatment 0 AFY \$ 242 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 LS \$ 100,000 \$0 Total 0&M Costs (\$/yr) 0 LS \$ 100,000 \$0 Annualized Costs (\$ / Year) 0 LS \$ 100,000 \$0 Annualized Costs (\$ / Year) 0 0 S 1,370,000 \$0,000	El Camino Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Library Extraction Well/Wellhead Treatment 0 AFY \$ 242 \$0 Mountain View Feasibility Study Long-Term Recommended Phase 0 LS \$ 100,000 \$0 Total O&M Costs (\$/yra) Annualized Costs (\$/Year) Annual Q&M Costs (\$/Year) Annual Q&M Costs (\$/Year) Total Annualized Cost Total Annualized Cost Estimated Unit Cost (\$/AF) S 242 \$0 100,000 \$0 \$1,370,000 \$1	Eleanor Extraction Well/Wellhead Treatment		0	AFY	\$	256	\$0
Mountain View Feasibility Study Long-Term Recommended Phase 0 LS \$ 100,000 \$0 Total O&M Costs (\$/year) \$1,370,000 Annualized Capital Costs (\$/year) One payment per year, spread over Project Life \$6,612,000 Annual O&M Costs \$1,370,000 \$1,370,000 Total Annualized Cost \$1,370,000 Total Annualized Cost \$1,370,000 Total Annualized Cost \$7,982,000 Deliveries of Recycled Water \$00 AFY	Library Extraction Well/Wellhead Treatment		0	AFY	\$	242	\$0
0 LS \$ 100,000 \$00 Annualized Costs (\$ / Year) \$1,370,000 \$1,370,	Mountain View Feasibility Study Long-Term Recommend	ded Phase					
Annualized Costs (\$ / Year) Annualized Capital Costs (\$/Year) One payment per year, spread over Project Life \$6,612,000 Annual O&M Costs \$1,370,000 \$1,370,000 \$1,370,000 Total Annualized Cost \$7,982,000 \$7,982,000 Deliveries of Recycled Water \$00 AFY \$8,900	Total O&M Costs (\$/yr)	0	LS	\$	100,000	\$0 \$1.370.000
Annualized Capital Costs (\$/Year) One payment per year, spread over Project Life \$6,612,000 Annual 0&M Costs \$1,370,000 Total Annualized Cost \$7,982,000 Deliveries of Recycled Water 900 AFY	Annualized Costs (\$ / Year)						
Annual O&M Costs \$1,370,000 Total Annualized Cost \$7,982,000 Deliveries of Recycled Water 900 AFY Estimated Unit Cost (\$/AF) \$8,900	Annualized Capital Costs (\$/Year)	One paymen	t per year, spre	ead over Project Life			\$6,612,000
Total Annualized Cost \$7,982,000 Deliveries of Recycled Water 900 AFY Estimated Unit Cost (\$/AF) \$8,900	Annual O&M Costs						\$1,370,000
Deliveries of Recycled Water 900 AFY Estimated Unit Cost (\$/AF) \$8,900	Total Annualized Cost						\$7,982,000
Estimated Unit Cost (\$/AF) \$8,900	Deliveries of Recycled Water	900) AFY				
	Estimated Unit Cost (\$/AF)						\$8,900

C1				Pa	lo Alto Recy	led Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72						
Item Conital Costs	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital costs		10%	\$3 353 169
Traffic Control			Applied to all capital costs		4%	\$1,341,268
Treatment						
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	\$	323,000	\$0
MF/UF system	2.5		MGD	\$	1,317,000	\$3,300,000
RO System	2.5		MGD	Ş	1,586,000	\$4,000,000
RO Concentrate Treatment	0.0		MGD	ş	1,510,000	\$0 \$1 200 000
Advanced Oxidation and Disinfection	2.5		MGD	Ş	470,000	\$1,200,000
Free Chlorine	0.0		MGD	Ş	271,000	\$U \$2.40.000
Chemicals (Storage and Use)	2.5		MGD	Ş	2 4 2 7 000	\$340,000
Sitework/Piping/Structures	2.5		MGD	Ş	3,427,000	\$8,600,000
High-Density Urban Pipeline, HDPE						
6 Inch		0	LF	Ś	186	ŚO
8 Inch		2,000	LF	\$	200	\$400,023
10 Inch		1,500	LF	\$	212	\$318,028
12 Inch		5,000	LF	\$	254	\$1,271,550
16 Inch		20,500	LF	\$	277	\$5,679,935
18 Inch		0	LF	\$	290	\$0
20 Inch		0	LF	\$	334	\$0
24 Inch		0	LF	\$	381	\$0
30 Inch		0	LF	\$	462	\$0
Repurposing Pipe						
6 Inch		0	LF	\$	55	\$0
8 inch	20/ 15 0	0	LF	Ş	66	\$0
Sileeting and Shoring (Open Cut)	3% of Upen (ut ripeline Co	51		3%	\$230,086
Tuppel and Cacing (26")		0	15	<i>.</i>	4 730	**
i unnei anu Casirig (35°) Jacking Shaft		0		ş	1,/28	\$0
JacKing Stidit		0	EA CA	ş	150,000	\$0
Horizontal Directional Drilling		U	EA	Ş	100,000	\$0
24 Inch Bore Diameter		0	IF	¢	579	ćn
PTGAB		0	Li Li	Ŷ	520	ψŲ
6 Inch		0	IF	Ś	375	\$0
8 Inch		0	LF	ŝ	500	\$0
10 Inch		0	LF	ŝ	625	\$0
12 Inch		0	LF	s	750	\$0
16 Inch		458	LF	\$	1,000	\$458,096
20 Inch		0	LF	\$	1,250	\$0
Jacking Shafts		1	EA	\$	258,000	\$258,000
Receiving Shafts		1	EA	\$	148,000	\$148,000
Pipe Bridge						
Pipe Bridge Support		0	LF	\$	5,000	\$0
Pipe Bridge Pipe						
6 Inch		0	LF	\$	66	\$0
8 Inch		0	LF	ş	86	\$0
10 Inch		0	LF	ş	108	\$0
12 Inch		0	LF	Ş	139	\$0
16 Inch		0	LF	Ş	1/5	\$0 ¢1.47.200
Potnoling Cathedia Bratastian	20/ of Disalis	295	EA	Ş	500	\$147,290
Cathodic Protection	3% OJ PIPEIII		.051	ć	10 000	\$250,732
Customer Services (no meter replacement)		0	EA	ç	15,000	\$U \$0
Planter Box (Housing Pine on Bridge Sidewalk)		0	CY CY	ś	2 000	50 \$0
Planter Box (Installation Labor)		0	Day	ś	4 000	50 \$0
Pump Stations		Ū	507	Ť	4,000	ço
Pump Station #1	300	Total	installed HP, including standby	\$	6,433	\$1,929,951
Pump Station #2	0	Total	installed HP, including standby	Ś	-	ŝ
Pump Station #3	0	Total	installed HP, including standby	ş	-	\$0
Pump Station #4	0	Total	installed HP, including standby	\$	-	\$0
Pump Station #5	0	Total	installed HP, including standby	\$	-	\$0
Phase 3 RWQCP Pump Station Improvements		0	LS	\$	1,389,000	\$0
Phase 3 Booster Pump Station		0	LS	\$	918,000	\$0
Hydropneumatic Tank - Pump Station #1	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #2	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #3	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #4	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #5	0		Gal	\$	-	\$0
Storage Tank						
Storage Fank	0.0		MG	Ş	1,500,000	\$0
Underground Construction		0.0	LS	Ş	1,000,000	
Injection Well			54		1.000.000	ér 000 cr-
Extraction Wellhead Treatment		5	ŁA	Ş	1,000,000	\$5,000,000
Hale		0	AEV	ć	2 0 2 7	ćo
Rinconada		0	AFY	ş	2,937 2,937	50 ¢n
Peers		0	AFY	ŝ	3.353	\$0
El Camino		0	AFY	ŝ	4,538	\$0 \$0
Eleanor		0	AFY	\$	4,538	\$0
Library		0	AFY	\$	4,538	\$0
Mountain View Feasibility Study Long-Term Recommend	led Phase					
		0	LS	\$	3,326,000	\$0
Subtotal	A /*	to b-16 . C	ital costs (not including Commit			\$38,226,000
Sales Tax Construction Cost Subtotal	Applied	a co naif of cap	nui costs (not including General)		9%	\$1,509,000 \$39,735,000
Market Adjustment Factor					10%	\$35,733,000 \$3,97,8 000
Construction Contingency	,				10%	\$3,974,000 \$15,894.000
Construction Cost Total						\$59,700,000
Engineering and Admin Services (Design)					15%	\$5,960,000
Construction Management					10%	\$3,974,000
Engineering Services During Construction					3%	\$1,192,000
Property Acquisition (Property Only)		20,000	SQ FT	\$	500	\$10,000,000
Property Acquisition (House on Property)		0	SQ FT	\$	1,000	\$0
Rinconada Land Cost		1	LS	\$	4,500,000	\$4,500,000
Peers Land Cost		1	LS	Ş	7,000,000	\$7,000,000
Un-nine Fee		0	LS	Ş	/5,000	603 300 000
						÷32,200,000

