

South Tahoe Public Utility District

STPUD Water Facilities CIP

Final Report - Appendices

Water System Optimization Plan

and





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WYA Project No. 489



Prepared by:

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K/J Project No. 1270004*00

Date: July 21, 2016

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Appendix A for Section 1 (TM 1A) Appendix A1

Downhole Well Condition Assessment

Γ	Service Status								
Well	In	Out	Abandoned	Demolished	Reason for Video	Date Videoed	Who Videoed	Attachment (Y/N)	PDFed As
Airport Well		x			General Inspection	2/3/1999	Layne Christensen Co.	Υ	Airport Well 1999
Bakersfield Well	x				=	2/3/2003	South Tahoe PUD	N	-
Bayview Test Well	x				New Well Inspection	9/14/2004	Zim Irrigation	Υ	Bayview Test Well 2004
Black Rock Well #1		x			-	5/7/1986	Water Well Specialties	N	-
Black Rock Well #2		x			=	5/7/1986	Water Well Specialties	N	-
Clement Well		x			-	10/28/1993	South Tahoe PUD	N	-
College Well		x			=	10/18/1989	South Tahoe PUD	N	=
College Well		x			=	11/3/1989	Layne Christensen Co.	N	=
College Well		x			Casing Inspection	5/14/1998	Welenco	Υ	College Well 1998
Country Club Well			x		Repair and Rehab.	11/1/2000	Water Well Technology, Inc.	N	-
Country Club Well			x		After Repair	1/31/2001	South Tahoe PUD	N	-
Country Club Well			x		Carson Pump	8/31/2005	South Tahoe PUD	N	-
Elks Club Well #2	x				-	10/30/2003	Water Well Technology, Inc.	N	-
Glenwood #5	х	x			New Well Inspection	8/2/2002	Zim Industreis	Υ	Glenwood #5 2002
Helen Well #2	x	x		İ	-	9/28/1987	-	N	-
Helen Well #2	x	x			-	1993	-	N	-
Helen Well #2	x	x		İ	Video Survey	5/4/1993	South Tahoe PUD	N	-
Helen Well #2	x	x			Video Survey	5/17/1993	South Tahoe PUD	N	
Helen Well #2	x	x		İ	Liner Inspection	6/8/1993	South Tahoe PUD	N	-
Helen Well #2	x	x			-	6/21/1993	-	N	
Industrial Well #2				x	-	-	South Tahoe PUD	N	-
Industrial Well #2				x	Carson Pump	8/31/2005	South Tahoe PUD	N	-
Martin Well			x	İ	-	5/7/1986	Water Well Specialties	N	-
Martin Well			x	İ	-	2/24/1988	Water Well Specialties	N	-
Martin Well			x	İ	-	3/29/1988	Water Well Technology, Inc.	N	=-
Martin Well			x		-	12/3/1988	-	N	-
Martin Well			x	İ	-	1/20/1989	South Tahoe PUD	N	-
Middle School				x	-	9/15/1990	Layne Christensen Co.	N	-
Ralph Well				x	Carson Pump	11/20/1989	-	N	-
Sunset	x	x			-	9/15/1990	Layne Christensen Co.	N	-
So. Upper Truckee Well #1				x	-	10/4/1995	South Tahoe PUD	N	-
So. Upper Truckee Well #1				х	New Well Inspection	10/6/1999	Welenco	Υ	SUT #1 1999
So. Upper Truckee Well #3	x	x			New Well Inspection	10/7/2004	Zim Industries	Υ	SUT #3 2004
Tata Well #2			x			4/7/1994	South Tahoe PUD	N	-
Tata Well #2			x		-	4/12/1994	South Tahoe PUD	N	-
Tata Well #2		İ	x		-	6/14/1994	South Tahoe PUD	N	-
Tata Well #3		x			-	6/13/1995	Robertson Engineering	Υ	Tata Well #3 1995
Valhallla Well	x	İ			Repair and Rehab.	10/6/1999	-	N	-
Valhalla Well	х	İ			Repair and Rehab.	7/2/2001	Water Well Technology, Inc.	N	-
Valhalla Well	x	İ		İ	Repair and Rehab.	9/29/2001	Water Well Technology, Inc.	N	=



Layne Christensen Company

VISUAL WELL LOG EVALUATION STUDY

P.O. Box 1326/275 County Road 98/Woodland, California 9		
Owner: South Tahne P.U.D.		Date: 2 - 3 - 9 9
Location of Well: Airport		
,	CASING LOG	Wall Thickness:
Depth of Casing:		Casing Diameter:
Type of Perforation: wire wrap		
Liners and/or Tapers:		
	VISUAL LOG	
Area Scanned: 0 - 370'		SWL:
Purpose of Scan: GENERAL INSTE	noilon	Logger: Mc KAY
Remarks:		

DEPTH		VTR	CONDITION				
From	То	Ref.#	CONDITION				
186'	236'	8:30	Streens				
	1961	9:00	scan screens				
	227'	11:30	n n				
	231'	12:30	screens - plugged				
266'	285,	15120					
318'	368'	18:40	11				
	345	20:20	scan screens				
	363	21:50	11 - Nlesger od				
	370	23.05					

Vid-Pac		Wellbore Video Ro	eport welence	0
Company 71 M IR RIL ATION)		Job Ticket 398/3 Run No. 6 W F	
Address			Well No. BAYVIFW TEST WELL	
City			2	
Requested by		P.O	Well Owner	_
			Zero Datum Tol of CASING	
Operator D, JACKSON		Well Depth	Vehicle No.	
Location				
Casing I.D. at Surface 23,5 "		D. Reference WELL	KF CGQ DS Build-Up	=
SELECTED WELLBORE SNAPSHOTS	SIDESCAN DEPTHS		WELLBORE/CASING INFORMATION	_
	0	TOPOF CAS	SINC SIDESCAN	
	36	57A716 W	WATER LEVEL	
	169'	TOPOFCAM	PERA PORT	
	171'	0	F CAMERA PORT	
	173		APERED BEDUCTION	
	176	80170m 06	TAPERED REDUCTION	
	179'	TOLOF 97	TAINLESS	
	160	TOP OF TO		
	100'	SI DESCAU S	HNSOL SCHEEN	
	220'			
		SIDESCAL V		
	230'	SIDESCAN S	7	
	2391		11 (WELD	
·	259	SIDESCAR		
	275	SIDESCAN		
	299'	BOTTOM O		
	340	TOP OF SCB	keen	
	349	SIPESCAN U	well	
	369'	BOTTOM OF	SCREEN	
	410	TOP OF SCRE	eeN	
	429	BOTTOM 06		
534 SIDESCAN SCREEN	509	TOP OF SCRE		
347 FILL	519	SIDESCAN U	NELD	

welenco, inc. 5201 Woodmere Dr. Bakersfield, CA 93313 www.welenco.com e-mail: welenco@welenco.com Phone: (800) 445-9914 Fax: (661) 834-2550 Notes:



Fax (805) 834-2550 • (800) 445-9914 • (805) 834-8100

Address City <u></u> たけん Request By Copy To	P.O. Rox 70542 Lake Taboe State CA Zip 95705 Bugania Cust. P.O. Survey Casing Inspection	Job No. 29236 Run No. ONE Well No. College Well Date 5-14-98 Location 1275 Mendow Crest DR. Zero Datum Top & Caring Survey By Robert' Truck No. 2-17
DEPTH 2' 35-' 247' 340	Begin Sirvey Static water Level water Top of Screen No Visibility, Bottom of Sirven	
300° 300° 3/0° 327°	Stop Survey much Run 100 51 Re Start Survey Better Visibility - Re Video unter gets mirkly Dottom & Survey.	
NOTE:		
CASING COI ID at Surface _ Diameter Refe	rence: ☐ Caliper Survey ☐ Estimate from TV/Ph	

Vid-Pac		Wellbore Video Report Welenco
Company ZIM INDUSTIZE	IE5	Job Ticket Run No
Address	¥ .	Well No. GLEWWOOD 45
City FRESNO	State	Zip Survey Date 8/2/2002
Requested by MELVIN		P.O Well Owner
Copy to IVO BERGSOHN		Camera C(V SI) & SCAN
Reason for Survey ///SPOCT ALEM		UPIECO WELL Zero Datum TOC
Operator		Well Depth Vehicle No
Location SOUTH TAHDE	P.U.D.	
Casing I.D. at Surface 13"01 17	1/8:113 I.	D. Reference BECURD Build-Up NONIE
SELECTED WELLBORE SNAPSHOTS	DEPTHS	WELLBORE/CASING INFORMATION
	0	ZERO DOWN VIEW CAMBRA AT TUC
	19	SWL WATER VERY CLEAR
	56	CASING WIELD
9	.89	ψ - 1 · · · · · · · · · · · · · · · · · ·
	119	-2 SIDE SCAN CASING WELD
	148	2WALL CASING THEUNIESS CHANGE
7	150	TOP OF SLOTT
	153	SINE JOHN TOP OF SLOTS
	182	SIDE SEAN CASING WELD
	172	SIDE SCAN CAXING WELV
	223	SINF JCAN
	230	Bottom DE WELL
21		
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and the second s		
100 Maria		

www.welenco.com e-mail: welenco@welenco.com Phone: 1-(800) 445-9914 Fax: 1-(661) 834-2550 Notes:

Vid-Pac		Wellbore Video Report	welenco
		Joh Tickt	t 399/4 Run No. 0 N 3
Company ZIM INDUST		Well No.	SOUTH LAKE TAHUE #3
Address	State _	Zip Survey I	pate
City		P.O Well Ow	ner Soutth Carrie
Conv. to			LAURE
Reason for Survey	INS	Zero Da	<u>G.C.</u>
Operator L. Hour			No //
Location South TRuc	KEC K	1 + EGRET L	Day None
Casing I.D. at Surface	I.I	O. Reference	Build-Op
SELECTED WELLBORE SNAPSHOTS	DEPTHS	WELLE	SORE/CASING INFORMATION
		DOWN VIEW DEDTHS	THE 2' DEEDER THAN DISPLAYED
	0'	23 Roto . GL. U	1.TI Sideview Lows
	16'	5.W.L e 18'	
	71	TOD OF SHEEN	Section
	90	Bim OF SLYER	
	161	Top of Super	
	In	mank on ser	
	180	Bm of School	
		Top or Sugar	
	230		
	204	SIDEULEW SCH	
	240	BTM OF Saras	
	260	Top or Screen	
(9)	270		
	980	Top or Su	
	300	AIR LINE (a)
	307	TAPE ON AIR	100.00
	309		
	31	7 F.LL 0 319	END OF DR. SURJE,
	0	END OF S	21127

welenco, inc. 5201 Woodmere Dr. Bakersfield, CA 93313

www.welenco.com e-mail: welenco@welenco.com Phone: (800) 445-9914 Fax: (661) 834-2550

Notes:

Robertson Engineering

1401 NORTH ROOP STREET • CARSON CITY, NEVADA 89706 • (702) 882-0707 VIDEO WELL SURVEY

	CUSTOM	ER D. T. P. U. D.	DATE June 13, 199;	5
	WELL N	0. TATA # 3	WELL DIA. 8" DEPTH 20	5
	WITNES	SED BY	LOGGED BY K- R.	
DEPTH		ELAP. TIME	COMMENTS	
+3		Top of cos,	ing	
-0		grade		
30		widely scattere	ed scale	
43		Stotic water la	we/	
60		wire wound so	reen i alean	
80		Blank, clean		1
		scale increa	sing w/ depth	
114		Que line 5	torks	
170	-	209 air line	indication of so	creen
			ns below 80 ft.	
		189' of 3" F	Tipe on ground pi	45
		3' bury of	pitless adapter.	

Appendix A for Section 1 (TM 1A) Appendix A2

District Asset Condition Assessments

Appendix A2

Booster Pump Stations

South Tahoe PUD										
Water System Optim	ization Plan									
Summary of Booster	Pump Station Condit	ion and Capacity Evalua	ation							
				•	Failure I	Mode Scori	ng Summa	ry - Criticality So	cores	
			Pump					Other Critical		Overall Total
Pump Station Facility	Zone Served	Pump Station Facility	Station	Building		Piping &	SCADA	Mechanical	Electrical	Factored Score
Name:		ID #:	Site	Structure	-	Valves	System	Equipment	Power	(Out of 25) =
Twin Peaks	Twin Peaks	TPBS1, TPBS2, TPBS3	0.29							
Tata	Gardner Mountain	TATABP, TATABP2	0.39	0.36	1.75	0.41	0.97	0.16	1.68	5.72
Forest Mountain	Angora	FMPUMP1,FMPUMP2,F MPUMP3	0.44	0.24	1.45	0.56	1.02	0.40	1.03	5.14
Cornelian	Christmas Valley	CRNPUMP1,CRNPUMP 2, CRNPUMP3	0.37		1.71					
Airport	Country Club	APRBS	0.25	0.17	1.31	0.67	1.18	0.56	2.02	
Flagpole	Flagpole	FPBS1,FPBS2,FPBS3	0.35	0.32	1.20	0.56	0.95	0.32	1.03	4.73
Grizzly Mountain	Flagpole	GRIZBP1, GRIZBP2, GRIZBP3	0.27	0.17	0.91	0.37	0.65	0.32	0.83	3.53
Boulder Mountain	Forest Mountain	BMPUMP1, BMPUMP2, BMPUMP3	0.23							
H ST	H Street	HSTBS	0.49							
David Lane	Heavenly	DLBP3	0.36	0.27	1.85	0.37	1.13	0.48	1.23	5.70
South Apache	Iroquois	APBSP1 and APBSP2	0.38	0.56	2.75	0.69	1.13	0.10	1.13	6.75
North Apache	Iroquois	NAPBS1, NAPBS2, and NAPBS3	0.35	0.17	0.90	0.37	0.65	0.32	1.76	4.53
Keller	Keller	KLRBP1 and KLRBP2	0.54	0.25	1.49	0.37	0.97	0.10	1.55	5.27
Cold Creek Fltr Plant	Montgomery Estates	CCBP1 and CCBP2	0.32	0.29	1.76	0.37	0.65	0.26	1.83	5.49
Black Bart	Montgomery Estates	BLBTBP1, BLBTBP2, and BLBTP3	0.37	0.45	1.48	0.41	1.05	0.10	1.85	5.71
Cold Creek Tank	Main	CCBPUMP1 and CCBPUMP2	0.37	0.50	1.79	0.84	0.94	0.10	0.83	5.36