C1				Pa	alo Alto Recycled	Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate		Pro	oject Life
Updated by:	K. Howes		3%		30	Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit	I	Unit Cost	Total Cost
O&M Costs (Annual)						
Advanced Water Treatment						
MBR	0		MGD	\$	560,000	\$0
Ozone	0		MGD	\$	93,000	\$0
BAC	0		MGD	\$	131,000	\$0
MF/UF system	3		MGD	\$	342,000	\$860,000
RO System	3		MGD	\$	574,000	\$1,400,000
RO Concentrate Treatment	0		MGD	Ş	226,000	\$0
Advanced Oxidation and Disinfection	3		MGD	ş	73,000	\$180,000
Free Chlorine	0		MGD	ş	32,000	\$0 \$200.000
Chemicals	3	4.040	MGD	Ş	121,000	\$300,000
Labor for Treatment (no WBR)	3	1,040	his/MGD	Ş	100	\$200,000
Labor for MBR	0	1,040	nrs/year	Ş	100	\$U ¢0
Monitoring		0	\$/year	Ş	1,000,000	ŞU
Conveyance Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	tor Hours per	LF		\$0.78	\$23,320
Pump Stations						
Consumables						
Equipment					1%	\$19,300
Mechanical					1%	\$19,300
Electrical/Instrumentation					1%	\$19,300
Electricity Requirement						+/
Energy Charge		342.958	kWh/year	Ś	0.15	\$51,444
Labor Costs						
Total No. Operators		1	No.			
Average Annual Operator Hours per Year		520	Hours			
Total Operator Hours per Year		520	Hours	\$	99.81	\$51,903
Phase 3 RWQCP Pump Station Improvements		0	LS	\$	96,000	\$0
Phase 3 Booster Pump Station		0	LS	\$	81,000	\$0
Storage Tanks					10/	ćo
Annual O alvi					176	ŞU
Injection wells		-	54	ć	15 000	ć75.000
Annual Oxivi		2	EA	Ş	15,000	\$75,000
Extraction wells		F 000	457	ć	1.000	¢11 EC4 000
Hale Extraction Well/Wellbead Treatment		5,900	AFT	ç	1,960	\$11,504,000 \$0
Rinconada Extraction Well/Wellhead Treatment		0	AFY	é	205	90 \$0
Peers Extraction Well/Wellhead Treatment		0	AFY	é	205	90 \$0
El Camino Extraction Well/Wellhead Treatment		0	AFT	ç	224	30 \$0
Eleanor Extraction Well/Wellhead Treatment		0	AFY	é	256	90 \$0
Library Extraction Well/Wellbead Treatment		0	AFT	ç	230	30 \$0
Mountain View Feasibility Study Long-Term Recommend	lad Phase	U	011	Ŷ	242	ψŪ
wouldan view reasonry study Long-renn Recommence	ieu ritase	0	LS	\$	100,000	\$0
Total O&M Costs (\$/yr)						\$14,820,000
Annualized Costs (\$ / Year)						64.701.777
Annualized Capital Costs (\$/Year)	Une payment	t per year, spre	aa over Project Life			\$4,704,000
Annual O&IVI Costs						\$14,820,000
Iotal Annualized Cost	F 00	0.457				\$19,524,000
Deliveries of Recycled Water	5,90	UAFY				44.444
Estimated Unit Cost (\$/AF)						\$3,300