30%	Pump Station Site Is Failure Mode Score Calculated or Assigned?	Pump Station Facility ID # Pump Station Facility Name Pressure Zones Served Physical Mortality 1: new or excellent condition 2: minor defects only 3: moderate deterioration 4: significant deterioration 5: virtually unserviceable	TPBS1, TPBS2 Twin Peaks Boost Twin Peaks Fail Capacity (see note 1) 1: significantly exceeds design requirement 2: exceeds design requirement 3: meets design requirement	ter Station Zone ure Mode Scoring (1 - 5) Level functionality 1: exceeds all requirements	K/J Project Number Date	te: 2/23/ ent rs: Peter Lavallee a	nd Phill Torney
00%	Notes: 1. Capacity score will be based on hydraulic model 2. For Reliabilty to be determined based on CMMS maintenance records 3. For Criticality Weighting Factors to be determined at District Workshop Pump Station Site Is Failure Mode Score Calculated or Assigned?	Pump Station Facility Name Pressure Zones Served Physical Mortality 1: new or excellent condition 2: minor defects only 3: moderate deterioration 4: significant deterioration	Twin Peaks Boos Twin Peaks Fail Capacity (see note 1) 1: significantly exceeds design requirement 2: exceeds design requirement 3: meets design requirement	ter Station Zone ure Mode Scoring (1 - 5) Level of functionality 1: exceeds all requirements	Condition Assessme Inspecto Adjacent Pressure Zone of Service	rs: Peter Lavallee a es: Flagpole, Forest Mountain, Angor	nd Phill Torney
30%	Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop Pump Station Site Is Failure Mode Score Calculated or Assigned?	Pressure Zones Served Physical Mortality 1: new or excellent condition 2: minor defects only 3: moderate deterioration 4: significant deterioration	Fail Capacity (see note 1) 1: significantly exceeds design requirement 2: exceeds design requirement 3: meets design requirement	ure Mode Scoring (1 - 5) Level of functionality 1: exceeds all requirements	Adjacent Pressure Zone of Service reliability	Peter Lavallee a Piagpole, Forest Mountain, Angor	
00%	Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop Pump Station Site Is Failure Mode Score Calculated or Assigned?	Pressure Zones Served Physical Mortality 1: new or excellent condition 2: minor defects only 3: moderate deterioration 4: significant deterioration	Fail Capacity (see note 1) 1: significantly exceeds design requirement 2: exceeds design requirement 3: meets design requirement	ure Mode Scoring (1 - 5) Level of functionality 1: exceeds all requirements	Adjacent Pressure Zono of Service reliability	Flagpole, Forest Mountain, Angor	
30%	Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop Pump Station Site Is Failure Mode Score Calculated or Assigned?	Physical Mortality 1: new or excellent condition 2: minor defects only 3: moderate deterioration 4: significant deterioration	Capacity (see note 1) 1: significantly exceeds design requirement 2: exceeds design requirement 3: meets design requirement	ure Mode Scoring (1 - 5) Level of functionality 1: exceeds all requirements	of Service reliability		a Highlands, and Stateline Zones
30%	Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop Pump Station Site Is Failure Mode Score Calculated or Assigned?	new or excellent condition minor defects only moderate deterioration significant deterioration	Capacity (see note 1) 1: significantly exceeds design requirement 2: exceeds design requirement 3: meets design requirement	functionality 1: exceeds all requirements	reliability	Financial Efficiency	
30%	Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop Pump Station Site Is Failure Mode Score Calculated or Assigned?	new or excellent condition minor defects only moderate deterioration significant deterioration	(see note 1) 1: significantly exceeds design requirement 2: exceeds design requirement 3: meets design requirement	functionality 1: exceeds all requirements	reliability	Financial Efficiency	
30%	2. For Reliabilty to be determined based on CMMS maintenance records 3. For Criticality Weighting Factors to be determined at District Workshop Pump Station Site Is Failure Mode Score Calculated or Assigned?	new or excellent condition minor defects only moderate deterioration significant deterioration	significantly exceeds design requirement exceeds design requirement meets design requirement	1: exceeds all requirements			
00%	Pump Station Site Is Failure Mode Score Calculated or Assigned?	minor defects only moderate deterioration significant deterioration	exceeds design requirement meets design requirement				
00%	Pump Station Site Is Failure Mode Score Calculated or Assigned?	moderate deterioration significant deterioration	3: meets design requirement		1: failure every > 20 yrs	1: best available technology	
00%	Pump Station Site Is Failure Mode Score Calculated or Assigned?	4: significant deterioration		2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
30%	Pump Station Site Is Failure Mode Score Calculated or Assigned?			meets all requirements fails some requirements	3: failure every 7 to 10 yrs 4: failure every 3 to 6 yrs	financial efficiency is average financial efficiency is low	
30%	Is Failure Mode Score Calculated or Assigned?		less than design requirement significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
00%	Is Failure Mode Score Calculated or Assigned?		, , ,	·	,		
30%							
00%			N/A	Calculated	Calculated	N/A	
00%	Unweighted Failure Mode Score (1-5)	-	N/A	1.00	2.20	N/A	Total Factored Score
00%	Weighted Final Score (1-25)		N/A	3.50	9.00	N/A	
	Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	F 70
	Factored Score Criticality Score	•	N/A	2.1	3.6	N/A 5%	5.70 0.29
	Building Structure					570	0.23
	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
	Unweighted Failure Mode Score (1-5)		N/A	1.00	1.00	N/A	Total Factored Score
	Weighted Final Score (1-25)		N/A	3.33	3.00	N/A	
00%	Criticality Weighting Factor (0 - 100%)		N/A	50%	20%	N/A	
	Factored Score	1.2	N/A	1.67	0.6	N/A	3.47
	Criticality Score					5%	0.17
	Pumps	1					
	Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	Calculated	T. 15 10
					· ·		Total Factored Score
200/							
3078					ļ		3.65
			-			25%	0.91
	Piping & Valves						
	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
	Unweighted Failure Mode Score (1-5)		N/A	1.20	N/A	N/A	Total Factored Score
			N/A	4.00	N/A	N/A	
00%			,				
			N/A	3.20	N/A	,	4.00 0.40
						10/0	0.40
			N/A	Calculated	Calculated	N/A	
			N/A N/A	1.60	1.00	N/A N/A	Total Factored Score
		4.00	N/A	4.20	3.33	N/A	
00%	Criticality Weighting Factor (0 - 100%)	20%	N/A	40%	40%	N/A	
			N/A	1.68	1.33	N/A	3.81
						20%	0.76
						100	
							Total Factored Score
							Total Factoreu Score
00%		_					
			N/A	9.6	N/A	N/A	10.40
						10%	1.04
	Electrical Power						
		Calculated	N/A	Calculated	Calculated	N/A	
			N/A	3.00	0.80	N/A	Total Factored Score
			N/A	9.00	3.60	N/A	
00%			•				5.00
			N/A	5.4	0.72	N/A 25%	6.92 1.73
	Criticality Score						1 72
00%	66	Factored Score Criticality Score Pumps Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score Calculated or Assigned? Unweighted Final Score (1-5) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Scada System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Criticality Score Criticality Score Criticality Score Scada System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Criticality Score Criticality Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Factored Score Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Criticality Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Factored Score Criticality Score Criticality Score Calculated or Assigned?	Factored Score 1.2	Factored Score 1.2 N/A	Factored Store 12	Factored Score 1.2 N/A 1.67 0.6	Factored Score 12 N/A 1.67 0.5 N/A 1.67 N/A N/A 1.67 0.5 N/A 1.67 N/A

	South Tahoe PUD	Location Description:	Lake Tahoe Boulevard Just past Industrial Ave	K/J Project Number:	1270004*00
	Water System Optimization Plan	Pump Station Facility ID #:	TPBS1, TPBS2, TPBS3	Date:	2/23/2012
		Pump Station Facility Name:	Twin Peaks Booster Station	Condition Assessment Inspectors:	
		Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Flagpole, Forest Mountain, Angora Highlands, and Stateline Zones
				1 -	

			1	
Failure Mode		Importance		CONDITION ASSESSMENT CHECKLIST
Туре	Score	•	Weighted Score	CONDITION ASSESSMENT CHECKLIST
Туре	30016	Weighting (1-3)	Weighted Score	
				Pump Station Site
Fn	1	4	4.00	key O&M staff have access to site? Yes
Fn	1	4	4.00	adequate vehicle access for maintenance? Yes
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	3	5	15.00	is site vulnerable to wildfires? Yes the property is adjacent to open wooded space, however, building is constructed from non-combustible materials and defensible space is provided around structure perimeter
R	4	4	16.00	is site close to known active seismic faults? Three at 623 feet, 750 feet, and 2,066 feet away
R	1	4	4.00	any unstable site conditions (if yes, describe)? No unstable sit conditions
R	1	4	4.00	site drainage adequate to prevent flooding of buildings and critical equipment? Yes
Fn	1	3	3.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?
Fn	1	3	3.00	other known problems? No other known problems with the site
		1		Building Structure
Fn	1	3	3.00	adequate security measures and monitoring to prevent unauthorized access? The building has intrusion alarms which are tied to the SCADA monitoring at the main plant
INFORMATION	N/A	N/A	N/A	date building was constructed? 2009
Fn	1 1 1	4	4.00	adequate equipment clearances to facilitate routine O&M? Yes
PM	1	4	4.00	condition of exterior coatings adequate to protect structure? Yes
Fivi	1	3	3.00	
	1	3		adequate openings for ingress/egress? Yes
Fn	1		3.00	interior lighting adequate for routine O&M? Yes
Fn R	1	2	4.00	building designed to withstand snow load and not create safety issue? Yes
	1	_	2.00	building meets code compliance requirements? Yes as of design in 2008
R	1	4	4.00	known fire or haz-mat conditions that could be mitigated? No known haz mat or fire conditions
Fn	1	3	3.00	other known problems? No other known problems with the building
PM	1	4	4.00	estimated service life remaining? 27 years based on AWU Useful Life
				D. W. C.
				Pumps
INFORMATION	N/A	N/A	N/A	no. of pumps? 3
INFORMATION	N/A	N/A	N/A	pump types? Vertical Turbines
INFORMATION	N/A	N/A	N/A	pump manufacturer? Floway Pumps
PM	1	3	3.00	pumps rebuilt (list year) and describe work done? New in 2009
FE	1	4	4.00	pump curves available for each unit? Yes
R	1	4	4.00	known history of pump/motor failures? If so, explain the nature of the failure(s). No pump or motor failures since construction
R	1	4	4.00	number of service calls/repairs in the last year? None
С	1	4	4.00	what is firm capacity of pump station based on flow test? 1500 - 1900 gpm (there are three pumps. ea puts out 1,000 when running by itself. Two pump running simultaneously could overpressurize system ("Should be ok now" per district review comments 11/21/12))
PM	1	4	4.00	coatings adequate to provide corrosion protection? New coatings with no visual defects
FE	1	3	3.00	pumps operate efficiently (>70% bowl efficiency)? yes
FE	1	3	3.00	motor high efficiency and no excessive noise? yes
R	1	4	4.00	pumps operate free from excessive vibration? There is no record of excessive vibration at this station
Fn	1	4	4.00	adequate NPSH available to prevent cavitation? yes
INFORMATION	N/A	N/A	N/A	dedicated fire pumps available (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	date of last fire-pump test (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	measured fire-pump capacity (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	standby power supply available for fire pumps (hydro pneumatic pump stations only)? NA
R	1	3	3.00	spare parts readily available? Seals, Bearings, Shaft Sleeves are stored within the station. Other parts would need to be ordered from the manufacturer
Fn	1	3	3.00	other known problems? No other known problems
PM	1	4	4.00	estimated service life remaining? 27 years based on AWU Useful Life
	-	1		
		- 1	1	

1		1						
				South Tahoe PUD	Location Description:	Lake Tahoe Boulevard Just past Industrial Ave	K/J Project Number: 127	0004*00
				30uth failue FOD	Location Description.	Lake Tanioe Boulevard Just past industrial Ave	Nystroject Number: 127	0004*00
				Water System Optimization Plan	Pump Station Facility ID #:	TPBS1, TPBS2, TPBS3	Date:	2/23/2012
							Condition Assessment	
					Pump Station Facility Name:	Twin Peaks Booster Station	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Flagpole, Forest Mountain, Angora Highlands, and Stateline Zones
				n:	ning 8 Values			
PM	1	4	4.00		ping & Valves nent or vibration? Yes they are coated steel supports that are epoxy bo	alted to the floor and grouted beneath the plate		
PM	1	4	4.00		piping and valves? Coatings are new in 2009 and there are no visual det	-		
Fn	1	4	4.00		noise or headloss? Pipes are adequately sized	11.0		
Fn	1	4	4.00		led for all pumps? All pumps have isolation valves.			
Fn	1	3	3.00		d reliable service? Valves are new, efficient, and reliable			
Fn	2	2	4.00		njection provided? There is no chemical injection at this site			
INFORMATION Fn	N/A	N/A 5	N/A 5.00	·	f chemical added? NA	le water quality and are located payt to each of the procesure gages		
PM	1	4	4.00		ure water quality? Ports with bent copper are available for use to samp ce life remaining? 57 years for steel piping and 47 years for valves base			
				Other Critical Mechanic	al Fouipment			
INFORMATION	N/A	N/A	N/A	surge tank or surge anticipato				
Fn	4	3	12.00			per 1 which has been valved off. 12" PRV from the Twin Peaks Zone to State	eline	
INFORMATION	N/A	N/A	N/A	chemical tanks onsite, volume, and secondary conta	inment provided? NA			
INFORMATION	N/A	N/A	N/A	chemical additives comp				
PM	1	4	4.00	estimated servi	ce life remaining? 22 years based on AWU Useful Life			
					CARA			
_		_			CADA system			
Fn	1	3	3.00		mp performance? Yes the flow meter is a Siemens mag meter installed	in 2009		
Fn Fn	3	2	6.00 2.00	pressure instrumentation is adequate to monitor pu	ls? How frequent? Daily and hand logged into log book			
Fn	1	4	4.00		res and reliability? Yes and monitored by District Operations			
Fn	2	3	6.00		eviewed annually? The alarm log is maintained but it is not reviewed an	nually		
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, o		•		
R	1	4	4.00		ures in last year)? There have been no communication errors in the las			
R	1	3	3.00	adequate power (UPS) available to run all telemetry and instrumentation on m				
R	1	3	3.00		readily available? Spare parts for the SCADA system are available at th	e District offices or readily through the manufacturer		
PM	1	4	4.00	estimated servi	ce life remaining? 9 years based on AWU Useful Life			
					ectrical Power			
INFORMATION	N/A	N/A	N/A		nerator size (kW)? 275kW, 422 bhp @1800RPM Diesel			
R	1	5	5.00		run all equipment The generator is sized to handle all three pumps and	l associated controls		
R	1	5	5.00	adequate standby power pre				
INFORMATION R	N/A 1	N/A 5	N/A 5.00	fuel supply adequate for stand	ge capacity (gals)? 200 gallons			
R	N/A	3	N/A		ortable generator? NA, standby generator on site			
Fn	3	3	9.00		ould be mitigated? Arc Flash labeling has not been completed on the co	ntrol panels and other electrical equipment		
R	1	3	3.00		readily available? Yes some parts are housed within the station and ot			
PM	1	4	4.00		ce life remaining? 22 years based on AWU Useful Life			
				Λ.	Iditional Data			
			+	Nameplate duty conditions (rated flow and head, nominal m	otor horsepower):			
INFORMATION					Pump No. 1 Rated Flow=875gpm, Head=275', Size=11JKH, 5 Stag			
INFORMATION					Pump No. 2 Rated Flow=875gpm, Head=275', Size=11JKH, 5 Stag			
INFORMATION			1			e, Power=100hp, 1790 RPM, Impeller setting 0.125" off bottom		
INFORMATION			+		Pump No. 4	T		
			+		Legend	<u> </u>		I
					PM Physical Mortality			
					Fn Functionality			
					R Reliability			
					FE Financial Efficiency			
			1		C Capacity			
1								

	South Tahoe PUD	Location Description:	Lake Tahoe Boulevard Just past Industrial Ave	K/J Project Number: 1	270004*00
	Water System Optimization Plan	Pump Station Facility ID #:	TPBS1, TPBS2, TPBS3	Date:	2/23/2012
				Condition Assessment	
		Pump Station Facility Name:	Twin Peaks Booster Station	Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Flagpole, Forest Mountain, Angora Highlands, and Stateline Zones

Photo Evidence for PM, Fn, R, FE











			T					
		South Tahoe PUD	Location Descriptio	on: 1128 Tata L	ane	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID	#: TATABP1, TA	ГАВР2	Date:	2/23/	2012
			B			Condition Assessment		
			Pump Station Facility Nam	Tata Boos	ter	Inspectors:	Peter Lavallee a	nd Phill Torney
			Pressure Zones Serve	Gardner Mount	ain Zone	Adjacent Pressure Zones:	Statelin	e Zone
		Notes: 1. Capacity score will be based on hydraulic model		Fail Capacity	ure Mode Scoring (1 - 5)	el of Service		
		Capacity score will be based on Hydraulic Inides For Reliability to be determined based on CMMS maintenance records	Physical Mortality	(see note 1)	functionality	reliability	Financial Efficiency	
		3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
			minor defects only moderate deterioration	exceeds design requirement meets design requirement	2: exceeds some requirements 3: meets all requirements		2: financial efficiency is high 3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements		5: asset should be replaced	
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	1.75 5.75	2.60 11.00	N/A N/A	Total Factored Score
HECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	60%	40%	N/A N/A	
	100/3	Factored Score		N/A	3.45	4.4	N/A	7.85
		Criticality Score					5%	0.39
		Building Structure						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	3.50	N/A	1.17	1.50	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.83	5.00	N/A	
IECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score	30% 4.2	N/A N/A	50% 1.92	20%	N/A N/A	7.12
		Criticality Score		N/A	1.92	1	N/A 5%	0.36
		Pumps					5,0	0.00
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)		2.00	1.00	2.00	3.67	Total Factored Score
		Weighted Final Score (1-25)		8.00	3.50	6.75	12.67	
HECK	100%	Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
		Factored Score		1.6	1.05	1.35	1.9	7.00
		Criticality Score					25%	1.75
		Piping & Valves		N/A	Calculated	N/A	N/A	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	1.00	N/A N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.67	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	80%	N/A	N/A	
		Factored Score	1.2	N/A	2.93	N/A	N/A	4.13
		Criticality Score					10%	0.41
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5)		N/A	1.00	3.00	N/A	Total ractored Score
ECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	2.75 40%	9.33 40%	N/A N/A	
.con	100/3	Factored Score		N/A	1.1	3.73	N/A	4.83
		Criticality Score					20%	0.97
		Other Critical Mechanical Equipment						
		Is Failure Mode Score Calculated or Assigned?	_	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
IFCK	1000/	Weighted Final Score (1-25)		N/A	2.00 80%	N/A N/A	N/A N/A	
IECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score	20% N/A	N/A N/A	80% 1.6	N/A N/A	N/A N/A	1.60
	+ +	Criticality Score		IV/M	1.0	IN/A	10%	0.16
		Electrical Power						
	+ +	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	2.20	N/A	Total Factored Score
		Weighted Final Score (1-25)	16.00	N/A	3.00	8.60	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	60%	20%	N/A	
		Factored Score		N/A	1.8	1.72	N/A	6.72
		Criticality Score					25% rerall Total Factored Score (Out of 25) =	1.68 5.72
	_							