C2				Pa	lo Alto Recy	cled Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital costs		10%	\$4 213 006
Traffic Control			Applied to all capital costs		4%	\$1,685,202
Treatment						
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	Ş	323,000	\$0 \$2 700 000
MF/UF system	2.8		MGD	ş	1,317,000	\$3,700,000
RO Concentrate Treatment	2.8		MGD	ŝ	1,580,000	\$1,400,000
Advanced Oxidation and Disinfection	2.8		MGD	ŝ	470,000	\$1,300,000
Free Chlorine	0.0		MGD	\$	271,000	\$0
Chemicals (Storage and Use)	2.8		MGD	\$	134,000	\$370,000
Sitework/Piping/Structures	2.8		MGD	\$	3,427,000	\$9,600,000
Conveyance						
6 Inch		0	IF	¢	186	Śr
8 Inch		11.000	LF	ŝ	200	\$2,200,124
10 Inch		5,500	LF	ş	212	\$1,166,103
12 Inch		3,000	LF	\$	254	\$762,930
16 Inch		2,500	LF	\$	277	\$692,675
18 Inch		0	LF	\$	290	\$0
20 Inch		18,500	LF	Ş	334	\$6,175,485
30 Inch		0	LF	¢ ¢	381	Şü ¢r
Repurposing Pipe		3		Ŷ	402	ŞU
6 Inch		0	LF	\$	55	ŚC
8 Inch		0	LF	\$	66	\$0
Sheeting and Shoring (Open Cut)	3% of Open C	ut Pipeline Co	st		3%	\$329,920
Microtunneling						
Tunnel and Casing (36")		0	LF	\$	1,728	\$0
Jacking Shaft Receiving Shaft		0	EA	Ş	300,000	\$0
Horizontal Directional Drilling		U	EA	ş	150,000	\$0
24 Inch Bore Diameter		0	LF	s	528	Śſ
PTGAB						
6 Inch		0	LF	\$	375	\$0
8 Inch		160	LF	\$	500	\$80,017
10 Inch		0	LF	\$	625	\$0
12 Inch		0	LF	ş	750	\$0
16 Inch 20 Inch		0 619	15	ş	1,000	\$U \$773.012
Jacking Shafts		3	FA	ş	258.000	\$774.000
Receiving Shafts		3	FA	ŝ	148.000	\$444,000
Pipe Bridge					,	+,
Pipe Bridge Support		19	LF	\$	5,000	\$95,000
Pipe Bridge Pipe						
6 Inch		170	LF	\$	66	\$11,143
8 Inch		0	LF	\$	86	\$0
10 Inch		0	LF	Ş	108	\$0
12 Inch		0	15	ş	139	ŞU
Potholing		414	EA	ŝ	500	\$207.245
Cathodic Protection	3% of Pipelin	e Installation (Cost		3%	\$342,552
Customer Services (no meter replacement)		0	EA	\$	10,000	\$0
Customer Services (with meter replacement)		25	EA	\$	15,000	\$375,000
Planter Box (Housing Pipe on Bridge Sidewalk)		0	CY	\$	2,000	\$0
Planter Box (Installation Labor)		0	Day	Ş	4,000	\$0
Pump Stations	200	Total	installed HB including standby	ć	6 422	¢1.020.0E1
Pump Station #1	0	Total	installed HP, including standby	ڊ د	0,455	\$1,525,531
Pump Station #3	0	Total	installed HP, including standby	ŝ	-	\$0 \$0
Pump Station #4	0	Total	installed HP, including standby	ŝ	-	\$0
Pump Station #5	0	Total	installed HP, including standby	\$	-	\$0
Phase 3 RWQCP Pump Station Improvements		0	LS	\$	1,389,000	\$0
Phase 3 Booster Pump Station		0	LS	\$	918,000	\$0
Hydropneumatic Tank - Pump Station #1	0		Gal	Ş	-	\$0
Hydropheumatic Tank - Pump Station #3	0		Gal	ç		\$U ¢n
Hydropneumatic Tank - Pump Station #4	0		Gal	ŝ	-	\$0 \$0
Hydropneumatic Tank - Pump Station #5	0		Gal	\$	-	\$0
Storage Tank						
Storage Tank	0.0		MG	\$	1,500,000	\$0
Underground Construction		0.0	LS	\$	1,000,000	
Injection Well		E	EA	¢	1 000 000	¢5 000 000
Extraction Wellhead Treatment		5	LA	Ş	1,000,000	\$5,000,000
Hale		983	AFY	\$	2,937	\$2,887.865
Rinconada		983	AFY	\$	2,937	\$2,887,865
Peers		983	AFY	\$	3,353	\$3,296,834
El Camino		983	AFY	Ş	4,538	\$4,462,774
Library		983	AFT	ş	4,538	\$4,462,774
Mountain View Feasibility Study Long-Term Recommend	led Phase			Ŷ	4,550	ç-1,-102,774
		0	LS	\$	3,326,000	\$0
Subtotal		1 4 4 1 1 1 1 1	ital anata (and include at a second			\$70,489,000
Sales Tax Construction Cost Subtotal	Applied	ι ιο naif of cap	itui costs (not including General)		9%	\$2,907,000 \$73 396 000
Market Adjustment Factor					10%	\$7,340.000
Construction Contingency	,				40%	\$29,358,000
Construction Cost Total						\$110,100,000
Engineering and Admin Services (Design)					15%	\$11,009,000
Construction Management Engineering Services During Construction					10%	\$7,340,000
Property Acquisition (Property Only)		20,000	SO FT	Ś	500	\$10.000 000
Property Acquisition (House on Property)		0	SQ FT	ŝ	1.000	\$10,000,000
Rinconada Land Cost		1	LS	ş	4,500,000	\$4,500,000
Peers Land Cost		1	LS	\$	7,000,000	\$7,000,000
On-Time Fee		0	LS	\$	75,000	64F2 400
Total Capital Cost						\$152,100,000

C2				Pa	alo Alto Recycleo	d Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate		Pro	oject Life
Updated by:	K. Howes		3%		30	Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit	I	Unit Cost	Total Cost
O&M Costs (Annual)						
Advanced Water Treatment						
MBR	0		MGD	\$	560,000	\$0
Ozone	0		MGD	\$	93,000	\$0
BAC	0		MGD	\$	131,000	\$0
MF/UF system	3		MGD	\$	342,000	\$950,000
RO System	3		MGD	\$	574,000	\$1,600,000
RO Concentrate Treatment	1		MGD	\$	226,000	\$210,000
Advanced Oxidation and Disinfection	3		MGD	\$	73,000	\$200,000
Free Chlorine	0		MGD	ş	32,000	\$0
Chemicals	3		MGD	ş	121,000	\$340,000
Labor for Treatment (no MBR)	3	1,040	hrs/MGD	Ş	100	\$290,000
Labor for MBR	0	1,040	hrs/year	ş	100	\$0 \$1
Monitoring		0	Ş/year	Ş	1,000,000	Ş0
Conveyance						
Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	itor Hours per	LF		\$0.78	\$32,816
Pump Stations						
Consumables						
Equipment					1%	\$19,300
Mechanical					1%	\$19,300
Electrical/Instrumentation					1%	\$19,300
Electricity Requirement					270	<i>ç</i> 13,300
Energy Charge		453 458	kWh/year	¢	0.15	\$68.019
Labor Costs		455,450	kwii/yeai	Ŷ	0.15	500,015
Total No. Operators		1	No			
Average Annual Operator Hours per Year		520	Hours			
Total Operator Hours per Year		520	Hours	Ś	99.81	\$51 903
Phase 3 RWOCP Pump Station Improvements		0	15	ś	96,000	\$0
Phase 3 Booster Pump Station		0	15	ś	81,000	\$0
Storage Tanks		Ū		Ŷ	01,000	φu
Annual O&M					1%	\$0
Injection Wells					270	φu
Annual Q&M		5	FA	Ś	15.000	\$75.000
Extraction Wells		5	2.1	Ŷ	15,000	<i>ç, 5,</i> 000
Groundwater Pumping Charge		5 900	ΔΕΥ	¢	1 960	\$11 564 000
Hale Extraction Well/Wellhead Treatment		983	AFY	ŝ	265	\$260,797
Rinconada Extraction Well/Wellhead Treatment		983	AFY	Ś	263	\$258,689
Peers Extraction Well/Wellhead Treatment		983	AFY	Ś	224	\$220,625
El Camino Extraction Well/Wellhead Treatment		983	AFY	ŝ	256	\$251,497
Eleanor Extraction Well/Wellhead Treatment		983	AFY	Ś	256	\$251,783
Library Extraction Well/Wellhead Treatment		983	AFY	Ś	242	\$238,429
Mountain View Feasibility Study Long-Term Recommend	led Phase					
		0	LS	\$	100,000	\$0
Total O&M Costs (\$/yr)						\$16,920,000
Annualized Costs (\$ / Year)						
Annualized Capital Costs (\$/Year)	One paymen	t per year, spre	ad over Project Life			\$7,760,000
Annual O&M Costs						\$16,920,000
Total Annualized Cost						\$24,680,000
Deliveries of Recycled Water	6,10	0 AFY				
Estimated Unit Cost (\$/AF)						\$4,000

C3				Pa	alo Alto Recy	cled Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72						
Item Conital Costs	Size	Qty	Unit		Unit Cost	Total Cost
Capital Costs						
Mobilization			Applied to all capital costs		10%	\$6.472.618
Traffic Control			Applied to all capital costs		4%	\$2,589,047
Treatment						
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	0.0		MGD	\$	360,000	\$0
BAC	0.0		MGD	Ş	323,000	\$0 64 400 000
MF/UF system	3.3		MGD	Ş	1,317,000	\$4,400,000
RO System	3.3		MGD	Ş	1,586,000	\$5,300,000
Advanced Oxidation and Disinfection	1.0		MGD	ç	470.000	\$1,500,000
Eree Chlorine	3.3		MGD	ç	271 000	\$1,000,000
Chemicals (Storage and Lise)	3.3		MGD	ś	134 000	\$440.000
Sitework/Piping/Structures	3.3		MGD	ŝ	3,427,000	\$11.000.000
Conveyance					-, ,	+==,===,===
High-Density Urban Pipeline, HDPE						
6 Inch		0	LF	\$	186	\$0
8 Inch		19,994	LF	\$	200	\$3,999,025
10 Inch		12,529	LF	\$	212	\$2,656,383
12 Inch		9,873	LF	\$	254	\$2,510,803
16 Inch		47,801	LF	\$	277	\$13,244,223
18 Inch		0	LF	\$	290	\$0
20 Inch		0	LF	Ş	334	\$0
24 Inch 20 Inch		0	LF	ş	381	\$0
SUITICH Renurnosing Pine		U	Lt	Ş	462	\$0
6 Inch		0	15	ė		ćo
8 Inch		0	IF	ç	55	\$U ¢n
Sheeting and Shoring (Open Cut)	3% of Onen (ut Pipeline Co	st	ş	394	\$U \$672 212
Microtunneling					576	2012,313
Tunnel and Casing (36")		800	LF	Ś	1.728	\$1.382.400
Jacking Shaft		3	EA	ŝ	300.000	\$900.000
Receiving Shaft		3	EA	ŝ	150,000	\$450.000
Horizontal Directional Drilling						
24 Inch Bore Diameter		350	LF	\$	528	\$184,800
PTGAB						
6 Inch		0	LF	\$	375	\$0
8 Inch		0	LF	\$	500	\$0
10 Inch		0	LF	\$	625	\$0
12 Inch		0	LF	\$	750	\$0
16 Inch		160	LF	\$	1,000	\$160,033
20 Inch		0	LF	ş	1,250	\$0
Jacking Shafts		1	EA	ş	258,000	\$258,000
Receiving Shafts		1	EA	\$	148,000	\$148,000
Pipe Bridge		0	15	ć	F 000	ć 40.000
Fipe Bridge Support		ő	Lt	Ş	5,000	\$40,000
6 Inch		0	15	¢	66	ŚO
8 Inch		0	15	ç	86	30 \$0
10 Inch		ő	IF	ŝ	108	\$0 \$0
12 Inch		0	LF	ŝ	139	\$0
16 Inch		65	LF	ŝ	175	\$11.387
Potholing		916	EA	\$	500	\$457,860
Cathodic Protection	3% of Pipelin	e Installation (Cost		3%	\$785,141
Customer Services (no meter replacement)		62	EA	\$	10,000	\$620,000
Customer Services (with meter replacement)		142	EA	\$	15,000	\$2,130,000
Planter Box (Housing Pipe on Bridge Sidewalk)		6	CY	\$	2,000	\$12,000
Planter Box (Installation Labor)		8	Day	\$	4,000	\$32,000
Pump Stations						
Pump Station #1	400	Total	installed HP, including standby	\$	5,800	\$2,320,102
Pump Station #2	0	Total	installed HP, including standby	\$	-	\$0
Pump Station #3	0	Total	Installed HP, including standby	ş	-	\$0
Pump Station #4	0	I otal	installed HP, including standby	ş	-	\$0 60
Pump Station #3	U	I otal	installed mr, including standby	ş	1 390 000	\$0 ¢1 200 000
Phase 3 Rooster Pump Station		1	10	ç	1,305,000	1,563,000 ۵۱۵ و ۵۱۵
Hydropneumatic Tank - Pump Station #1	5.800	1	Gal	ć	310,000	\$204 714
Hydropneumatic Tank - Pump Station #2	0		Gal	ś	-	\$20-7,714
Hydropneumatic Tank - Pump Station #3	0		Gal	\$		\$0
Hydropneumatic Tank - Pump Station #4	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #5	0		Gal	\$	-	\$0
Storage Tank						
Storage Tank	0.0		MG	\$	1,500,000	\$0
Underground Construction		0.0	LS	\$	1,000,000	
Injection Well						
		5	EA	Ş	1,000,000	\$5,000,000
Extraction Weilnead Treatment		022	157		2.025	An
Rinconada		833	AFY AFY	ş	2,937	\$2,447,343 \$2,447,343
Peers		833	AFY	ç	3 352	\$2,447,343
El Camino		833	AFY	ŝ	4.538	\$3,782.012
Eleanor		833	AFY	ş	4,538	\$3,782,012
Library		833	AFY	\$	4,538	\$3,782,012
Mountain View Feasibility Study Long-Term Recommend	led Phase					
		0	LS	\$	3,326,000	\$0
Subtotal	A	to half of	ital costs (not including Caract)		001	\$92,822,000
Construction Cost Subtotal	Applied	1 to haij oj cap	ital costs (not including General)		9%	\$5,769,000
Market Adjustment Factor					10%	\$9.659.000
Construction Contingency	,				40%	\$38,636,000
Construction Cost Total						\$144,900,000
Engineering and Admin Services (Design)					15%	\$14,489,000
Construction Management					10%	\$9,659,000
Engineering Services During Construction					3%	\$2,898,000
Property Acquisition (Property Only)		30,000	SQ FT	\$	500	\$15,000,000
Property Acquisition (House on Property)		0	SQ FT	\$	1,000	\$0
Rinconada Land Cost		1	LS	Ş	4,500,000	\$4,500,000
Peers Land LOST		1	LS	ş	7,000,000	\$7,000,000
Total Canital Cost		U	ы	Ş	/5,000	\$198 400 000