				South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 1270004*0)
				Water System Optimization Plan	Pump Station Facility ID #:	TATABP1, TATABP2	Date:	2/23/2012
					Dumm Station Facility Name		Condition Assessment	
					Pump Station Facility Name:	Tata Booster	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Gardner Mountain Zone	Adjacent Pressure Zones:	Stateline Zone
					_			
ailure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CON	DITION ASSESSMENT CHECKLIST		
	333.5			Pump Station Sit	e			
Fn	1	4	4.00		? The site has adequate year round access on a paved drive			
Fn	1	4	4.00	adequate vehicle access for maintenance	² The Booster Station is on a large lot with adequate parking	g for crew trucks and crane if necessary		
R	1	3	3.00		No. This site is indicated as other areas Zone X on the FEM	ΛΑ flood map.		
R	4	5	20.00		S? Yes there are trees and vacant lots near by.			
R	4	4	16.00	is site close to known active seismic fault				
R	3	4	12.00)? There are trees touching the tank and the lot has frequen	unauthorized entries		
R	1	4	4.00	site drainage adequate to prevent flooding of buildings and critical equipmen				
Fn	4	3	12.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism	No, the fencing does not prevent vandalism of the tank			
Fn	1	3	3.00	other known problem	s? There are no other known site problems			
				Building Structur				
Fn	2	3	6.00	adequate security measures and monitoring to prevent unauthorized access		secured utilizing pad locks that only have access by District C	yber Key	
INFORMATION	N/A	N/A	N/A	date building was constructed				
Fn	1	4	4.00	adequate equipment clearances to facilitate routine O&N				
PM	3	4	12.00			and soffit of the building show water damage on the low side	of the single sloped roof. It also appears that animals may at one t	me had nests within the soffit of the building.
Fn -	1	3	3.00	adequate openings for ingress/egres				
Fn -	1	3	3.00	interior lighting adequate for routine O&N		h		
Fn R	1	4	4.00	building designed to withstand snow load and not create safety issue		built and has not had any issue with snow loads since 1968		
R R	2	2	2.00 8.00	building meets code compliance requirement:	there are no known haz-mat or fire conditions that could	he mitigated within the interior of the building. Trees on the	parcel may increase the risk of fire to the building	
Fn	1	3	3.00	-	5? No other known problems on the site	be intigated within the interior of the building. Hees on the	parcel may increase the risk of the to the building	
PM	4	4	16.00	·	? Exceed Expected useful life by 14 years based on AWU Us	eful Life		
				Pump	2			
INFORMATION	N/A	N/A	N/A	no. of pump				
INFORMATION	N/A	N/A	N/A		S? End Suction Centrifugal			
INFORMATION	N/A	N/A	N/A	pro processor and a second sec	r? Pump #1 - Universal Manufacturing Company, Pump #2 -		hands into anni in tale 2011	
PM	2	3	6.00		P. New seals on both pumps in 2002. Pumps out of service for	or a period of time and station not in use. The station was pu	t Dack Into Service in July 2011.	
FE	5	4	20.00	pump curves available for each uni				
R	1	4	4.00	known history of pump/motor failures? If so, explain the nature of the failure(s		the station was restarted in 2011		
R	1	4	4.00		r? there have been no service calls within the last year since			
C PM	1	4	8.00 4.00		t? Pump No. 1 - 410 GPM, Pump No. 2 - 610 GPM, Qfirm - 4 1? Minor dings in coating but overall in great condition.	ITO OLIM		
FF	5	2	15.00	pumps operate efficiently (>70% bowl efficiency	12 Insufficient data			
FE	1	3	3.00	motor high efficiency and no excessive noise				
R	1	4	4.00		? No excessive vibration was noted while pumps were in se	vice running at max		
Fn	1	4	4.00	adequate NPSH available to prevent cavitation				
INFORMATION	N/A	N/A	N/A	dedicated fire pumps available (hydro pneumatic pump stations only				
INFORMATION	N/A	N/A	N/A	all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only				
INFORMATION	N/A	N/A	N/A	date of last fire-pump test (hydro pneumatic pump stations only				
INFORMATION	N/A	N/A	N/A	measured fire-pump capacity (hydro pneumatic pump stations only)? NA			
INFORMATION	N/A	N/A	N/A	standby power supply available for fire pumps (hydro pneumatic pump stations only)? NA			
R	5	3	15.00	spare parts readily available	e? There are no parts available for these pumps. Everything	vould need to be ordered from the Manufacturer.		
Fn	1	3	3.00	other known problems	s? No other known problems with the pumps and motors			
	_	1 -					-	

estimated service life remaining? Pumps have been out of service for a period of time and maintained within the last year.

12.00

							K/I Duning to Manusham	
			;	South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number:	1270004*00
			,	Water System Optimization Plan	Pump Station Facility ID #:	TATABP1. TATABP2	Date:	2/23/2012
							Condition Assessment	-11/
					Pump Station Facility Name:	Tata Booster	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Gardner Mountain Zone	Adjacent Pressure Zones:	Stateline Zone
				Piping & Valves				
Fn PM	2	4	4.00 8.00			concrete floor. No movement or additional vibration was noted or dings in the coating but no rust can be seen. See photos belo		
Fn	1	4	4.00	pipes adequately sized to prevent excessive noise or headloss?		of units in the coating but no rust can be seen. See photos belo	vv	
Fn	1	4	4.00		Isolation valves are installed for both pumps.			
Fn Fn	1	3	3.00 2.00	valves are suitable for efficient and reliable service? chemical injection provided?	Chemical injection was recently installed at this station			
INFORMATION	N/A	N/A	N/A	type of chemical added?	Sodium Hypochlorite			
Fn PM	1	5	5.00 4.00		Sample taps are in place and they are turned down with no Piping has been replaced on the interior of the pump stati			
FIVI	1	4	4.00	estimated service me remaining:	riping has been replaced on the interior of the pump stati	on. Estimate 30 years of Oserul Life Left		
				Other Critical Mechanical Equipment				
INFORMATION Fn	N/A 1	N/A 1	N/A 1.00	surge tank or surge anticipator valve condition? pressure relief valves?	NA NA-No pressure relief valves in station-Assigned score of 1	to prevent artificially lowered scores		
Fn	1	3	3.00	Altitude Valves?	Altitude valve which controls Tata tank is in good operatin	g condition		
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	chemical tanks onsite, volume, and secondary containment provided? chemical additives compliant with NSF 60?		y containment for them.		
PM	1	4	4.00		Other mechanical equipment has been added over the life	of the station and estimated service life would vary.		
				CCADA sustan				
INFORMATION	N/A	N/A	N/A	SCADA system pump station flow meter is adequate to monitor pump performance?		uate		
Fn	1	2	2.00	flow totals recorded at regular intervals? How frequent?	Flow totals are logged daily by hand			
Fn Fn	1	2	2.00 4.00	pressure instrumentation is adequate to monitor pump performance? automated alarm callout for critical failures and reliability?		ut they are not tied to SCADA		
Fn	1	3	3.00		The alarm log is maintained but it is not reviewed on an ar	nnual basis		
INFORMATION R	N/A 1	N/A 4	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? communication system is reliable (approximate no. of comm. failures in last year)?				
K	1	4	4.00	communication system is renable (approximate no. or comm. randres in last year)?	There are no communication failures within the last year			
					There is adequate power to the site, but during a power of	utage a portable generator would need to be mobilized to the s	ite to provide adequate power to run telemetry.	
R R	5 3	3	15.00 9.00	adequate power (UPS) available to run all telemetry and instrumentation on main power failure?	Parts are readily available at the plant and through the ma	nufacturer		
PM	1	4	4.00		11 years based on AWU Useful Life			
				Electrical Downer				
INFORMATION	N/A	N/A	N/A	Electrical Power standby generator size (kW)?				
R	1	5	5.00	adequate power available to run all equipment	NA			
R INFORMATION	4 N/A	5 N/A	20.00 N/A		No, a portable generator would need to be mobilized to the	ne site		
R	N/A	5	N/A	fuel storage capacity (gals)? fuel supply adequate for standby power service?				
	-	3	45.00		A generator could be brought to the site within a few hou	rs depending on conditions. There are no quick hookups to the	station which means that the hookup process for bac	kup power may take longer than mobilizing the portable generator.
R Fn	5 1	3	15.00 3.00	time needed to mobilize portable generator? known electrical hazards that could be mitigated?				
R	1	3	3.00	spare parts/service support readily available?	Some spare parts are available but others would need to b			
PM	4	4	16.00	estimated service life remaining?	Older components have exceed the useful life. Some new	electrical may exist for changes made in the nineties.		
				Additional Data				
INFORMATION				Nameplate duty conditions (rated flow and head, nominal motor horsepower):	No Hand or flow lines I all the second			
INFORMATION INFORMATION					No Head or flow listed on the nameplates. 30HP Pump No Head or flow listed on the nameplates. 50HP Pump			
INFORMATION				Pump No. 3	- I - I - I - I - I - I - I - I - I - I			
				Pump No. 4	This pump station was not used for a period of time becau	se it is not necessary for the operation of the system as it is cur	rrently run today. The District has evaluated how to a	et water to the Y area of South Lake Tahoe. As part of this evaluation the
				Comments	booster station was put online to isolate a portion of the S		till looking at the necessity for this pump station and	other alternatives that could be done in order to adequately supply the west
				Legend				
				PM	Physical Mortality			
					Functionality Reliability			
					Financial Efficiency			
					Capacity			

South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 1270004*00	
Water System Optimization Plan	Pump Station Facility ID #:	TATABP1, TATABP2	Date:	2/23/2012
	Pump Station Facility Name:	Tata Booster	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
	Pressure Zones Served:	Gardner Mountain Zone	Adjacent Pressure Zones:	Stateline Zone
Photo Evidence for PM, Fn,	R, FE	 РНОТОЅ		
2011/05/06 12:39 PM		2011/05/06 12:39 PM		2011/05/06 12:40
2011/05/06 12:40 PM		2011/05/06 12:40 PM		

		South Tahoe PUD	Location Description	927 Forest Moun	ntain Dr.	K/J Project Number:	1270004*00	
Proper Section Facility States Property Learner States Property		Water System Optimization Plan	Pump Station Facility ID	fMPUMP1, FMPUMP2	2, FMPUMP3	Date:	3/12/201	.2
Part Part			Pump Station Facility Name	Forest Mountain	Booster			Phill Torney
Company Comp			Pressure Zones Serve	: Angora Highland	ds Zone	Adjacent Pressure Zones:	Twin Peaks 7	Zone
Company Comp								
					9, ,	l of Comico		
		2. For Reliabilty to be determined based on CMMS maintenance records		(see note 1)	functionality	reliability		
Company Comp			2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
Part Part					•			
In Patient Notes from Conducted an Angegord 10.5 10.0 10.0 12.0 12.0 10.								
		Pumn Station Site						
Section Company Comp		•		N/A	Calculated	Calculated	N/A	
Crossin Wageling Factor ID 1900 10%							· · · · · · · · · · · · · · · · · · ·	Total Factored Score
Factors Score 1/4	100%		· ·					
Bailling Structure B Failure Mode Score Colorated and Angeord NA GAL-Jord NA GAL-Jord NA GAL-Jord NA GAL-Jord NA TO NA	10076		·	·			·	8.86
B rature Notes Store Calculated an Auspeed Calculated N/A Lot Calculated N/A Lot Lot Lot N/A Lot Lot Lot Lot N/A Lot		·					5%	0.44
Unweighted Fallow Mode Score (1-5) 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 1-70 N/A 1-20 N/				N/A	Calculated	Calculated	N/A	
Company Negative Pactor (2005) 200 2				-				Total Factored Score
Factored Sories 18							· · · · · · · · · · · · · · · · · · ·	
Critically Score Pumps St.	100%			·			·	4.82
Image: Company of the State of Company of				19/0	2.42	0.0		0.24
Comment Comm		Pumps						
Melphet First Note [1,28] 8.0								Total Fastavad Saava
1000 Critically Woighing Factor (0.5005) 190. 200. 300. 200. 190								Total Factored Score
Critically Score Piping & Values Piping &	100%							
Piping & Values Piping & P				0.8	1.05	0.75		5.80
Staller Mode Soro Calculated or Assigned? Calculated N/A Calculated N/A N/A N/A							25%	1.45
				N/A	Calculated	N/A	N/A	
1005				-			N/A	Total Factored Score
Factored Score 0.8 N/A 4.8 N/A	1000/							
Criticality Score	100%			-			·	5.60
Section Sect				.,,		.,,		0.56
Company				_				
Name								Total Factored Score
100%								
Criticality Score 20%	100%	Criticality Weighting Factor (0 - 100%)	20%					
Other Critical Mechanical Equipment Spailure Mode Score Calculated or Assigned? Calculated N/A Calculated N/A N/				N/A	1.36	2.13		5.09 1.02
Calculated N/A Calculated N/A N/		•					20%	1.02
March Marc		Is Failure Mode Score Calculated or Assigned?	Calculated					
100% Criticality Weighting Factor (0 - 100%) 20% N/A 80% N/A								Total Factored Score
Factored Score	100%							
Calculated Cal	 100,0	Factored Score	1.6				N/A	4.00
Section Sect							10%	0.40
Unweighted Failure Mode Score (1-5) 2.00 N/A 1.00 0.80 N/A Total				N/A	Calculated	Calculated	NI/A	
Neighted Final Score (1-25) 8.00 N/A 3.00 3.60 N/A								Total Factored Score
Factored Score 1.6 N/A 1.8 0.72 N/A Criticality Score 25%		Weighted Final Score (1-25)	8.00	N/A	3.00	3.60	N/A	
Criticality Score 25%	100%							442
				N/A	1.8	U./2		4.12 1.03
Overall Total Factored Score (Out of 25) =		5				0	overall Total Factored Score (Out of 25) =	5.14

			South Tahoe PUD	Location Description:	927 Forest Mountain Dr.	K/J Project Number:	1270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	FMPUMP1, FMPUMP2, FMPUMP3	Date:	3/12/2012
						Condition Assessment	
				Pump Station Facility Name:	Forest Mountain Booster	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Angora Highlands Zone	Adjacent Pressure Zones:	Twin Peaks Zone
				Pump Station Site			· ·
Fn	1	4	4.00 key O&N	1 staff have access to site? Yes			
Fn	3	4	12.00 adequate vehicl	e access for maintenance? Only in the summer time or periods of low snow fall			
R	1	3		within 100-yr flood plain? No. This site is indicated as other areas Zone X on the F	EMA flood map.		
R	4	5		te vulnerable to wildfires? Yes this area was part of the Angora burn area			
R	4	4		own active seismic faults? 5,000 feet to the nearest fault line			
R	1	4	•	nditions (if yes, describe)? None			
R	1	4	4.00 site drainage adequate to prevent flooding of buildin	gs and critical equipment? Yes			
Fn	5	2	15.00 site lighting, fencing, and security monitoring adequate to discourage unaut	There is no security around the property			
Fn	1	3	3.00 Site lighting, rending, and security monitoring adequate to discourage unduc	other known problems? None			
	-	3	3.00	Certer Mileston problems. Hone			
				Building Structure			
Fn	3	3	9.00 adequate security measures and monitoring to pre	vent unauthorized access? The door is locked and there have been no instances of	unauthorized access		
INFORMATION	N/A	N/A	N/A date	building was constructed? 2000	andanonized decessi		
Fn	1	4	4.00 adequate equipment clearances				
PM	2	4		uate to protect structure? There are no coatings on the block but the door coating	s are starting to fade		
Fn	2	3		enings for ingress/egress? Single door in and out			
Fn	1	3		lequate for routine O&M? Yes			
Fn	1	4		nd not create safety issue? The building meets the loads when constructed			
R	1	2		compliance requirements? The building meets the codes for when it was construct	ed		
R	1	4	4.00 known fire or haz-mat condition	s that could be mitigated? None			
Fn	1	3	3.00	other known problems? None			
PM	1	4	4.00 estima	ted service life remaining? 18 years based on AWU Useful Life			
				Pumps			
INFORMATION	N/A	N/A	N/A	no. of pumps? 3			
INFORMATION	N/A	N/A	N/A	pump types? Centrifugal			
INFORMATION	N/A	N/A	N/A	pump manufacturer? 1 and 2 are peerless. Pump 3 is aurora (fire pump)			
PM	2	3		and describe work done? No rebuilds, new seals and bearings in 2009 on pumps	L ands 2		
FE	5	4	20.00 pump curv	es available for each unit? No			
R	1	4	4.00 known history of pump/motor failures? If so, explain t				
R	1	4		Is/repairs in the last year? None			
С	1	4	4.00 what is firm capacity of pump s	tation based on flow test? approximately 200 gpm w/ pump no. 3 out of service			
PM	3	4		vide corrosion protection? Coatings have worn away in some locations but are in a	dequate condition		
FE	5	3		ly (>70% bowl efficiency)? wire-to-water efficiency ranges between 47% - 59%			
FE	1	3		cy and no excessive noise? Assumed yes			
R	1	4		from excessive vibration? Yes			
Fn	1	4		ble to prevent cavitation? yes			
INFORMATION	N/A	N/A	N/A dedicated fire pumps available (hydro pneur				
INFORMATION	N/A	N/A	N/A all fire pumps are UL/FM rated for fire service (hydro pneur				
INFORMATION	N/A	N/A	N/A date of last fire-pump test (hydro pneur				
INFORMATION	N/A	N/A	N/A measured fire-pump capacity (hydro pneur				
INFORMATION	N/A	N/A	N/A standby power supply available for fire pumps (hydro pneur				
R	1	3		re parts readily available? Readily available in the District's main shop			
Fn	1	3	3.00	other known problems? None			
PM	2	4	8.00 estima	ted service life remaining? 18 years based on AWU Useful Life			
		1					

			South Tabos DUD	Location Description	027 Farant Mauritain Da	K/J Project Number:	1270004800
			South Tahoe PUD	Location Description:	927 Forest Mountain Dr.	ky3 FTOJECT Walliber.	1270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	FMPUMP1, FMPUMP2, FMPUMP3	Date:	3/12/2012
						Condition Assessment	
				Pump Station Facility Name:	Forest Mountain Booster	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Angora Highlands Zone	Adjacent Pressure Zones:	Twin Peaks Zone
				11000110 201100 0011001	/ Mgord Mg. Market Zone	,	THIN CARD ZONE
			Piping 8	& Valves			
Fn	1	4	4.00 pipe supports adequate to prevent movement or	vibration? Yes steel supports embedded in concrete floor, or steel v	vith no bolts to floor		
PM	1	4		nd valves? Pipe and valve coatings in excellent condition			
Fn Fn	1	4	4.00 pipes adequately sized to prevent excessive noise or 4.00 isolation valves provided for				
Fn	1	3	3.00 valves are suitable for efficient and reliab				
Fn	3	2	6.00 chemical injection				
INFORMATION	N/A	N/A		cal added? None			
Fn	3	5	15.00 sample tap(s) provided to measure wat				
PM	1	4	4.00 estimated service life r	emaining? 48 years based on AWU Useful Life			
			Other Critical Mechanical Equ	uipment			
INFORMATION	N/A	N/A	N/A surge tank or surge anticipator valve	•			
Fn	1	3		ief valves? On site and in good condition no recent issues			
INFORMATION	N/A	N/A	N/A chemical tanks onsite, volume, and secondary containment				
INFORMATION PM	N/A 2	N/A 4	N/A chemical additives compliant wi 8.00 estimated service life r	th NSF 60? NA emaining? 13 years based on AWU Useful Life			
PIVI	2	4	8.00 estimated service life i	emaining: 13 years based on Awo oserdi Life			
			SCADA	system			
Fn	1	3	3.00 pump station flow meter is adequate to monitor pump per	-			
Fn	1	2		frequent? Flow totals are logged daily by hand			
Fn	1	2		formance? There are numerous pressure gauges around the station	but they are not tied to SCADA		
Fn Fn	1	4		reliability? Yes all alarms are monitored by District Operations	nnual hacis		
Fn INFORMATION	2 N/A	3 N/A	6.00 alarm log maintained and reviewed N/A type of telemetry used (radio, fiber optic, leased line, cell mod	annually? The alarm log is maintained but it is not reviewed on an lem etc. 12 Radio	illiudi Dasis		
R	1	4	4.00 communication system is reliable (approximate no. of comm. failures in				
R	3	3	9.00 adequate power (UPS) available to run all telemetry and instrumentation on main pow	er failure? There is adequate power to the site but during a power of	utage a portable generator would need to be mobilized to the site		
R PM	2	3		available? Parts are readily available at the plant and through the nemaining? 11 years based on AWU Useful Life	anufacturer		
FIVI	2	4	8.00 Estimated service life i	ernaning: 11 years based on Awo oserdi Life			
			Electrica	l Power			
INFORMATION	N/A	N/A	N/A standby generator	size (kW)? 125kW			
R	1	5	5.00 adequate power available to run all				
R INFORMATION	1 N/A	5 N/A	5.00 adequate standby power present an N/A fuel storage capa				
R	1	5	5.00 fuel supply adequate for standby pow				
R	N/A	3	N/A time needed to mobilize portable a	generator? NA, standby power on site			
Fn R	1	3	3.00 known electrical hazards that could be	mitigated? None available? Yes at District's main plant			
PM	2	4		emaining? 13 years based on AWU Useful Life			
FIVI	۷	7	5.55 Estimated Service life i				
			Addition	nal Data			
			Nameplate duty conditions (rated flow and head, nominal motor ho	rsepower):			
INFORMATION				ump No. 1 20hp			
INFORMATION INFORMATION				ump No. 2 20Hp ump No. 3 450gpm, 280 ft., 60Hp			
INFORMATION				ump No. 3 450gpm, 280 ft., 60Hp ump No. 4			
ONWATION				F - F - F - F - F - F - F - F - F - F -			
				Legend	1		'
				PM Physical Mortality			
				Fn Functionality R Reliability			
				FE Financial Efficiency			
				C Capacity			
							

South Tahoe PUD	Location Description:	927 Forest Mountain Dr.	K/J Project Number: 1270004*00	
Water System Optimization Plan	Pump Station Facility ID #:	FMPUMP1, FMPUMP2, FMPUMP3	Date:	3/12/2012
	Pump Station Facility Name:	Forest Mountain Booster	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
	Pressure Zones Served:	Angora Highlands Zone	Adjacent Pressure Zones:	Twin Peaks Zone
		Aligora i iigiilailus 2011e	Adjutent Hessure Esnesi	TWIIT Edits Zolle
Photo Evidence for PM, Fn, R, FE		PHOTOS		
2011/05/24 02:13 FM	2011/05/P8 C215 0. PM	2911/05/25	62:10 PM	2011/05/24 02:10 PM

		South Tahoe PUD	Location Description	Hwy89 and Corr	nelian Dr.	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID #	t: CRNPUMP1, CRNPUM	P2, CRNPUMP3	Date:	3/8/201	12
			Duman Station Facility Name			Condition Assessment		
			Pump Station Facility Name	Cornelian Bo	ooster	Inspectors:	Peter Lavallee and	1 Mark Gray
			Pressure Zones Served	Christmas Valle	ey Zone	Adjacent Pressure Zones:	Arrowhead	Zone
		Notes:		Fail	ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity (see note 1)	Lev functionality	el of Service reliability	- Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
			2: minor defects only	2: exceeds design requirement	2: exceeds some requirements		2: financial efficiency is high	
			moderate deterioration significant deterioration	3: meets design requirement 4: less than design requirement	meets all requirements fails some requirements		financial efficiency is average financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements		5: asset should be replaced	
			,	12 20 27 27 27 2 2 2 2				
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	1.75	2.40	N/A	Total Factored Scor
		Weighted Final Score (1-25)		N/A	5.75	10.00	N/A	
	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	60% 3.45	40%	N/A N/A	7.45
	+ + + + + + + + + + + + + + + + + + + +	Criticality Score		IN/A	5.45	4	N/A 5%	0.37
		Building Structure						3.5.
	+ + + + + + + + + + + + + + + + + + + +	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.50	1.00	N/A	Total Factored Sco
		Weighted Final Score (1-25)	6.00	N/A	4.83	3.00	N/A	
	100%	Criticality Weighting Factor (0 - 100%)	30%	N/A	50%	20%	N/A	
		Factored Score		N/A	2.42	0.6	N/A	4.82
		Criticality Score					5%	0.24
		Pumps						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	Total Factored Sco
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		2.00 8.00	1.00 3.50	1.50 5.25	3.67 11.33	Total ractored 3co
	100%	Criticality Weighting Factor (0 - 100%)		20%	30%	20%	15%	
	100%	Factored Score		1.6	1.05	1.05	1.7	6.85
		Criticality Score					25%	1.71
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.17	N/A	N/A	Total Factored Sco
		Weighted Final Score (1-25)		N/A	4.00	N/A	N/A	
	100%	Criticality Weighting Factor (0 - 100%) Factored Score	20% 0.8	N/A N/A	80% 3.20	N/A N/A	N/A N/A	4.00
		Criticality Score		N/A	3.20	N/A	10%	4.00 0.40
		SCADA System					10,0	0.40
	+ + + + + + + + + + + + + + + + + + + +	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.20	1.00	N/A	Total Factored Sco
		Weighted Final Score (1-25)	4.00	N/A	3.40	3.33	N/A	
	100%	Criticality Weighting Factor (0 - 100%)		N/A	40%	40%	N/A	
	+ + + + + + + + + + + + + + + + + + + +	Factored Score		N/A	1.36	1.33	N/A	3.49
	+ + + + + + + + + + + + + + + + + + + +	Criticality Score					20%	0.70
	+ + + + + + + + + + + + + + + + + + + +	Other Critical Mechanical Equipment		21/2	61111		N/C	
	+ + + + + + + + + + + + + + + + + + + +	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.00	N/A N/A	N/A N/A	Total Factored Sc
	+ + + + + + + + + + + + + + + + + + + +	Weighted Final Score (1-25)		N/A	3.00	N/A N/A	N/A	
	100%	Criticality Weighting Factor (0 - 100%)		N/A	80%	N/A	N/A	
		Factored Score	1.6	N/A	2.4	N/A	N/A	4.00
-		Criticality Score					10%	0.40
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	1.40	N/A	Total Factored Sco
	1000/	Weighted Final Score (1-25)		N/A N/A	3.00 60%	5.40 20%	N/A	
	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	1.8	20% 1.08	N/A N/A	3.68
	+	Criticality Score		N/A	1.0	1.00	25%	0.92
		Citicality score						
		Criticality score				O	verall Total Factored Score (Out of 25) =	4.74

				11 7 L			V/I Project Number	
			Sc	outh Tahoe PUD	Location Description:	Hwy89 and Cornelian Dr.	K/J Project Number: 1270004*00	
			l w	ater System Optimization Plan	Pump Station Facility ID #:	CRNPUMP1, CRNPUMP2, CRNPUMP3	Date:	3/8/2012
			-		, , , , , ,		Condition Assessment	2,0,202
					Pump Station Facility Name:	Cornelian Booster	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Christmas Valley Zone	Adjacent Pressure Zones:	Arrowhead Zone
				F	ump Station Site			
Fn	1	4	4.00	key O&M sta	ff have access to site? Yes			
Fn	1	4	4.00		cess for maintenance? Yes			
R	2	3	6.00		nin 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEI	AA flood map. Which means flood hazards are undetermined but	possible.	
R	4	5	20.00		ulnerable to wildfires? Yes there are wooded lots adjacent to the facility			
R	4	4	16.00		active seismic faults? 3,715 ft. to the nearest fault			
R	1	4	4.00 4.00	site drainage adequate to prevent flooding of buildings a	ions (if yes, describe)? None			
R	1	4						
Fn	4	3	12.00 sit	te lighting, fencing, and security monitoring adequate to discourage unauthori	ned access/vandalism? None and there is no history of unauthorized access			
Fn	1	3	3.00	O	her known problems? None			
	-		5.00	-	Tone			
				E	uilding Structure			
Fn	4	3	12.00		unauthorized access? The door is locked but the facility has had issues in the pa	st with vandalism		
NFORMATION	N/A	N/A	N/A	date buil	ding was constructed? 2003			
Fn	1	4	4.00	adequate equipment clearances to fa				
PM	1	4	4.00		to protect structure? Block building with no coatings and the roof is in good co	ndition		
Fn	1	3	3.00		gs for ingress/egress? Yes			
Fn	1	3	3.00		ate for routine O&M? Yes			
Fn	1	4	4.00		ot create safety issue? Met the requirements at the time of construction			
R	1	2	2.00		pliance requirements? Met requirements at the time of construction			
R	1	4	4.00	known fire or haz-mat conditions th				
Fn	1	3	3.00		her known problems? None			
PM	2	4	8.00	estimated	service life remaining? 21 years based on AWU Useful Life			
					Pumps Pump No. 3 is used as a fire pump, however, it does not a	ppear to be UL/FM rated for fire service.		
	N/A	N/A	N/A		no. of pumps? 3	opear to be UL/FM rated for fire service.		
NFORMATION	N/A	N/A	N/A		no. of pumps? 3 pump types? Centrifugal Pumps	opear to be UL/FM rated for fire service.		
NFORMATION NFORMATION	N/A N/A		N/A N/A		no. of pumps? 3 pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse			
NFORMATION NFORMATION PM	N/A N/A 3	N/A N/A 3	N/A N/A 9.00		no. of pumps? 3 pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse describe work done? No work done and this is really only used in the wintertim			
NFORMATION NFORMATION PM FE	N/A N/A 3 1	N/A N/A 3 4	N/A N/A 9.00 4.00	pump curves a	no. of pumps? 3 pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse describe work done? No work done and this is really only used in the wintertim vailable for each unit? Yes			
NFORMATION NFORMATION PM FE R	N/A N/A 3 1	N/A N/A 3 4	N/A N/A 9.00 4.00 4.00	pump curves a known history of pump/motor failures? If so, explain the r	no. of pumps? 3 pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse I describe work done? No work done and this is really only used in the wintertim valiable for each unit? Yes ature of the failure(s). None			
NFORMATION NFORMATION PM FE R R	N/A N/A 3 1 1	N/A N/A 3 4 4	N/A N/A 9.00 4.00 4.00 4.00	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r	no. of pumps? 3 pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse I describe work done? No work done and this is really only used in the wintertim valiable for each unit? Yes ature of the failure(s). None epairs in the last year? None			
NFORMATION NFORMATION PM FE R R C	N/A N/A 3 1 1 2	N/A N/A 3 4 4 4	N/A N/A 9.00 4.00 4.00 4.00 8.00	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati	no. of pumps? 3 pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse I describe work done? No work done and this is really only used in the wintertim valiable for each unit? Yes ature of the failure(s). None epairs in the last year? None on based on flow test? firm capacity is 300 gpm based on flow test	e		
NFORMATION NFORMATION PM FE R C PM	N/A N/A 3 1 1 2 2	N/A N/A 3 4 4 4 4	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide	no. of pumps? 3 pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse d describe work done? No work done and this is really only used in the wintertim vailable for each unit? Yes vailable for each wint? None epairs in the last year? None on based on flow test? If firm capacity is 300 gpm based on flow test corrosion protection? Exterior coatings are in good condition and show minimal	e		
NFORMATION NFORMATION PM FE R C C PM FE	N/A N/A 3 1 1 2 2 5	N/A N/A 3 4 4 4 4 4 4 3	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 15.00	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (:	no. of pumps? pump types? pump manufacturer? Fairbanks Morse describe work done? No work done and this is really only used in the wintertim vailable for each unit? Yes ature of the failure(s). None pairs in the last year? None on based on flow test? corrosion protection? Exterior coatings are in good condition and show minimal 70% bowl efficiency)? wire-to-water efficiency ranges between 32% - 42%	e		
NFORMATION NFORMATION PM FE R R C C PM FE FE FE	N/A N/A 3 1 1 2 2 2 5	N/A N/A 3 4 4 4 4 4 4 3 3	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 15.00	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (? motor high efficiency a	no. of pumps? pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse I describe work done? No work done and this is really only used in the wintertim vailable for each unit? Yes ature of the failure(s). Pon based on flow test? If m capacity is 300 gpm based on flow test corrosion protection? Exterior coatings are in good condition and show minimal 70% bowl efficiency)? wire-to-water efficiency ranges between 32% - 42% excessive noise?	e		
NFORMATION NFORMATION PM FE R R C PM FE FE R R R R R R R R R R R R R R R R R	N/A N/A 3 1 1 2 2 5 5	N/A N/A 3 4 4 4 4 4 3 3 3	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 8.00 15.00 4.00 4.00	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (? motor high efficiency a	no. of pumps? pump types? pump manufacturer? Fairbanks Morse I describe work done? I describe work done? No work done and this is really only used in the wintertim variable for each unit? Yes ature of the failure(s). None pairs in the last year? In based on flow test? firm capacity is 300 gpm based on flow test corrosion protection? Exterior coatings are in good condition and show minimal 70% bowl efficiency)? wire-to-water efficiency ranges between 32% - 42% In excessive noise? wire-to-water efficiency ranges between 32% - 42% In excessive vibration? None	e		
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NFORMATION NFORMATION PM FE R R C PM FE FE FE FF R NFORMATION	N/A N/A 3 1 1 1 2 2 5 5 1 1 1 1 N/A N/A	N/A N/A 3 4 4 4 4 4 4 5 3 3 4 4 N/A N/A	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 15.00 15.00 4.00 4.00 N/A N/A	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (; motor high efficiency a pumps operate free fro adequate NPSH available dedicated fire pumps available (hydro pneumati	no. of pumps? pump types? Centrifugal Pumps pump manufacturer? Al describe work done? Valiable for each unit? Yes ature of the failure(s). spairs in the last year? None spairs in the last year? None corrosion protection? Tow bowl efficiency)? In excessive noise? In excessive vibration? None spairs to the last year? None Exterior coatings are in good condition and show minimal wire-to-water efficiency ranges between 32% - 42% excessive noise observed on pump no. 3 during flow tests on provent cavitation? Spairs to the wire-to-water efficiency ranges between 32% - 42% excessive noise observed on pump no. 3 during flow tests on prevent cavitation? Spairs to the wire-to-water efficiency ranges between 32% - 42% excessive noise observed on pump no. 3 during flow tests on prevent cavitation? Spairs to the wire-to-water efficiency ranges between 32% - 42% excessive noise observed on pump no. 3 during flow tests on prevent cavitation? Yes Spump stations only)? NA	e		
NFORMATION NFORMATION PM FE R R C PM FE FE FE R FN NFORMATION NFORMATION NFORMATION	N/A N/A 3 1 1 1 2 2 5 5 5 1 1 1 N/A N/A	N/A N/A 3 4 4 4 4 3 3 3 4 4 N/A N/A N/A	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 15.00 15.00 4.00 4.00 N/A N/A	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (: motor high efficiency a pumps operate free fro adequate NPSH available dedicated fire pumps available (hydro pneumati all fire pumps are UL/FM rated for fire service (hydro pneumati date of last fire-pump test (hydro pneumati	no. of pumps? pump types? Centrifugal Pumps pump manufacturer? Fairbanks Morse describe work done? No work done and this is really only used in the wintertime valiable for each unit? Yes ature of the failure(s). None spairs in the last year? None on based on flow test? Firm capacity is 300 gpm based on flow test corrosion protection? Exterior coatings are in good condition and show minimal volume friciency)? In excessive noise? In excessive vibration? In pump stations only)? In pump stations only pump stations on	e		
FE R R C C PM FE FE FE R INFORMATION INFORMATION INFORMATION INFORMATION	N/A N/A 3 1 1 1 2 2 5 5 5 1 1 1 N/A N/A N/A	N/A N/A 3 4 4 4 4 4 4 4 A N/A N/A N/A N/A	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 15.00 15.00 4.00 4.00 N/A N/A N/A	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (: motor high efficiency a pumps operate free fro adequate NPSH available dedicated fire pumps available (hydro pneumati all fire pumps are UL/FM rated for fire service (hydro pneumati date of last fire-pump test (hydro pneumati measured fire-pump capacity (hydro pneumati	no. of pumps? pump types? pump manufacturer? Fairbanks Morse d describe work done? No work done and this is really only used in the wintertime valiable for each unit? Yes ature of the failure(s). Pairs in the last year? In based on flow test? Corrosion protection? Exterior coatings are in good condition and show minimal rows bowl efficiency)? Ind no excessive noise? In excessive vibration? In excessive vibration? In pump stations only)? In pump stations only? In pump stations	e		
NFORMATION NFORMATION PM FE R R C PM FE FE FE R NFORMATION NFORMATION NFORMATION	N/A N/A 3 1 1 1 2 2 2 5 5 5 1 1 N/A N/A N/A	N/A N/A 3 4 4 4 4 3 3 3 4 4 N/A N/A N/A	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 15.00 15.00 4.00 N/A N/A N/A N/A	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (? motor high efficiency a pumps operate free fro adequate NPSH available dedicated fire pumps available (hydro pneumati all fire pumps are UL/FM rated for fire service (hydro pneumati date of last fire-pump tast (hydro pneumati measured fire-pump capacity (hydro pneumati standby power supply available for fire pumps (hydro pneumati	no. of pumps? pump types? pump manufacturer? Fairbanks Morse I describe work done? I describe work done? I describe work done? I describe work done? I describe work done? I describe work done and this is really only used in the wintertime valiable for each unit? Yes ature of the failure(s). I hone I ho	e		
NFORMATION NFORMATION PM FE R R C PM FE FE FE R R Fn NFORMATION NFORMATION NFORMATION NFORMATION NFORMATION R	N/A N/A 3 1 1 1 2 2 2 5 5 1 1 N/A N/A N/A N/A N/A 3	N/A N/A 3 4 4 4 4 4 4 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 15.00 15.00 4.00 N/A N/A N/A N/A N/A 9.00	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (; motor high efficiency a pumps operate free fro adequate NPSH available dedicated fire pumps available (hydro pneumati all fire pumps are UL/FM rated for fire service (hydro pneumati date of last fire-pump test (hydro pneumati measured fire-pump capacity (hydro pneumati standby power supply available for fire pumps (hydro pneumati	no. of pumps? pump types? pump manufacturer? Fairbanks Morse I describe work done? I describe work done? I describe work done and this is really only used in the wintertime valiable for each unit? Yes ature of the failure(s). I None Pairs in the last year? In based on flow test? In corrosion protection? I Exterior coatings are in good condition and show minimal varieties of the failure of the firm capacity is 300 gpm based on flow test. I Exterior coatings are in good condition and show minimal varieties of the following of	e		
NFORMATION NFORMATION PM FE R R C PM FE FE R FF NFORMATION NFORMATION NFORMATION NFORMATION NFORMATION	N/A N/A 3 1 1 1 2 2 2 5 5 5 1 1 N/A N/A N/A	N/A N/A 3 4 4 4 4 4 4 4 A N/A N/A N/A N/A	N/A N/A 9.00 4.00 4.00 4.00 8.00 8.00 15.00 15.00 4.00 N/A N/A N/A N/A	pump curves a known history of pump/motor failures? If so, explain the r number of service calls/r what is firm capacity of pump stati coatings adequate to provide pumps operate efficiently (2 motor high efficiency a pumps operate free fro adequate NPSH available dedicated fire pumps available (hydro pneumati all fire pumps are UL/FM rated for fire service (hydro pneumati date of last fire-pump test (hydro pneumati measured fire-pump capacity (hydro pneumati standby power supply available for fire pumps (hydro pneumati	no. of pumps? pump types? pump manufacturer? Fairbanks Morse I describe work done? I describe work done? I describe work done? I describe work done? I describe work done? I describe work done and this is really only used in the wintertime valiable for each unit? Yes ature of the failure(s). I hone I ho	deterioration hile parts are ordered	partoning graphom. Estimated usaful life sometiming for	x 2 is Eugage