C3				Pa	Palo Alto Recycled Water Feasibility Study			
Last Updated:	4-Feb-19	b-19 Discount Rate			Project Life			
Updated by:	K. Howes		3%		30	Years		
CCI (SF, June 2018): 12014.72								
Item	Size	Qty	Unit	I	Unit Cost	Total Cost		
O&M Costs (Annual)								
Advanced Water Treatment								
MBR	0		MGD	\$	560,000	\$0		
Ozone	0		MGD	Ś	93,000	\$0		
BAC	0		MGD	\$	131,000	\$0		
MF/UF system	3		MGD	\$	342,000	\$1,100,000		
RO System	3		MGD	\$	574,000	\$1,900,000		
RO Concentrate Treatment	1		MGD	\$	226,000	\$220,000		
Advanced Oxidation and Disinfection	3		MGD	\$	73,000	\$240,000		
Free Chlorine	0		MGD	ş	32,000	\$0		
Chemicals	3		MGD	ş	121,000	\$400,000		
Labor for Treatment (no MBR)	3	1,040	hrs/MGD	Ş	100	\$350,000		
Labor for MBR	0	1,040	hrs/year	Ş	100	\$0 \$0		
Monitoring		0	\$/year	Ş	1,000,000	ŞO		
Conveyance Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	itor Hours per	LF		\$0.78	\$71.588		
Pumn Stations								
Consumables								
Equipment					1%	\$23,201		
Mechanical					1%	\$23,201		
Electrical/Instrumentation					1%	\$23,201		
Electricity Requirement					1/0	\$23,201		
Energy Charge		466 702	kW/b/year	ć	0.15	\$70.019		
Labor Costs		400,752	Kvvii/year	Ŷ	0.15	\$70,015		
Total No. Operators		1	No					
Average Annual Operator Hours per Year		520	Hours					
Total Operator Hours per Year		520	Hours	¢	99.81	\$51 903		
Phase 3 RWOCP Pump Station Improvements		1	15	ś	96.000	\$96,000		
Phase 3 Booster Pump Station		1	15	ś	81,000	\$81,000		
Storage Tanks		-	В	Ŷ	01,000	J 01,000		
Annual Q&M					1%	\$0		
Injection Wells						+-		
Annual Q&M		5	FA	Ś	15.000	\$75.000		
Extraction Wells				•		+ ,		
Groundwater Pumping Charge		5.000	ΔΕΥ	Ś	1 960	\$9,800,000		
Hale Extraction Well/Wellhead Treatment		833	AFY	ŝ	265	\$221.014		
Rinconada Extraction Well/Wellhead Treatment		833	AFY	Ś	263	\$219,228		
Peers Extraction Well/Wellhead Treatment		833	AFY	Ś	224	\$186,970		
El Camino Extraction Well/Wellhead Treatment		833	AFY	ŝ	256	\$213,133		
Eleanor Extraction Well/Wellhead Treatment		833	AFY	Ś	256	\$213,376		
Library Extraction Well/Wellhead Treatment		833	AFY	Ś	242	\$202.059		
Mountain View Feasibility Study Long-Term Recommend	led Phase							
		0	LS	\$	100,000	\$0		
Total O&M Costs (\$/yr)						\$15,780,000		
Annualized Costs (\$ / Year)						640 433 000		
Annualized Capital Costs (\$/Year)	Une payment	t per year, spre	aa over Project Life			\$10,122,000		
Annual O&IVI Costs						\$15,/80,000		
Total Annualized Cost		0.45%				\$25,902,000		
Deliveries of Recycled Water	5,90	UAFY						
Estimated Unit Cost (\$/AF)						\$4,400		