			South Tahoe PUD	Location Description:	Hwy89 and Cornelian Dr.	K/J Project Number:	1270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	CRNPUMP1, CRNPUMP2, CRNPUMP3	Date:	3/8/2012
				Pump Station Facility Name:	Cornelian Booster	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
				Pressure Zones Served:	Christmas Valley Zone	Adjacent Pressure Zones:	Arrowhead Zone
			Piping & \	alves			
Fn	1	4		ation? Concrete supports as well as steel posts that are bolted	to the concrete floor		
PM	1	4	4.00 coatings adequate to protect piping and				
Fn Fn	1	4	4.00 pipes adequately sized to prevent excessive noise or he 4.00 isolation valves provided for all p				
Fn	1	3	3.00 valves are suitable for efficient and reliable s				
Fn	2	2	4.00 chemical injection pro				
INFORMATION	N/A	N/A	N/A type of chemical				
Fn	1	5	5.00 sample tap(s) provided to measure water of	uality? Yes			
PM	1	4	4.00 estimated service life rem	aining? 51 years based on AWU Useful Life			
			2.1 2.1.1.2.1.1.1				
			Other Critical Mechanical Equip				
INFORMATION	N/A	N/A	N/A surge tank or surge anticipator valve cor		1		
Fn INFORMATION	1	3 N/A			low water to head back into the Arrowhead zone from Christmas Valle	ey Zone	
INFORMATION	N/A N/A	N/A N/A	N/A chemical tanks onsite, volume, and secondary containment pro N/A chemical additives compliant with I				
PM	2	4		nining? 14 years based on AWU Useful Life			
	_	•		,			
			SCADA s	stem			
Fn	1	3	3.00 pump station flow meter is adequate to monitor pump perform				
Fn	1	2	2.00 flow totals recorded at regular intervals? How fre				
Fn	1	2	2.00 pressure instrumentation is adequate to monitor pump perform	nance? Yes			
Fn	1	4	4.00 automated alarm callout for critical failures and reli				
Fn	2	3		nually? The alarm log is maintained but it is not reviewed annu	ally		
INFORMATION R	N/A 1	N/A 4	N/A type of telemetry used (radio, fiber optic, leased line, cell moden 4.00 communication system is reliable (approximate no. of comm. failures in las		par		
N.	1	4	4.00 Communication system is reliable (approximate no. or comm. randres in las				
R	1	3	3.00 adequate power (UPS) available to run all telemetry and instrumentation on main power	Yes there is a permanent backup generator within the sailure?	tation		
R	1	3		ilable? Spare parts for the SCADA system are available at the D	istrict offices or readily through the manufacturer		
PM	1	4	4.00 estimated service life rem	aining? Estimated 10 years based on AWU Useful Life			
			Electrical F				
INFORMATION	N/A	N/A	N/A standby generator size				
R	1	5	5.00 adequate power available to run all equ				
R INFORMATION	1 N/A	5 N/A	5.00 adequate standby power present and re N/A fuel storage capacity	(gals)? Natural Gas so there is no tank necessary			
R	1 1	5 N/A		ervice? Yes unless there is a natural gas service interruption as	well		
R	3	3	9.00 time needed to mobilize portable gen	erator? 1-2 hours depending on external conditions hookups an	re available		
Fn	1	3	3.00 known electrical hazards that could be mit				
R	1	3	3.00 spare parts/service support readily av				
PM	1	4	4.00 estimated service life rem	aining? 14 years based on AWU Useful Life			
			Additional				
INICODADATION			Nameplate duty conditions (rated flow and head, nominal motor horse				
INFORMATION INFORMATION				o No. 1 30 hp o No. 2 30 hp			
INFORMATION			Pum	o No. 3 75 hp			
INFORMATION				0 No. 4			
				egend			·
				PM Physical Mortality			
				Fn Functionality			
				R Reliability			
				FE Financial Efficiency C Capacity			
				Сараситу			
						l	

	South	Tahoe PUD	Location Description:	Hwy89 and Cornelian Dr.	K/J Project Number: 1270004*00	
		r System Optimization Plan	Pump Station Facility ID #:	CRNPUMP1, CRNPUMP2, CRNPUMP3	Date:	3/8/2012
	- Voice	System Optimization Flain		Chiar Givir 1, Chiar Givir 2, Chiar Givir 3	Condition Assessment	3/3/2012
			Pump Station Facility Name:	Cornelian Booster	Inspectors:	Peter Lavallee and Mark Gray
			Pressure Zones Served:	Christmas Valley Zone	Adjacent Pressure Zones:	Arrowhead Zone
		Photo Evidence for PM, Fn, R, FE	 	1		
				PHOTOS		
		76/11/05/20 04:54 PM	2011/05/20 04:53 PM	2011/05/	20 04:53 PM	2011/05/20 04:50 PM
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+						
				1		

_			T					
		South Tahoe PUD	Location Description	On airport pro	pperty	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID)#: APRBS		Date:	3/8	/2012
						Condition Assessment		
			Pump Station Facility Nan	ne: Airport Boo	ster	Inspectors:	Peter Lavallee	and Mark Gray
			Pressure Zones Serve	ed: Country Club	Zone	Adjacent Pressure Zones:	Stateli	ine Zone
		Notes:			ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity (see note 1)	functionality	el of Service reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
			2: minor defects only	2: exceeds design requirement	2: exceeds some requirements		2: financial efficiency is high	
			moderate deterioration significant deterioration	meets design requirement less than design requirement	3: meets all requirements 4: fails some requirements		3: financial efficiency is average 4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements		5: asset should be replaced	
		Pump Station Site		N/A	C-11-44	Colouinted	NI/A	
	+ +	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	-	N/A N/A	Calculated 1.00	Calculated 1.80	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.50	7.40	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	40%	N/A	
		Factored Score		N/A	2.1	2.96	N/A	5.06
		Criticality Score					5%	0.25
		Building Structure Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	1.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.33	3.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	30%	N/A	50%	20%	N/A	
		Factored Score		N/A	1.67	0.6	N/A	3.47
		Criticality Score					5%	0.17
		Pumps		Coloulated	Colonitate	Coloulated	Calaulatad	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		Calculated 1.00	Calculated 1.00	Calculated 1.00	Calculated 2.33	Total Factored Score
		Weighted Final Score (1-25)		4.00	3.50	3.75	7.33	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
		Factored Score		0.8	1.05	0.75	1.1	5.25
		Criticality Score					25%	1.31
		Piping & Valves		N/A	Colonitate	N/A	N1/A	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.83	N/A N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	6.33	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	80%	N/A	N/A	
		Factored Score		N/A	5.07	N/A	N/A	6.67
		Criticality Score					10%	0.67
		SCADA System Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 2.00	N/A N/A	Calculated 1.20	Calculated 2.33	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.40	7.33	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	40%	40%	N/A	
		Factored Score		N/A	1.36	2.93	N/A	5.89
		Criticality Score					20%	1.18
		Other Critical Mechanical Equipment Is Failure Mode Score Calculated or Assigned?		N/A	المناء المناء	A1/A	NI/A	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 2.00	N/A N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	6.00	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score		N/A	4.8	N/A	N/A	5.60
		Criticality Score					10%	0.56
		Electrical Power		N/A	المعادات المعادات	Colouintari	NI/A	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.00	Calculated 3.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A N/A	3.00	11.40	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	-	N/A	60%	20%	N/A	
		Factored Score	4	N/A	1.8	2.28	N/A	8.08
		Criticality Score					25%	2.02
						0\	verall Total Factored Score (Out of 25) =	6.16

	South Tahoe PUD	Location Description:	On airport property	K/J Project Number: 1270004*00	
	Water System Optimization Plan	Pump Station Facility ID #:	APRBS	Date:	3/8/2012
				Condition Assessment	
		Pump Station Facility Name:	Airport Booster	Inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Stateline Zone

Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score	CONDITION ASSESSMENT CHECKLIST				
				Pump Station Site				
Fn	1	4	4.00	key O&M staff have access to site? Yes				
Fn	1	4	4.00	adequate vehicle access for maintenance? Yes				
R	1	3	3.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone X on the FEMA flood map.				
R	2	5	10.00	is site vulnerable to wildfires? It is near a meadow that is developed so there is a slight wildfire risk				
R	4	4	16.00	is site close to known active seismic faults? 2,630 ft. to the nearest fault				
R	1	4	4.00	any unstable site conditions (if yes, describe)? None				
R	1	4	4.00	site drainage adequate to prevent flooding of buildings and critical equipment? Yes				
Fn	1	3	3.00	ghting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? The facility is within the airport fencing and is protected from entry with their security				
Fn	1	3	3.00	other known problems? None				
				Building Structure				
Fn	1	3	3.00	adequate security measures and monitoring to prevent unauthorized access? The door is locked with a cyber key				
INFORMATION	N/A	N/A	N/A	date building was constructed? 1978				
Fn	1	4	4.00	adequate equipment clearances to facilitate routine O&M? Yes				
PM	1	4	4.00	condition of exterior coatings adequate to protect structure? Coatings are in good condition				
Fn	1	3	3.00	adequate openings for ingress/egress? Yes Single entry door				
Fn	1	3	3.00	interior lighting adequate for routine O&M? Yes				
Fn	1	4	4.00	building designed to withstand snow load and not create safety issue? Building meets the code snow loadings for the time of construction				
R	1	2	2.00	building meets code compliance requirements? Building meets the code requirements for when it was built				
R	1	4	4.00	known fire or haz-mat conditions that could be mitigated? None				
Fn	1	3	3.00	other known problems? None				
PM	1	4	4.00	estimated service life remaining? Exceeds AWU Useful Life				
				Pumps				
INFORMATION	N/A	N/A	N/A	no. of pumps? 1				
INFORMATION	N/A	N/A	N/A	pump types? Centrifugal				
INFORMATION	N/A	N/A	N/A	pump manufacturer? Aurora				
PM	5	3	15.00	pumps rebuilt (list year) and describe work done? Insufficient data				
FE	1	4	4.00	pump curves available for each unit? Yes				
R	1	4	4.00	known history of pump/motor failures? If so, explain the nature of the failure(s). None				
R	1	4	4.00	number of service calls/repairs in the last year? None				
С	1	4	4.00	what is firm capacity of pump station based on flow test? Pump test at 242 gpm. Pump station does not have a spare pump, so firm capacity is zero.				
PM	3	4	12.00	coatings adequate to provide corrosion protection? Existing external coatings have worn off of pump and motor				
FE	5	3	15.00	pumps operate efficiently (>70% bowl efficiency)? wire-to-water efficiency measured at 37%				
FE	1	3	3.00	motor high efficiency and no excessive noise? no excessive noise noted				
R	1	4	4.00	pumps operate free from excessive vibration? Yes				
Fn	1	4	4.00	adequate NPSH available to prevent cavitation? yes				
INFORMATION	N/A	N/A	N/A	dedicated fire pumps available (hydro pneumatic pump stations only)? NA				
INFORMATION	N/A	N/A	N/A	all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)? NA				
INFORMATION	N/A	N/A	N/A	date of last fire-pump test (hydro pneumatic pump stations only)? NA				
INFORMATION	N/A	N/A	N/A	measured fire-pump capacity (hydro pneumatic pump stations only)? NA				
INFORMATION	N/A	N/A	N/A	standby power supply available for fire pumps (hydro pneumatic pump stations only)? NA				
R	1	3	3.00	spare parts readily available? New pump and motor within pump station				
Fn	1	3	3.00	other known problems? none				
PM	1	4	4.00	estimated service life remaining? Exceeds AWU Useful Life				
		1						

		T.							
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Page Page					South Tahoe PUD	Location Description:	On airport property	K/J Project Number:	1270004*00
Pump Station Facility Name					W	Down Chaling Facility ID #		D-4	
Part					Water System Optimization Plan	Pump Station Facility ID #:	APRBS		3/8/2012
Pressure Services Pres						B 60 5 111			
Page Page						Pump Station Facility Name:	Airport Booster	inspectors:	Peter Lavallee and Mark Gray
Paging & Valve 1									
The company of the						Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Stateline Zone
The company of the									
1					Piping & Valves				
1		· · · · · · · · · · · · · · · · · · ·							
The content of the		-							
Processing Content of the Content									
Percentage No.		1							
Part		-							
Property Committee Commi		N/A							
Commission Com		1							
Material Content Material Co									
Fig. 2 3 5 5 6 5 7 7 1 1 1 1 1 1 1 1					• •				
NOTICE N				· · · · · · · · · · · · · · · · · · ·			ar untar to flow book from Country Club to Stateling and it is in a	good condition	
Miles			,		·		or water to now back from Country Club to Stateline and it is in g	good condition	
			,						
The content of the	PM	1	4	4.00	estimated service life remaining?	26 years based on AWU Useful Life			
1					SCADA system				
Fig. 1	Fn	1	3	3.00		Yes the flow meter is attached to SCADA and has had no	issues		
Fig. 1			2		flow totals recorded at regular intervals? How frequent?	Daily and hand logged into log book			
Re		1	2						
NOMATION NA NA NA NA NA Operation of the process of the control of the process of	H						i.		
R			-				ly .		
R							r		
R						There is no genset on site			
PM 2 4 8.00 estimated service life remaining? Estertical Power			3				trict offices or readily through the manufacturer		
NPORMATION N/A	.,	_	-				the offices of readily through the manufacture.		
NPORMATION N/A									
R									
R S S S 25.00 adequate standby power present and reliable? No			,						
NICHIANTON N/A N/A N/A N/A fuel storage capacity (gals); NA fuel storage capacity (gals); NA fuel supply adequate for standing yone service; NA fuel supply adequate for stan	.,								
R		-	-						
Fin		,	5				hadina		
R 5 3 15.00 spare parts/service support readily available? NA PM S 4 20.00 estimated service life remaining? NA Lead Image: Company of the part of the par	- "	4	3				е по поокирѕ.		
PM S 4 20.00 estimated service life remaining? NA		5	3						
Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION Pump No. 2 Morphanian Pump No. 2 INFORMATION Pump No. 3 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 5 INFORMATION Pump No. 6 INFORMATION Pump No. 6 INFORMATION Pump No. 7	PM	5	4	20.00	estimated service life remaining?	NA			
Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION Pump No. 2 Morphanian Pump No. 2 INFORMATION Pump No. 3 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 4 INFORMATION Pump No. 5 INFORMATION Pump No. 6 INFORMATION Pump No. 6 INFORMATION Pump No. 7						Station is in log to File Club W-II			
INFORMATION Pump No. 1 400gpm, 162 ft., 30Hp						Station is in lag to eiks club Well			
INFORMATION Pump No. 2 Pump No. 3 Pump No. 3 Pump No. 4 Pu	INFORMATION					400gpm, 162 ft., 30Hp			
INFORMATION	INFORMATION				Pump No. 2	•			
Legend Physical Mortality Financial Efficiency									
PM Physical Mortality Fn Functionality R Reliability FE Financial Efficiency	INFORMATION				Pump No. 4				
PM Physical Mortality Fn Functionality R Reliability FE Financial Efficiency				1	Legend				
R Reliability FE Financial Efficiency					PM				
FE Financial Efficiency									

South Tahoe PUD Water System Optimization Plan	Location Description: Pump Station Facility ID #:	On airport property APRBS	K/J Project Number: 1270004*00	3/8/2012
	Pump Station Facility Name:	Airport Booster	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
	Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Stateline Zone
Photo Evidence for PM, Fn, R, FE		РНОТОЅ		
	2011/05/20 02:57 PM		2011/05/20 02:57 PM	

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		South Tahoe PUD	Location Description	n: 821 W. San Berna	adino Ave.	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID	#: FPBS1, FPBS2,	, FPBS3	Date:	3/12/20:	2
						Condition Assessment		
			Pump Station Facility Nam	e: Flagpole Boo	ooster	Inspectors:	Peter Lavallee and	Phill Torney
			Pressure Zones Serve	d: Flagpole Zo	one	Adjacent Pressure Zones:	Arrowhead and Twi	n Peaks Zone
		Notes: 1. Capacity score will be based on hydraulic model			lure Mode Scoring (1 - 5)	el of Service		
		Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	- Physical Mortality	Capacity (see note 1)	functionality	reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
			2: minor defects only 3: moderate deterioration	exceeds design requirement meets design requirement	exceeds some requirements meets all requirements		2: financial efficiency is high 3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Footoned Coons
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A N/A	N/A N/A	2.00	1.80 7.60	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	
		Factored Score		N/A	3.9	3.04	N/A	6.94
		Criticality Score Building Structure					5%	0.35
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.33	2.50	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	4.33	9.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score	30%	N/A N/A	50% 2.17	20%	N/A N/A	6.37
		Criticality Score		IV/A	2.17	1.0	5%	0.32
		Pumps						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)		1.00	1.00	1.25 4.50	2.00	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		4.00	3.50	4.50	6.33 15%	
		Factored Score		0.8	1.05	0.9	0.95	4.80
		Criticality Score					25%	1.20
		Piping & Valves		110			21/2	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.67	N/A N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	6.00	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score Criticality Score		N/A	4.8	N/A	N/A 10%	5.60 0.56
		SCADA System					1076	0.30
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.80	1.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	4.60 40%	3.33 40%	N/A N/A	
CITECK	100%	Factored Score		N/A	1.84	1.33	N/A	4.77
		Criticality Score					20%	0.95
		Other Critical Mechanical Equipment						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.00	N/A N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.00	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score Criticality Score		N/A	2.4	N/A	N/A 10%	3.20 0.32
		Criticality Score Electrical Power					10%	U.32
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	1.00	0.80	N/A	Total Factored Score
au sau		Weighted Final Score (1-25)		N/A	3.00	3.60	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	60%	20% 0.72	N/A N/A	4.12
		Criticality Score		1975	1.0	0.72	25%	1.03
						0	verall Total Factored Score (Out of 25) =	4.73

	South Tahoe PUD	Location Description:	821 W. San Bernadino Ave.	K/J Project Number:	1270004*00
	Water System Optimization Plan	Pump Station Facility ID #:	FPBS1, FPBS2, FPBS3	Date:	3/12/2012
		Pump Station Facility Name:	Flagpole Booster	Condition Assessment Inspectors:	
		Pressure Zones Served:	Flagpole Zone	Adjacent Pressure Zones:	Arrowhead and Twin Peaks Zone
		1		1	

Failure Mode Type	Score	Importance Weighting (1-5)	CONDITION ASSESSMENT CHECKLIST Weighted Score	
			Pump Station Site	
Fn	1	4	4.00 key O&M staff have access to site? Yes	
Fn	1	4	4.00 adequate vehicle access for maintenance? Yes	
R	1	3	3.00 is site within 100-yr flood plain? No. This site is indicated as other areas Zone X on the FEMA flood map.	
R	3	5	15.00 is site vulnerable to wildfires? Yes it is adjacent to wooded open space	
R	3	4	12.00 is site close to known active seismic faults? 1,880 ft. to the nearest fault	
R	1	4	4.00 any unstable site conditions (if yes, describe)? None	
R	1	4	4.00 site drainage adequate to prevent flooding of buildings and critical equipment? Yes there are no drainage issues	
Fn	5	3	15.00 site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? other known problems 2 None	
Fn	1	3	3.00 other known problems? None	
			Building Structure	
Fn	1	3	3.00 adequate security measures and monitoring to prevent unauthorized access? Yes there have been no unauthorized access	
INFORMATION	N/A	N/A	N/A date building was constructed? 1997	
Fn	1	4	4.00 adequate equipment clearances to facilitate routine O&M? There is adequate room	
PM	2	4	8.00 condition of exterior coatings adequate to protect structure? Yes there are some missing shingles but the wood siding is good and the paint is intact	
Fn	1	3	3.00 adequate openings for ingress/egress? There are two openings	
Fn	1	3	3.00 interior lighting adequate for routine O&M? Yes	
Fn	1	4	4.00 building designed to withstand snow load and not create safety issue? Yes and met the loadings when it was constructed	
R	1	2	2.00 building meets code compliance requirements? Met the codes for when it was constructed	
R	4	4	16.00 known fire or haz-mat conditions that could be mitigated? There are numerous trees in close proximity to the facility	
Fn	3	3	9.00 other known problems? The ceiling is very low in this building and an engine hoist needs to be used to remove the motors	
PM	2	4	8.00 estimated service life remaining? 15 years based on AWU Useful Life	
			Pumps	
INFORMATION	N/A	N/A	N/A no. of pumps? 3	
INFORMATION	N/A	N/A	N/A pump types? Centrifugal Pumps	
INFORMATION	N/A	N/A	N/A pump manufacturer? Peerless	
PM	2	3	6.00 pumps rebuilt (list year) and describe work done? Bearings in all three motors and seals on pump number 2 in 2009	
FE	1	4	4.00 pump curves available for each unit? yes	
R R	1	4	4.00 known history of pump/motor failures? If so, explain the nature of the failure(s). None	
К	1	4	4.00 number of service calls/repairs in the last year? None	
PM	2	4	4.00 what is firm capacity of pump station based on flow test? 760 gpm based on flow test 8.00 coatings adequate to provide corrosion protection? Coatings are in good condition with minor chips and scratches	
FE	4	2	8.00 coatings adequate to provide corrosion protection? Coatings are in good condition with minor chips and scratches 12.00 pumps operate efficiently (>70% bowl efficiency)? wire-to-water efficiency is poor (60%)	
FE	1	3		
R	1	4	3.00 motor high efficiency and no excessive noise? yes 4.00 pumps operate free from excessive vibration? yes	
Fn	1	4	4.00 gamps specific from the from caster visit and year. 4.00 adequate NPSH available to prevent cavitation? Assumed yes	
INFORMATION	N/A	N/A	N/A dedicated fire pumps available (hydro pneumatic pump stations only)? NA	
INFORMATION	N/A	N/A	N/A all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)? NA	
INFORMATION	N/A	N/A	N/A date of last fire-pump test (hydro pneumatic pump stations only)? NA	
INFORMATION	N/A	N/A	N/A measured fire-pump capacity (hydro pneumatic pump stations only)? NA	
INFORMATION	N/A	N/A	N/A standby power supply available for fire pumps (hydro pneumatic pump stations only)? NA	
R	2	3	6.00 spare parts readily available? Bearings are available but other parts would need to be ordered from a supplier	
Fn	1	3	3.00 other known problems? None	
PM	2	4	8.00 estimated service life remaining? 15 years based on AWU Useful Life	

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Viter System Optimisation Film				South Tahoe PUD	Location Description:	821 W. San Bernadino Ave.	K/J Project Number:	1270004*00
Pump Station Facility Name: Pages Footer Protecting Adjacent Protecting Zones: Adjacent Protecting Zon								
Pressure Zenes Served Pressure Zenes Served Segon Segon S				Water System Optimization Plan	Pump Station Facility ID #:	FPBS1, FPBS2, FPBS3		3/12/2012
Property Property					Pump Station Facility Name:	Flagpole Booster		Peter Lavallee and Phill Torney
Property Property					Pressure Zones Served:	Flagpole Zone	Adjacent Pressure Zones:	Arrowhead and Twin Peaks Zone
Fig. 1						<u> </u>	<u> </u>	
PM								
10						concrete		
Fig. 1								
Process		_						
Methods Michael Mich	Fn	1	3		ervice? Yes			
Fig. 3 5 1.50 Committee of the committee of the		3	2					
PRIN		N/A						
MODIANTON N. N. N. N. N. N. N. N.		3	-					
INFORMATION N/A N/A N/A SUBJECT SHOW OF SECURITION OF THE PART OF	PM	1	4	4.00 estimated service life rem	aning? 45 years based on AWU Useful Life			
INFORMATION N/A N/A N/A SUBJECT SHOW OF SECURITION OF THE PART OF				Other Critical Mechanical Equin	mont			
Fig. 1 3 100 Prescure Feeler (whee? Prescure Feeler (whee? Prescure Feeler (whee? Prescure Feeler wh	NEODMATION	NI/A	NI/A			dition		
MICHANTON N/A N/A N/A N/A N/A Chemical tables control strokes (and the complete promiser) N/A N/A N/A Chemical additions control information N/A N/A N/A Chemical additions control information N/A N/A N/A Chemical additions control information N/A								
INFORMATION N/A N/A N/A N/A Chemical additives compliant with NSF 6FF AA estimated work manually (1) upers based on ANV Lineful Life SCDA system SCDA system SCDA system SCDA system SCDA system In 1 2 2 2.00 Suprop lattine flow restrict is estimated from the formation of the system of the s				·		u with surge articipator valve		
PAM 2 4 4.00 Settlement survive in the remaining F Dyears based on ANU Useful Life				,				
SCADA system Fig. 1 3 3 5.00 pump station flow meter is dequate to monitor pump performance? Yes Fig. 1 1 3 5.00 pump station flow meter is dequate to monitor pump performance? Yes Fig. 1 1 2 2 2.00 flow state in croded a reing performance? Yes Fig. 1 1 2 2 2.00 flow state in croded a reing performance? Yes Fig. 1 1 2 2 2.00 flow state in croded a reing performance? Yes Fig. 1 1 2 4 4.00 statement performance in crode a reing performance in								
Fin 1 3 3 3.00 pump station flow meter is adequate to monitor pump performance? If you totals are logged daily by hand Fin 4 2 2 8.00 presume informmentation is adequate to monitor pump performance? If you totals are logged daily by hand Fin 1 4 4.00 automated altimication for the presume informance altimication for the presume informance altimication for the presume and the station but they are not teed to SCADA. No pressure gages between discharge root/risk and discharge control valve. Fin 2 3 3 6.00 automated altimication for failure and reliable (proposations) Fin 2 3 3 6.00 automated altimication for failure and reliable (proposations) Fin 2 4 4.00 communication stations and are invested in presume to the foreign and discharge control valve. Fin 3 3 0.00 adequate power (µF) souldable for run all relementary and information on man power failure. Fin 3 3 0.00 adequate power (µF) souldable for run all relementary and information on man power failure. Fin 4 5 3 1.00 segmentary and reliable (proposations) and power failure) Fin 4 5 5 5.00 adequate power (µF) souldable for run all relementary and information on man power failure. Fin 5 5 5.00 adequate power (µF) souldable for run all relementary and information on man power failure. Fin 6 1 5 5 5.00 adequate power (µF) souldable for run all relementary and information on man power failure. Fin 6 1 5 5 5.00 adequate power (µF) souldable for run all relementary and information on man power failure. Fin 7 5 5.00 adequate power failure. Fin 8 1 5 5 5.00 adequate power failure. Fin 8 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adequate power failure. Fin 9 1 5 5 5.00 adeq								
Fin 1 2 2 2.00 flow tools recorded at regular intervals* flow frequency? Flow frequency? Flow frequency? Flow for tools are logged daily by hand Fin 4 2 8.00 persons internations is adequate power quantities. In the fine of the fine				SCADA s	stem			
Fin 1 4 2 8.00 pressure instrumentation as adequate to monitor pump performance? In fine or an enumerous pressure gages around the station but they are not inter to SCADA. No pressure gages between discharge control valve. In 1 4 4.00 station grain and station of the station	Fn	1	3					
Fin	Fn	1	2	2.00 flow totals recorded at regular intervals? How fre	quent? Flow totals are logged daily by hand			
NFORMATION N/A	Fn	4	2				arge nozzles and discharge control valve.	
N/O	Fn	1	4					
R 1 4 4 5 Communication system is reliable (approximate no. of comm. failures in last year)? There is adequate power (UFS) available to run all telemetry and instrumentation on main power failure? R 1 3 3 3.00 Associated a space parts/service support readily available to run all telemetry and instrumentation on main power failure? R 1 3 3 3.00 Separe parts/service support readily available at the plant and through the manufacturer Electrical Power (UFS) available at the plant and through the manufacturer Electrical Power (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (Here is significant black discoloring on the sound insulation around the generator (He			3			on an annual basis		
R 1 3 3.00 adequate power (UPS) available to run all telemetry and instrumentation on main power failure? R 1 3 3.00 Expre parts/service support readily available? Parts are readily available at the plant and through the manufacturer PM 2	IFORMATION					4		
R	R	1	4	4.00 communication system is reliable (approximate no. of comm. failures in las	year)? There are no communication failures within the las	st year		
R 1 3 3 0.0 spare parts/service support readily available of the plant and through the manufacturer PM 2 4 8.00 estimated service life remaining? INFORMATION N/A N/A N/A N/A Standby generator size (kiny)? 175kW R 1 5 5 5.00 dequate power available to run all equipment Ves R 1 5 5 5.00 dequate power available to run all equipment Ves R 1 5 5 5.00 dequate power available to run all equipment Ves R 1 5 5 5.00 dequate power available to run all equipment Ves R 1 1 5 5 5.00 dequate power available to run all equipment Ves R 1 1 5 5 5.00 dequate power available to run all equipment Ves R 1 1 5 5 5.00 dequate power available to run all equipment Ves R 1 1 5 5 5.00 dequate power available to run all equipment Ves R 1 1 5 5 5.00 dequate for standby power previce) R 1 1 5 5 5.00 fuel supply adequate for standby power service? Yes R N/A 3 N/A time needed to mobilize portable generator? R N/A 3 0.00 fuel supply adequate for standby power service? Yes R 1 3 3 3.00 fuel supply adequate for standby power service? Yes R 1 3 3 3.00 fuel supply adequate for standby power service? Yes R 1 3 3 3.00 fuel supply adequate for standby power on site PM 2 4 8.00 fuel supply adequate for standby power on site Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower). NFORMATION NFORMA	p	1	2	3 00 adequate nower (LIPS) available to run all telemetry and instrumentation on main nower	There is adequate power with standby generator o	on site		
PM 2 4 8.00 estimated service life remaining Stimated 10 years based on AWU Useful Life	R		3			the manufacturer		
NFORMATION N/A N/A N/A N/A N/A N/A Standby generators (kW)? 175kW 1 1 5 5.00 adequate power available to run all equipment Ves NFORMATION N/A N/A N/A N/A Adequate power available to run all equipment Ves NFORMATION N/A N	PM		-					
INFORMATION N/A N/A N/A N/A Standby generator size (kW) 1 5 5.00 adequate power available to run all equipment Yes Standby power present and reliable? Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during								
INFORMATION N/A N/A N/A N/A Standby generator size (kW) 1 5 5.00 adequate power available to run all equipment Yes Standby power present and reliable? Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby Pesignet or run two pumps and when running three it trips out. This occurred at max demand during				Flectrical F	ower There is significant black discoloring on the sound	insulation around the generator		
R 1 5 5.00 adequate power available to run all equipment Yes R 1 5 5.00 adequate standby power present and reliable? INFORMATION N/A N/A N/A N/A N/A Full supply adequate for standby power service? R 1 5 5.00 full supply adequate for standby power service? R 1 5 5.00 full supply adequate for standby power service? R N/A 3 N/A Supply adequate for standby power service? R N/A 3 N/A Supply adequate for standby power service? R N/A 3 N/A Supply adequate for standby power service? R N/A 3 N/A Supply adequate for standby power service? R N/A 3 N/A Supply adequate for standby power service? R N/A 3 N/A Supply adequate for standby power on site None Supply adequate for standby power	NEORMATION	N/A	N/A			<u> </u>		
R 1 5 5.00 adequate standby power present and reliable? Designed to run two pumps and when running three it trips out. This occurred at max demand during the Angora Fire. The third pump was supposed to be a standby fuel storage capacity (gals)? Sogal R 1 5 5.00 fuel supply adequate for standby power service? Yes R 1 3 5.00 fuel supply adequate for standby power service? Yes R N/A 3 N/A time needed to mobilize portable generator? NA. standby power on site R 1 3 3.00 known electrical hazards that could be mitigated? None R 1 3 3.00 spare parts/service support readily available? Parts at the District's main plant PM 2 4 8.00 estimated service life remaining? Additional Data Simple Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION R S S S.00 Additional Data Simple Angora Fire. The third pump was supposed to be a standby of the fuel to the view of the fund of the pump No. 1 GOTIP Control of the pump No. 2 GOTIP Control of the pump No. 2 GOTIP Control of the pump No. 2 GOTIP Control of the pump No. 3 GOTIP Control of the pump No. 2 GOTIP Control of the pump No. 3 GOTIP Control of the pump No. 4 GOTIP Control of the p								
INFORMATION N/A N/A N/A N/A fuel storage capacity (gals) 250gal	R	1				ee it trips out. This occurred at max demand during the Angora Fire. The	third pump was supposed to be a standby	
R N/A 3 N/A time needed to mobilize portable generator? Fn 1 3 3.00 known electrical hazards that could be mitigated? R 1 3 3.00 spare parts/service support readily available? PM 2 4 8.00 estimated service life remaining? PM 2 5 4 8.00 Mameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION INFORM	NFORMATION	N/A	N/A					
Fn 1 3 3.00 known electrical hazards that could be mitigated? R 1 3 3.00 spare parts/service support readily available? PM 2 4 8.00 estimated service life remaining? Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION No S S S S S S S S S S S S S S S S S S	R		5					
R 1 3 3.00 spare parts/service support readily available? PM 2 4 8.00 estimated service life remaining? Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION	.,	N/A	3					
PM 2 4 8.00 estimated service life remaining? 10 years based on AWU Useful life Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION Pump No. 1 INFORMATION Pump No. 2 INFORMATION Pump No. 3 INFORMATION Pump No. 3 INFORMATION Pump No. 3 INFORMATION Pump No. 3		1	3					
Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION INFORMATI								
Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION IN	PM	2	4	8.UU estimated service life rem	nining? 10 years based on AWU Useful life			
Nameplate duty conditions (rated flow and head, nominal motor horsepower): INFORMATION IN				- 1 11	B			
INFORMATION Pump No. 1 INFORMATION Pump No. 2 INFORMATION Pump No. 3 60hp INFORMATION Pump No. 3								
INFORMATION Pump No. 2 60hp INFORMATION Pump No. 3 60hp								
INFORMATION Pump No. 3 60hp								
Tump no. 4								
	5			ruii	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
Legend					egend			
PM Physical Mortality								
Fn Functionality					Fn Functionality			
Reliability								
FE Financial Efficiency					FE Financial Efficiency			
C Capacity					C Capacity			