D1				Pa	lo Alto Recy	cled Water Feasibility Study
Last Updated:	4-Feb-19		Discount Rate			Project Life
Updated by:	K. Howes		3%			30 Years
CCI (SF, June 2018): 12014.72						
Item	Size	Qty	Unit		Jnit Cost	Total Cost
Capital Costs						
General Requirements Mobilization			Applied to all capital costs		10%	\$3 772 /51
Traffic Control			Applied to all capital costs		4%	\$1,508,980
Treatment			· · · · · · · · · · · · · · · · · · ·			+-,,
MBR	0.0		MGD	\$	17,200,000	\$0
Ozone	4.7		MGD	\$	360,000	\$1,700,000
BAC	4.7		MGD	\$	323,000	\$1,500,000
MF/UF system	4.7		MGD	\$	1,317,000	\$6,200,000
RO System	4.7		MGD	\$	1,586,000	\$7,500,000
RO Concentrate Treatment	1.2		MGD	\$	1,510,000	\$1,900,000
Advanced Oxidation and Disinfection	4.7		MGD	ş	470,000	\$2,200,000
Free Chlorine	4.7		MGD	ş	271,000	\$1,300,000
Chemicals (Storage and Use)	0.0		MGD	Ş	134,000	Şü
	0.0		MGD	Ş	3,427,000	Şu
Lonveyance High-Density Urban Pineline HDPF						
6 Inch		0	IE	Ś	186	Śr
8 Inch		0	LF	ŝ	200	\$0
10 Inch		0	LF	ŝ	212	\$0
12 Inch		5,000	LF	ŝ	254	\$1,271,550
16 Inch		0	LF	\$	277	\$0
18 Inch		0	LF	\$	290	\$0
20 Inch		500	LF	\$	334	\$166,905
24 Inch		1,400	LF	\$	381	\$533,568
30 Inch		2,600	LF	\$	462	\$1,202,422
Repurposing Pipe						
6 Inch		0	LF	\$	55	\$0
8 Inch		0	LF	\$	66	\$0
Sheeting and Shoring (Open Cut)	3% of Open (ut Pipeline Co.	st		3%	\$59,161
Microtunneling						
Lunnel and Casing (36")		0	LF	Ş	1,728	\$0
Jacking Shaft		0	EA	Ş	300,000	\$0
Receiving Shart		0	ŁA	ş	150,000	\$0
24 Inch Bore Diameter		0	15	ć	5.20	ćo
		U	LP	ç	528	ŞU
6 Inch		0	IE	Ś	375	ŚO
8 Inch		0	IF	ś	500	50 \$0
10 Inch		0 0	IF	š	625	\$0 \$0
12 Inch		0	LF	ŝ	750	\$0
16 Inch		0	LF	ŝ	1.000	\$0
20 Inch		1,200	LF	ŝ	1,250	\$1,500,313
Jacking Shafts		1	EA	ŝ	258,000	\$258,000
Receiving Shafts		1	EA	, \$	148,000	\$148,000
Pipe Bridge						
Pipe Bridge Support		0	LF	\$	5,000	\$0
Pipe Bridge Pipe						
6 Inch		0	LF	\$	66	\$0
8 Inch		0	LF	\$	86	\$0
10 Inch		0	LF	\$	108	\$0
12 Inch		0	LF	\$	139	\$0
16 Inch		0	LF	\$	175	\$0
Potholing		107	EA	\$	500	\$53,500
Cathodic Protection	3% of Pipelin	e Installation (Cost		3%	\$97,008
Customer Services (no meter replacement)		0	EA	ş	10,000	\$0
Customer Services (with meter replacement)		0	EA	ş	15,000	\$0
Planter Box (Housing Pipe on Bridge Sidewalk)		0	CY	ş	2,000	\$0
Planter Box (Installation Labor)		0	Day	Ş	4,000	\$0
Pump Stations	60	Total	installed HR including standby	ć	11 492	¢600 070
rump Station #2	400	10tal	installed HD including standby	\$	11,483	\$688,978 \$1,976 \$1,976
Pump Station #3	400	Total	installed HP, including standby	ç	5,800	\$2,320,102
Pump Station #4	0	Total	installed HP_including standby	ç	-	ŞU ¢n
Pump Station #5	0	Total	installed HP, including standby	ç	-	\$U ¢n
Phase 3 RWOCP Pump Station Improvements	U	0	IS	ç	1.389.000	\$U \$1
Phase 3 Booster Pump Station		0	15	ś	918.000	30 ¢n
Hydropneumatic Tank - Pump Station #1	0		Gal	ŝ	- 10,000	30 ¢0
Hydropneumatic Tank - Pump Station #2	0		Gal	ŝ	-	\$0 \$0
Hydropneumatic Tank - Pump Station #3	0		Gal	, \$	-	\$0
Hydropneumatic Tank - Pump Station #4	0		Gal	\$	-	\$0
Hydropneumatic Tank - Pump Station #5	0		Gal	\$	-	\$0
Storage Tank						
Storage Tank	4.8		MG	\$	1,500,000	\$7,125,000
Underground Construction		1.0	LS	\$	1,000,000	
Injection Well						
		0	EA	\$	1,000,000	\$0
Extraction Wellhead Treatment						
Hale		0	AFY	Ş	2,937	\$0
Peers		0	AFT	¢ ¢	2,93/	\$0 ¢0
El Camino		0	AFT	ç	3,303	\$U ¢n
Eleanor		0	AFY	ŝ	4,538	\$0 \$0
Library		0	AFY	\$	4,538	\$0
Mountain View Feasibility Study Long-Term Recommend	led Phase					
		0	LS	\$	3,326,000	\$0
Subtotal						\$43,006,000
Sales Tax	Applied	d to half of cap	ital costs (not including General)		9%	\$1,698,000
Construction Cost Subtotal						\$44,704,000
Market Adjustment Factor	,				10%	\$4,470,000
Construction Contingency Construction Cost Total					40%	\$17,882,000 \$67.100.000
Engineering and Admin Services (Design)					15%	\$6.706.000
Construction Management					10%	\$4,470.000
Engineering Services During Construction					3%	\$1,341,000
Property Acquisition (Property Only)		50,000	SQ FT	\$	500	\$25,000,000
Property Acquisition (House on Property)		0	SQ FT	\$	1,000	\$0
Rinconada Land Cost		0	LS	\$	4,500,000	\$0
Peers Land Cost		0	LS	\$	7,000,000	\$0
On-Time Fee		1	LS	\$	75,000	
Total Capital Cost						\$104,600,000