			T	T				
		South Tahoe PUD	Location Description	1553 Grizzly Mou	untain Dr.	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID #	GRIZBP1, GRIZBP2	2, GRIZBP3	Date:	3/12/20	012
			Pump Station Facility Name	Grizzly Mountain	n Booster	Condition Assessment Inspectors:	Peter Lavallee and	d Phill Torney
			Pressure Zones Served	l: Flagpole, Twin Peaks, and	l Mt. Rainer Zones	Adjacent Pressure Zones:	Same as Zones served dependi	ng on demand and valving
				- "				
		Notes: 1. Capacity score will be based on hydraulic model	- Physical Mortality	Capacity		l of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records	* *	(see note 1)	functionality	reliability	·	
		For Criticality Weighting Factors to be determined at District Workshop 4. Score of 5 was assigned on three occassions to prompt further investigation	new or excellent condition minor defects only	significantly exceeds design requirement exceeds design requirement	exceeds all requirements exceeds some requirements		best available technology financial efficiency is high	
		(see Condition Assessment Checklist: Pumps)	3: moderate deterioration	3: meets design requirement	3: meets all requirements	·	3: financial efficiency is average	
		, , , , , , , , , , , , , , , , , , , ,	4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site	,			,		
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Cook
		Unweighted Failure Mode Score (1-5)	N/A	N/A	1.25	1.80	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	N/A N/A	N/A N/A	4.25 60%	7.20 40%	N/A N/A	
LHECK	100%	Factored Score	*	N/A N/A	2.55	2.88	N/A	5.43
		Criticality Score		N/A	2.33	2.00	5%	0.27
		Building Structure						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)	4.00	N/A	3.33	3.00	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	50%	20%	N/A	
		Factored Score		N/A	1.67	0.6	N/A	3.47
		Criticality Score					5%	0.17
		Pumps					21.1.1	
		Is Failure Mode Score Calculated or Assigned?		N/A 1.00	Calculated 1.00	Calculated 1.00	Calculated 1.00	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		4.00	3.50	3.75	3.33	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		20%	30%	20%	15%	
-		Factored Score		0.8	1.05	0.75	0.5	3.65
		Criticality Score					25%	0.91
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.67	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score	20% 0.8	N/A N/A	80% 2.93	N/A N/A	N/A N/A	3.73
		Criticality Score		IN/A	2.93	N/A	10%	0.37
		SCADA System					10,0	3.37
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)	4.00	N/A	2.80	3.33	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	40%	40%	N/A	
		Factored Score		N/A	1.12	1.33	N/A	3.25
		Criticality Score					20%	0.65
		Other Critical Mechanical Equipment Is Failure Mode Score Calculated or Assigned?	Colonian I	N/A	Colonia I	N/A	21/2	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.00	N/A N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-5)		N/A N/A	3.00	N/A N/A	N/A	Total Tastored Store
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	80%	N/A	N/A	
	100%	Factored Score		N/A	2.4	N/A	N/A	3.20
		Criticality Score					10%	0.32
		Electrical Power						
-		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	0.80	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.00	3.60	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	60%	20%	N/A N/A	2.22
		Factored Score Criticality Score		N/A	1.8	0.72	N/A 25%	3.32 0.83
		Criticality Score						
							verall Total Factored Score (Out of 25) =	3.53

			South	n Tahoe PUD	Location Description:	1553 Grizzly Mountain Dr.	K/J Project Number: 1270	004*00
					·	·		
			Wate	r System Optimization Plan	Pump Station Facility ID #:	GRIZBP1, GRIZBP2, GRIZBP3	Condition Assessment	3/12/2012
					Pump Station Facility Name:	Grizzly Mountain Booster	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Flagpole, Twin Peaks, and Mt. Rainer Zones	Adjacent Pressure Zones:	Same as Zones served depending on demand and valving
Failure Mode Type	Score	Importance Weighting (1-5) V	Veighted Score		со	NDITION ASSESSMENT CHECKLIST		
				Pump Station				
Fn	1	4	4.00	key O&M staff have access to				
Fn	1	4	4.00	adequate vehicle access for mainten		TNAA flood man. Which means flood beyonds are undetermined but a	assible	
R R	2	3 5	6.00 10.00	·		EMA flood map. Which means flood hazards are undetermined but p wever, building is constructed from non-combustible materials and d		er
R	3	4	12.00	is site close to known active seismic f		wever, building is constructed from non-combustible materials and d	ierensibie space is provided around structure perimet	еі
R	1	4	4.00	any unstable site conditions (if yes, desc				
R	1	4	4.00	site drainage adequate to prevent flooding of buildings and critical equip				
					Building is provided. There is no site security around th	e perimeter of the facility		
Fn	2	3		hting, fencing, and security monitoring adequate to discourage unauthorized access/vanda	alism?	,		
Fn	1	3	3.00	other known prob	lems? No other known problems with the site			
+				Building Struc	ture			
Fn	1	3	3.00	adequate security measures and monitoring to prevent unauthorized a		SCADA monitoring at the main plant		
INFORMATION	N/A	N/A	N/A	date building was constru				
Fn	1	4	4.00	adequate equipment clearances to facilitate routine (
PM	1	4	4.00	condition of exterior coatings adequate to protect structure.	cture? Yes			
Fn	1	3	3.00	adequate openings for ingress/e				
Fn	1	3	3.00	interior lighting adequate for routine (
Fn R	1 1	2	4.00 2.00	building designed to withstand snow load and not create safety building meets code compliance requiren				
R	1	4	4.00	known fire or haz-mat conditions that could be mitig				
Fn	1	3	3.00		lems? No other known problems with the building			
PM	1	4	4.00	estimated service life rema	ining? 30 years based on AWU Useful Life			
					imps			
INFORMATION	N/A	N/A	N/A	no. of pu				
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A		types? Vertical Turbines turer? Floway Pumps			
PM	N/A 1	N/A 3	3.00	pumps rebuilt (list year) and describe work				
FE	1	4	4.00	pump curves available for each				
R	1	4	4.00	known history of pump/motor failures? If so, explain the nature of the fail				
R	1	4	4.00	number of service calls/repairs in the last				
C	1	4	4.00		v test? Score has been updated using block diagram cases			
PM FE	1 1	4	4.00 3.00	coatings adequate to provide corrosion prote	ction? New coatings with no visual defectsency)? New pump sta assume pumps operate efficiently. Distr	ict to conduct test to confirm this assumption correct		
FE	1	3	3.00	motor high efficiency and no excessive	noise? New pump sta assume pumps operate efficiently. Distr	ict to conduct test to confirm this assumption correct.		
R	1	4	4.00	pumps operate free from excessive vibra	ation? There is no record of excessive vibration at this station	and a south priorities.		
Fn	1	4	4.00	adequate NPSH available to prevent cavit	ation? New pump sta assume pumps operate efficiently. Distr	ict to conduct test to confirm this assumption correct.		
INFORMATION	N/A	N/A	N/A	dedicated fire pumps available (hydro pneumatic pump stations				
INFORMATION	N/A	N/A	N/A	all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations				
INFORMATION	N/A N/A	N/A	N/A N/A	date of last fire-pump test (hydro pneumatic pump stations measured fire-pump capacity (hydro pneumatic pump stations				
INFORMATION	N/A N/A	N/A N/A	N/A N/A	standby power supply available for fire pumps (hydro pneumatic pump stations				
INFORMATION	IN/A	IV/ A						
INFORMATION R	1	3	3.00	spare parts readily avai	lable? Some parts are in stock for the pumps other parts are a	vailable through the manufacturer		
		3	3.00 3.00		lable? Some parts are in stock for the pumps other parts are a lems? No other known problems	vailable through the manufacturer		

						K/I Dunia at Novela au	
			South Tahoe PUD	Location Description:	1553 Grizzly Mountain Dr.	K/J Project Number:	1270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	GRIZBP1, GRIZBP2, GRIZBP3	Date:	3/12/2012
						Condition Assessment	7, 23, 2022
				Pump Station Facility Name:	Grizzly Mountain Booster	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Flagpole, Twin Peaks, and Mt. Rainer Zones	Adjacent Pressure Zones:	Same as Zones served depending on demand and valving
			Piping & Va		l ha hir flagger and grounded in grounds his glade		
Fn PM	1	4		tion? Yes they are coated steel supports that are epoxy bolted lives? Coatings are new in 2012 and there are no visual defect			
Fn	1	4	4.00 pipes adequately sized to prevent excessive noise or hear				
Fn	1	4		mps? All pumps have isolation valves.			
Fn	1	3	3.00 valves are suitable for efficient and reliable se				
Fn INFORMATION	N/A	2 N/A	2.00 chemical injection prov N/A type of chemical a	Ided? Yes Ided? Sodium Hypochlorite			
Fn	1 N/A	N/A 5			vater quality and are located next to each of the pressure gages.		
PM	1	4		ning? 60 years for steel piping and 50 years for valves based o			
			Other Critical Mechanical Equipr				
INFORMATION	N/A	N/A	N/A surge tank or surge anticipator valve cond		2		
Fn INFORMATION	1 N/A	3 N/A	3.00 pressure relief v. N/A chemical tanks onsite, volume, and secondary containment prov	alves? Pressure Relief Valves on each discharge are new in 201	2		
INFORMATION	N/A	N/A	N/A chemical additives compliant with NS				
PM	1	4	·	ning? 25 years based on AWU Useful Life			
			SCADA sys				
Fn	1	3	3.00 pump station flow meter is adequate to monitor pump perform		2012		
Fn Fn	1	2	2.00 flow totals recorded at regular intervals? How freq 2.00 pressure instrumentation is adequate to monitor pump perform				
Fn	1	4	4.00 automated alarm callout for critical failures and relia				
Fn	1	3	3.00 alarm log maintained and reviewed ann				
INFORMATION	N/A	N/A	N/A type of telemetry used (radio, fiber optic, leased line, cell modem,				
R R	1	4	4.00 communication system is reliable (approximate no. of comm. failures in last a 3.00 adequate power (UPS) available to run all telemetry and instrumentation on main power fa		ration		
R	1	3		able? Spare parts for the SCADA system are available at the Di			
PM	1	4		ning? 12 years based on AWU Useful Life	, 5		
			Fl I.D				
INFORMATION	21/2	21/2	Electrical Po				
INFORMATION R	N/A 1	N/A 5		[kW)? 150kW, 237 bhp @1800RPM Diesel ment The generator is sized to handle all three pumps and ass	ociated controls		
R	1	5	5.00 adequate standby power present and rel		ociaca controls		
INFORMATION	N/A	N/A	N/A fuel storage capacity (
R	N/A	5	5.00 fuel supply adequate for standby power se N/A time needed to mobilize portable gene				
Fn	1 1	3		ated? Arc Flash labeling has not been completed on the control	ol panels and other electrical equipment		
R	1	3		able? Yes some parts are housed within the station and others			
PM	1	4	4.00 estimated service life rema	ning? 25 years based on AWU Useful Life			
			Additional	Data			
			Nameplate duty conditions (rated flow and head, nominal motor horsepo				
INFORMATION				No. 1 Pumps have not been installed yet. Information to come	2		
INFORMATION			Pump				
INFORMATION			Pump				
INFORMATION			Pump	No. 4	T		
			L.	egend			
				PM Physical Mortality			
				Fn Functionality			
				R Reliability			
				FE Financial Efficiency C Capacity	T		
				Серасну			
		1	l		L	l .	l

South Tahoe PUD	Location Description:	1553 Grizzly Mountain Dr.	K/J Project Number:	1270004*00
Water System Optimization Plan	Pump Station Facility ID #:	GRIZBP1, GRIZBP2, GRIZBP3	Date:	3/12/2012
	Pump Station Facility Name:	Grizzly Mountain Booster	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
	Pressure Zones Served:	Flagpole, Twin Peaks, and Mt. Rainer Zones	Adjacent Pressure Zones:	Same as Zones served depending on demand and valving
Photo Evidence for PM, Fn, R, FE	1	1		
Filoto Evidence for PW, Fri, K, FE		PHOTOS		
2011/05/24 03:		PARTITION AND ADMINISTRAL PROPERTY OF THE PARTITION OF TH		2011/05/24 03:17