D1				Pa	alo Alto Recycled	Water Feasibility Study	
Last Updated:	4-Feb-19 Discount Rate			Project Life			
Updated by:	K. Howes 3%				30	Years	
CCI (SF, June 2018): 12014.72							
Item	Size	Otv	Unit		Unit Cost	Total Cost	
O&M Costs (Annual)							
Advanced Water Treatment							
MBR	0		MGD	\$	560,000	\$0	
Ozone	5		MGD	ŝ	93,000	\$440,000	
BAC	5		MGD	Ś	131,000	\$620,000	
MF/UF system	5		MGD	\$	342,000	\$1,600,000	
RO System	5		MGD	\$	574,000	\$2,700,000	
RO Concentrate Treatment	1		MGD	\$	226,000	\$280,000	
Advanced Oxidation and Disinfection	5		MGD	\$	73,000	\$350,000	
Free Chlorine	5		MGD	\$	32,000	\$150,000	
Chemicals	0		MGD	\$	121,000	\$0	
Labor for Treatment (no MBR)	5	1,040	hrs/MGD	\$	100	\$490,000	
Labor for MBR	0	1,040	hrs/year	Ş	100	\$0	
Monitoring		1	\$/year	\$	1,000,000	\$1,000,000	
Conveyance							
Annual Inspection and Maintenance of Pipeline - Average	Annual Opera	tor Hours per	LF		\$0.78	\$6,434	
Pump Stations							
Consumables							
Equipment					1%	\$30,091	
Mechanical					1%	\$30,091	
Electrical/Instrumentation					1%	\$30,091	
Electricity Requirement							
Energy Charge		718,547	kWh/year	\$	0.15	\$107,782	
Labor Costs							
Total No. Operators		2	No.				
Average Annual Operator Hours per Year		520	Hours				
Total Operator Hours per Year		1,040	Hours	\$	99.81	\$103,805	
Phase 3 RWQCP Pump Station Improvements		0	LS	\$	96,000	\$0	
Phase 3 Booster Pump Station		0	LS	\$	81,000	\$0	
Storage Tanks							
Annual O&M					1%	\$71,250	
Injection Wells							
Annual O&M		0	EA	Ş	15,000	\$0	
Extraction Wells							
Groundwater Pumping Charge		0	AFY	ş	1,960	\$0 \$0	
Hale Extraction Well/Wellhead Treatment		0	AFY	Ş	265	\$0	
Rinconada Extraction Well/Wellhead Treatment		0	AFY	Ş	263	\$0	
Peers Extraction Well/Wellhead Treatment		0	AFY	ş	224	\$0	
El Camino Extraction Well/Wellhead Treatment		0	AFY	Ş	256	\$0	
Eleanor Extraction Well/Wellhead Treatment		0	AFY	ş	256	\$0	
Library Extraction Well/Wellhead Treatment		0	AFY	Ş	242	ŞO	
Mountain View Feasibility Study Long-Term Recommend	led Phase						
Total O&M Costs (\$/yr)		0	LS	Ş	100,000	50 \$8,010,000	
Annualized Costs (\$ / Year)							
Annualized Capital Costs (\$/Year)	One payment	t per year, spre	ad over Project Life			\$5,337,000	
Annual O&M Costs						\$8,010,000	
Total Annualized Cost						\$13,347,000	
Deliveries of Recycled Water	5,30	0 AFY					
Estimated Unit Cost (\$/AF)						\$2,500	

Appendix E - Concept Option Variations [Confidential – Not Included] Appendix F - Cost Per Unit of Water Analyses for Palo Alto, Cal Water, Purissima Hills Water District and East Palo Alto [Confidential – Not Included]

Appendix G - Funding Matrix

Summary of Potential Recycled Water Funding Opportunities – Updated March 13, 2019

Program	Administering Agency	Funding Type	CEQA/ NEPA Required?	Program Purpose	Eligible Uses	Eligibility Requirements	Due Date & Future Rounds	Funding Amounts & Terms	Cost Share	Priority Determination / Critical Factors
Title XVI Water Reuse & Reclamation Grant Program - Construction	U.S. Bureau of Reclamation (Reclamation)	Grant vatersmart/title/	CEQA and NEPA	Construction of water recycling treatment and conveyance facilities.	Planning, design, construction (can include prior costs)	A Title XVI Feasibility Study must be submitted to Reclamation for review and approval prior to submitting a construction application. Project must receive congressional authorization in order to receive construction grant funding.	Most recent round was due in Summer 2018. Next round anticipated spring 2019	The total amount of available funds varies each year. The 2018 FOA included \$34M for Title XVI. Historically, there has been a max of ~\$4M per applicant, though the new administration has favored funding fewer projects with larger awards per project. Maximum grant award of 25% of the total project costs or \$20 million, whichever is less. Grant funding is provided over multiple applications submitted on an annual basis until the project is complete or the total federal cost share has been provided. Typically limited to 3 years of costs per application.	75% cost share	1 Project must receive congressional approval.
Water Infrastructure Improvements for the Nation (WIIN) Subset of Title XVI	U.S. Bureau of Reclamation (Reclamation)	Grant	CEQA and NEPA	Construction of water recycling treatment and conveyance facilities for projects that have a Title XVI Feasibility Study completed, <i>but</i> <i>are not congressionally</i> <i>authorized.</i>	Similar to Title XVI: planning, design, construction (including prior costs)	A Title XVI Feasibility Study must have already been submitted to Reclamation for review and approval and the project must have a Determination of Feasibility from Reclamation	Reclamation appears to intend three rounds of funding – the first was in 2017, the second was in 2018, and a third to be released shortly after announcement of Round 2 awards – anticipated in spring 2019.	 \$50M total has been allocated under WIIN. \$10M released in first FOA, \$20M released in second FOA, \$20M anticipated for third FOA. Maximum grant award of 25% of the total project costs. Typically limited to 3 years of costs per application. 	75% cost share	1 Competitive program, but will only get more competitive as additional agencies submit their Feasibility Studies. Better to get money early and keep going back.

Program	Administering Agency	Funding Type	CEQA/ NEPA Required?	Program Purpose	Eligible Uses	Eligibility Requirements	Due Date & Future Rounds	Funding Amounts & Terms	Cost Share	Priority Determination / Critical Factors
Drought Response Program – Drought Resiliency Projects	Reclamation	Grant	CEQA and NEPA	Increase the reliability of water supply; improve water management; implement systems to facilitate the voluntary sale, transfer or exchange of water; and provide benefits for fish, wildlife, and the environment to mitigate impacts caused by drought.	Construction, tool development to improve water management, installation of data collecting devices, improving habitat. Proposed resiliency project should improve ability of water managers to deliver water during a drought.	Based on most recent FOA, project cannot be part of a congressionally authorized Title XVI Project. Must demonstrate that project is supported by an existing drought contingency plan; quantify benefits during droughts; address urgent needs and severe drought impacts.	Anticipate FOA in December 2018, with applications due February 2019	 \$8.3M was awarded in 2018 FY2019 budget TBD Funding Group I: up to \$300,000 for projects that can be completed within 2 years Funding Group II: up to \$750,000 for larger projects that can be completed within 3 years 	50% cost share	4 Competitiveness would be evaluated if and when another FOA is released based on project status and scoring criteria. Status of next round is unknown.
Website	https://www.usbr.gov	<u>//drought/</u>								
Integrated Regional Water Management (IRWM) Implementation Grant Program	California Department of Water Resources (DWR)	Grant	CEQA Only	Identify and implement projects and programs that increase regional self-reliance, reduce conflict, and manage water to concurrently achieve social, environmental, and economic objectives.	Planning, design, land acquisition, legal fees, environmental documentation, environmental mitigation, construction/ implementation, construction administration	Project must be included on the project list of an IRWM Region's IRWMP. Palo Alto is within the San Francisco Bay IRWM Region and thus, the project must be in its IRWMP.	 Prop 1 – Round 1 is underway; local call for projects closed Nov. 16, 2018 FY20/21: Round 2 Implementation Grant Solicitation anticipated City submitted a project in Fall 2018 for Round 1; currently awaiting selection for inclusion in regional application. 	 \$58.5M for the 2 rounds of implementation funding in the SF Funding Area, which includes the entire SF Bay Area IRWM Region and a portion of the East Contra Costa IRWM Region. (\$65M is allocated to SF Funding Area, \$6.5M to be allocated to DAC Involvement.) \$22.75M anticipated available in each round for non-DAC implementation projects 	50% cost share	3 Limited funding available for competitive area. Participate in SF Bay Area IRWM process. Ultimately, up to SF Bay Area project prioritization and selection process as to which projects are included in an application
Website	https://water.ca.gov/Wo	ork-With-Us/Gra	ants-And-Loans/IR	WM-Grant-Programs or Bay A	rea IRWM Program: http://bay	vareairwmp.org/				

Program	Administering Agency	Funding Type	CEQA/ NEPA Required?	Program Purpose	Eligible Uses	Eligibility Requirements	Due Date & Future Rounds	Funding Amounts & Terms	Cost Share	Priority Determination / Critical Factors
Clean Water State Revolving Fund (CWSRF) Ioan program	State Water Resources Control Board (SWRCB)	Loan	CEQA+ (includes CEQA and select federal crosscutters, i.e., not full NEPA)	Construction of publicly- owned facilities including wastewater treatment, local sewers, sewer interceptors, water reclamation and distribution, stormwater treatment, and combined sewers.	Planning, design, construction, construction management, mitigation measures (can include prior planning/design costs). Construction costs incurred prior to executing funding agreement NOT eligible for reimbursement.	Must either provide proof of submitted UWMP, proof of CUWCC MOU, or copy of Water Conservation Program for State Board approval. Letter of 2015 UWMP approval from DWR required prior to executing financing agreement.	Applications are continuously accepted, though the State Board now implements a deadline of December 31 and a scoring system to be added to the Fundable List. Projects must first get on Fundable Project List before applications will be reviewed. May be as long as 2 years from application submittal to contract	Typically, there is \$200M-\$300M available; Water recycling projects are given priority. Interest rate is ½ of the General Obligation Rate at the time of award (SRF i=1.9% for this year). Financing term up to 30 years. There is no maximum financing amount for a project / agency.	0%	2 Program is very popular. Application review can be up to 12 months, so financial forecast could change by the time an application is prepared, submitted, and reviewed. Highest scoring projects will be "corrective", or address drinking water or Delta water quality; help implement a climate change action plan or address multiple water quality issues; and those with both a complete application and at least 90%
Website	https://www.waterboar	ds.ca.gov/water	issues/programs/	<u>grants loans/srf/</u>						uesign/specs
Water Recycling Funding Program (WRFP) Construction Grants	SWRCB	Loans & Grant	CEQA+ (includes CEQA and select federal crosscutters, i.e., not full NEPA)	Promote beneficial use of recycled water to augment fresh water supplies in CA by supporting water recycling projects and research.	Planning, design and construction, including reasonable costs to provide emergency backup water supply for a recycled water system; pilot projects for new potable reuse (can include prior planning/design costs). Construction costs incurred prior to executing funding agreement NOT eligible	Apply through CWSRF program.	Applications are continuously accepted, though the State Board now implements a deadline of December 31 and a scoring system to be added to the Fundable List. Projects must first get on Fundable Project List before	Prop 1 provided \$625M for planning and construction of water recycling projects; however, this funding has been exhausted. Future allocations to the WRFP are possible, though currently TBD. Project could receive \$15M or 35% of project costs for construction, whichever is less.	N/A	2 By applying for CWSRF, the City will automatically be applying for any available grant funding under the umbrella CWSRF program.
Website	https://www.waterboards	terboards.ca.gov/water	ov/water_issues/programs/	/grants_loans/water_recycling/	for reimbursement.		applications will be reviewed. May be as long as 2 years from application submittal to contract	Offers 1% financing for recycled water projects through CWSF		

Program	Administering Agency	Funding Type	CEQA/ NEPA Required?	Program Purpose	Eligible Uses	Eligibility Requirements	Due Date & Future Rounds	Funding Amounts & Terms	Cost Share	Priority Determination / Critical Factors
Infrastructure SRF (ISRF) Loan Program	California Infrastructure and Economic Development Bank (I-Bank)	Loan	Application does not consist of environmental portion; however, CEQA would be required prior to construction	Construction and/or repair of publicly-owned wastewater collection and treatment systems.	Architectural, engineering, financial and legal services, plans, specifications, admin expenses, land acquisition, construction, machinery/equipment	Project complete construction within 2 years of financing approval. Must have applied for all required permits.	Applications are continuously accepted. Loans typically awarded three months after application submittal	ISRF Program funding is available in amounts ranging from \$50,000 to \$25M, with loan terms of up to 30 years. Pre-payment of loan not allowed until Year 13 of loan	N/A	5 Projects must demonstrate job creation, though this is only a small piece of the application. Loan terms not as good as other programs, and there are penalties to early repayment
Website	http://www.ibank.ca.g	gov/infrastruct	ture-state-revolvi	ng-fund-isrf-program/						
Water Infrastructure Finance and Innovation Act (WIFIA)	USEPA	Loan	CEQA and NEPA	Construction of wastewater conveyance and treatment projects, drinking water treatment and distribution projects, desalination, and water recycling projects	Planning, preliminary engineering, design, environmental review, revenue forecasting, construction, land acquisition, capitalized interest	Federal assistance may not exceed 80% of project costs.	Letters of Interest accepted during selection periods. FY 2018 solicited letters of interest from April-July 2018. 62 Letters of Interest applied for \$9.1B; 39 projects selected to apply for \$5B in loans	 \$5B was available in 2018. Minimum project size for large communities (population > 25,000) is \$20M; for small communities is \$5M. Interest rate greater or equal to U.S. Treasury rate of similar maturity, based on the weighted average life of the loan. Loans for 35 years or useful life of project, whichever is less. WIFIA received a 2-year \$100M reauthorization at end of 2018. 	51% non- WIFIA; (up to 80% of project costs can be covered by federal funds, using a combinati on of programs)	6 Non-refundable application fees of \$25,000 (small communities) or \$100,000 (>25,000 people). Total fees: \$250K-\$500K plus possibly additional fees for administration of loan. Low funding amount available. National program. Better local/state options.
Website	https://www.epa.gov/wi	<u>fia</u>								