				Corner of Lake Tahoe Boulevard and Boulder Mo	9	ne l		
		South Tahoe PUD	Location Description	1: Lake Valley Fire	e Dept.	K/J Project Number:	1270004*00	
			Down Station Facility ID			Data	- 4	
		Water System Optimization Plan	Pump Station Facility ID #	#: BMPUMP1, BMPUMP	22, BMPUMP3	Date:	3/12	/2012
			Down Chatian Facility Name			Condition Assessment		
			Pump Station Facility Name	Boulder Mountain	n Booster	Inspectors:	Peter Lavallee	and Phill Torney
						A.II		
			Pressure Zones Served	Forest Mountain	in Zone	Adjacent Pressure Zones:	Twin Pe	aks Zone
		Notes:		Failu	ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity		l of Service	Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records For Griffe life, Weighbirg Fortunate by determined at District Workship and Communication of the Com		(see note 1)	functionality	reliability	<u> </u>	
		For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	significantly exceeds design requirement exceeds design requirement	exceeds all requirements exceeds some requirements		best available technology financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	3: meets all requirements		3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	1.60	N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	3.50	6.40	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	40%	N/A	
		Factored Score Criticality Score		N/A	2.1	2.56	N/A 5%	4.66 0.23
		·					5%	0.23
		Building Structure Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	1.50	N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.33	3.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	30%	N/A	50%	20%	N/A	
		Factored Score		N/A	1.67	0.6	N/A	4.07
		Criticality Score					5%	0.20
		Pumps Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (21-5)		1.00	1.00	1.50	5.00	Total Factored Score
		Weighted Final Score (1-25)		4.00	3.50	5.25	16.67	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
		Factored Score		0.8	1.05	1.05	2.5	6.95
		Criticality Score					25%	1.74
		Piping & Valves		N/A	Colorilated	21/2	N1/A	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 2.33	N/A N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	8.67	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	80%	N/A	N/A	
		Factored Score		N/A	6.93	N/A	N/A	9.33
		Criticality Score					10%	0.93
		SCADA System		2111	1 0		N/-	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 2.00	N/A N/A	Calculated 1.00	Calculated 2.67	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A N/A	2.80	8.33	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	40%	40%	N/A	
		Factored Score	1.6	N/A	1.12	3.33	N/A	6.05
		Criticality Score					20%	1.21
		Other Critical Mechanical Equipment						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 2.00	N/A N/A	N/A N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	6.00	N/A N/A	N/A N/A	rotar ractoreu score
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A N/A	80%	N/A	N/A	
		Factored Score	1.6	N/A	4.8	N/A	N/A	6.40
		Criticality Score					10%	0.64
		Electrical Power				_		
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	1.00 3.00	2.60 11.00	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	60%	20%	N/A N/A	
	100/0	Factored Score		N/A	1.8	2.2	N/A	5.60
	<u> </u>						25%	1.40
		Criticality Score					verall Total Factored Score (Out of 25) =	

						Corner of Lake Tahoe Boulevard and Boulder Mountain Dr. in a shared building with the		
				South Tahoe PUD	Location Description:	Lake Valley Fire Dept.	K/J Project Number: 1270004*(00
				W. L. G. J. J. G. M. J. J. J. J. J. J. J. J. J. J. J. J. J.	Down Challes Facility ID #		D-4	
				Water System Optimization Plan	Pump Station Facility ID #:	BMPUMP1, BMPUMP2, BMPUMP3	Date:	3/12/2012
					Pump Station Facility Name:	Devides Mariabile Devides	Condition Assessment Inspectors:	Detector and District
					Tump station racinty ranne.	Boulder Mountain Booster	пізрессогз.	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Forest Mountain Zone	Adjacent Pressure Zones:	Twin Peaks Zone
							<u> </u>	
Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score			CONDITION ASSESSMENT CHECKLIST		
ranare mode type	Jeore	Weighting (1 3)	Weighted Score	Pump Station Site				
Fn	1	4	4.00	key O&M staff have access to site?				
Fn	1	4	4.00		Yes there is adequate parking and it is shared	with the fire department		
R	1	3	3.00	is site within 100-yr flood plain?	No. This site is indicated as other areas Zone	X on the FEMA flood map.		
R	1	5	5.00		? This site was part of the Angora Burn Area			
R	4	4	16.00	is site close to known active seismic faults?				
R	1	4	4.00	any unstable site conditions (if yes, describe)?				
R	1	4	4.00	site drainage adequate to prevent flooding of buildings and critical equipment?	-			
Fn	1	3	3.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	The station is attached to the fire departmen	t and there are no issues		
Fn	1	3	3.00	other known problems?	? None			
				Puilding Structure	The District weeks this serve force the fire does			
Fn	1	3	3.00	adequate security measures and monitoring to prevent unauthorized access?	The District rents this space from the fire dep			
INFORMATION	N/A	N/A	N/A	date building was constructed?		у		
Fn	1	4	4.00	adequate equipment clearances to facilitate routine O&M?				
PM	1	4	4.00	condition of exterior coatings adequate to protect structure?				
Fn	1	3	3.00		There is a single door in and a single door ou	i e e e e e e e e e e e e e e e e e e e		
Fn	1	3	3.00	interior lighting adequate for routine O&M?				
Fn R	1 1	4	4.00 2.00	building designed to withstand snow load and not create safety issue? building meets code compliance requirements?				
R	1	4	4.00	known fire or haz-mat conditions that could be mitigated?		structeu		
Fn	1	3	3.00	other known problems?				
PM	2	4	8.00		Estimate 10 years based on AWU Useful Life			
				Pumps				
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	no. of pumps?	? 3 Pumps 1 and 2 are multistage vertical turbine	and Duma 2 (fire numa) is a contributal		
INFORMATION	N/A	N/A	N/A		Pumps 1 and 2 are grundfos and pump 3 is a			
	,,,	,	,		Pump one was rebuilt in 2009, Pump 2 had n	ew bearings in 2008, Pump 3 had new mech seal installed. Excessive seal leakage on No.	3, and excessive noise from No. 1 motor. Excessiv	e sand in water main interferes w/ backflow preventer, cooling water
PM	5	3	15.00	pumps rebuilt (list year) and describe work done?	system must be manually operated			· · · · · · · · · · · · · · · · · · ·
FE	5	4	20.00	pump curves available for each unit?				
R R	1	4	4.00	known history of pump/motor failures? If so, explain the nature of the failure(s). number of service calls/repairs in the last year?				
C	1	4	4.00	what is firm capacity of pump station based on flow test?		on numn nos 1 + 2		
PM	2	4	8.00	coatings adequate to provide corrosion protection?				
FE	5	3	15.00	pumps operate efficiently (>70% bowl efficiency)?	wire-to-water efficiency between 47% - 50%			
FE	5	3	15.00			essive leakage from mechanical seal on fire pump		
R	1	4	4.00	pumps operate free from excessive vibration?				
Fn	1	4	4.00	adequate NPSH available to prevent cavitation? dedicated fire pumps available (hydro pneumatic pump stations only)?				
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)?				
INFORMATION	N/A N/A	N/A	N/A	date of last fire-pump test (hydro pneumatic pump stations only)?				
INFORMATION	N/A	N/A	N/A	measured fire-pump capacity (hydro pneumatic pump stations only)?				
INFORMATION	N/A	N/A	N/A	standby power supply available for fire pumps (hydro pneumatic pump stations only)?	? NA			
R	3	3	9.00		Parts would need to be ordered from the sup	plier		
Fn	1	3	3.00	other known problems?				
PM	2	4	8.00	estimated service life remaining?	Estimate 10 years based on AWU Useful Life			

				Corner of	ake Tahoe Boulevard and Boulder Mountain Dr. in a shared building with the		
			South Tahoe PUD	Location Description:	Lake Valley Fire Dept.	K/J Project Number:	1270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	BMPUMP1, BMPUMP2, BMPUMP3	Date:	3/12/2012
						Condition Assessment	
				Pump Station Facility Name:	Boulder Mountain Booster	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Forest Mountain Zone	Adjacent Pressure Zones:	Twin Peaks Zone
							-
Γn	-	4	Piping & \				
Fn PM	5 2	4	20.00 pipe supports adequate to prevent movement or vib 8.00 coatings adequate to protect piping and	valves? Yes, the coatings are in good condition with minor dings	and scratches		
Fn	1	4	4.00 pipes adequately sized to prevent excessive noise or he		una scrateries		
Fn	1	4	4.00 isolation valves provided for all				
Fn Fn	1	3	3.00 valves are suitable for efficient and reliable s 6.00 chemical injection pr				
INFORMATION	N/A	N/A	N/A type of chemical				
Fn	3	5	15.00 sample tap(s) provided to measure water of	uality? No			
PM	4	4	16.00 estimated service life rem	nining? Estimate 30 years based on AWU Useful Life - reduced to	5 years based on motor noise and seal leakage		
			Other Critical Mechanical Equip	ment			
INFORMATION	N/A	N/A	N/A surge tank or surge anticipator valve cor				
Fn	2	3	6.00 pressure relief	valves? Yes the connections to the system are lacking coatings a	nd the valve has been reliable		
INFORMATION	N/A	N/A	N/A chemical tanks onsite, volume, and secondary containment pro				
INFORMATION PM	N/A 2	N/A 4	N/A chemical additives compliant with I 8.00 estimated service life rem	sining? Estimate 20 years based on AWU Useful Life			
rivi		4	8.00 Estimated service meren	Estimate 20 years based on AWO Oseror Life			
			SCADA s	stem			
Fn	1	3	3.00 pump station flow meter is adequate to monitor pump perfor				
Fn Fn	1	2	2.00 flow totals recorded at regular intervals? How fre 2.00 pressure instrumentation is adequate to monitor pump perfor		but they are not tied to SCADA		
Fn	1	4		ability? Yes all alarms are monitored by District Operations	but they are not tied to SCADA		
Fn	1	3	3.00 alarm log maintained and reviewed an	nually? The alarm log is maintained but it is not reviewed on an	annual basis		
INFORMATION	N/A 1	N/A 4	N/A type of telemetry used (radio, fiber optic, leased line, cell moden				
R	5	3	4.00 communication system is reliable (approximate no. of comm. failures in las 15.00 adequate power (UPS) available to run all telemetry and instrumentation on main power				
R	2	3	6.00 spare parts/service support readily av	ilable? Parts are readily available at the plant and through the r			
PM	2	4	8.00 estimated service life rem	nining? 11 years based on AWU Useful Life			
			Electrical F	ower			
INFORMATION	N/A	N/A		(kW)? NA Fire pump has a diesel Engine to power and not an e	ectric motor		
R	2	5	10.00 adequate power available to run all equ	pment Yes			
R	5	5		liable? No and there are no hookups available			
INFORMATION R	1	<u>4</u> 5	4.00 fuel storage capacity 5.00 fuel supply adequate for standby power s	(gals)? 250 gals on the fire pump motor			
R	4	3	12.00 time needed to mobilize portable gen	erator? 1-2 hours but there are no hookups so the retrofit would	take much longer		
Fn	1	3	3.00 known electrical hazards that could be mit				
R PM	2	3		ilable? Available at the District's main facility ining? Estimate 10 years based on AWU Useful Life			
1 101	2	-	5.55 CSLINATED SCHOOL INC. CHI	6. Estimate 10 years based on AWO Oserai Life			
			Additiona	Data			
			Nameplate duty conditions (rated flow and head, nominal motor horse				
INFORMATION				No. 1 130gpm, 178ft, 15hp			
INFORMATION INFORMATION				o No. 2 130gpm, 178ft, 15hp o No. 3 No information on fire pump nameplate. Tests show the	pump runs at 820gpm		
INFORMATION				o No. 4	, , · · · · · · · · · · · · · · · · · ·		
				egend Physical Mortality			
				PM Physical Mortality Fn Functionality			
				R Reliability			
				FE Financial Efficiency			
				C Capacity			



			T					
		South Tahoe PUD	Location Description	n: Next to H St	Tank	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID #	#: HSTBS		Date:	3/8,	/2012
						Condition Assessment		
			Pump Station Facility Name	H St. Boost	ter	Inspectors:	Peter Lavallee	and Mark Gray
			Pressure Zones Served	d: H St. Zon	e	Adjacent Pressure Zones:	Stateli	ne Zone
		Notes:		Faile	ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity		el of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	(see note 1) 1: significantly exceeds design requirement	functionality 1: exceeds all requirements	reliability 1: failure every > 20 yrs	1: best available technology	
		3. To critically weighting racions to be accommised at District Workshop	2: minor defects only	significantly exceeds design requirement exceeds design requirement	2: exceeds some requirements		2: financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 7 to 10 yrs	3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site						
	+ +	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
	+	Unweighted Failure Mode Score (1-5)	-	N/A N/A	2.75	2.40	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	9.50	10.40	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	
		Factored Score		N/A	5.7	4.16	N/A	9.86
		Criticality Score					5%	0.49
		Building Structure						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5)	3.00	N/A	2.50	2.50	N/A	Total Factored Score
LEON.	1000/	Weighted Final Score (1-25)	12.00 30%	N/A N/A	8.33 50%	9.00	N/A N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	4.17	1.8	N/A N/A	9.57
		Criticality Score		1975	7.17	1.0	5%	0.48
		Pumps						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)		5.00	1.00	1.00	4.33	Total Factored Score
		Weighted Final Score (1-25)	15.67	20.00	3.50	3.75	14.67	
HECK	100%	Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
		Factored Score		4	1.05	0.75	2.2	10.35
		Criticality Score					25%	2.59
		Piping & Valves		1 2/4		21/2	21/2	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 2.00	N/A N/A	N/A N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	7.00	N/A N/A	N/A N/A	lotal ractorea score
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	80%	N/A	N/A	
-		Factored Score		N/A	5.6	N/A	N/A	7.60
		Criticality Score					10%	0.76
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	2.80	2.67	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	7.40	8.33	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	40% 2.96	40% 3.33	N/A N/A	7.89
	+ +	Criticality Score		N/A	2.90	3.33	N/A 20%	1.58
		Other Critical Mechanical Equipment					20/0	1.50
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)	12.00	N/A	3.00	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score		N/A	2.4	N/A	N/A	4.80
		Criticality Score					10%	0.48
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Parks 10
		Unweighted Failure Mode Score (1-5)		N/A	1.00	2.80	N/A	Total Factored Score
	+							
HECK	4000	Weighted Final Score (1-25)		N/A	3.00	7.80	N/A	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	4 92
1ECK	100%	Weighted Final Score (1-25)	N/A N/A				·	4.92 1.23

				South Tahoe PUD	Location Description:	Next to H St Tank	K/J Project Number: 1270004*00			
				South Tance P OD	Location Description.	Next to H St Talik	1751 Tojece Hamber 1270004 00			
				Water System Optimization Plan	Pump Station Facility ID #:	HSTBS	Date:	3/8/2012		
							Condition Assessment			
					Pump Station Facility Name:	H St. Booster	Inspectors:	Peter Lavallee and Mark Gray		
								·		
					Pressure Zones Served:	H St. Zone	Adjacent Pressure Zones:	Stateline Zone		
					riessure zones serveu.	11 31. 20116	Adjucent Fressure Zonesi	Stateline Zone		
	•	'								
		Importance				CONDITION ASSESSMENT CHECKLIST				
Failure Mode Type	Score	Weighting (1-5)	Weighted Score							
				Pump Station Site						
Fn	1	4	4.00	key O&M staff have access to site? Yes						
Fn	4	4	16.00	adequate vehicle access for maintenance? Yes						
R	1	3	3.00		This site is indicated as other areas Zone X	on the FEMA flood map.				
R R	5	5 4	25.00 16.00	is site vulnerable to wildfires? Yes is site close to known active seismic faults? 1,2						
R P	1	4	4.00	any unstable site conditions (if yes, describe)? No						
R	1	4	4.00	site drainage adequate to prevent flooding of buildings and critical equipment? Yes						
IV.	1	4	4.00							
Fn	5	3	15.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	site fencing and the lot has a history of una	uthorized access. Garbage observed around tank site.				
Fn	1	3	3.00	other known problems? No	ne					
				Building Structure						
Fn	1	3	3.00	adequate security measures and monitoring to prevent unauthorized access? The						
INFORMATION	N/A	N/A	N/A	date building was constructed? 198	30					
Fn	4	4	16.00		adequate equipment clearances to facilitate routine O&M? Marginal access to valves and pumps					
PM	2	4	8.00		condition of exterior coatings adequate to protect structure? Coatings are good but have a significant amount of graffiti					
Fn	3	3	9.00	adequate openings for ingress/egress?\ Ves single door						
Fn	3	3	9.00	interior lighting adequate for routine O&M? Ves						
Fn	1	4	4.00	building designed to withstand snow load and not create safety issue? Building met requirements for snow load when it was built						
R	1 4	2	2.00 16.00	building meets code compliance requirements? Building met code requirements at time of construction						
Fn	3	4	9.00	known fire or haz-mat conditions that could be mitigated? trees and other foliage should be cleared from bldg perimeter other known problems? insulation damage at building interior						
PM	3	3 4	16.00	estimated service life remaining? Exc						
FIVI	4	4	10.00	Committee service me remaining: EXC	eeus tile AWO Oseitii Lile					

Pumps

pump types? multi stage can pump

coatings adequate to provide corrosion protection? Existing external coatings have worn off of pump and motor

pumps operate efficiently (>70% bowl efficiency)? pump operates continuously, recirculates excess output to suction side motor high efficiency and no excessive noise? insufficient data

spare parts readily available? New pump and motor within pump station other known problems?

no. of pumps?

pump manufacturer? grundfos pumps rebuilt (list year) and describe work done? unknown - insufficient data

what is firm capacity of pump station based on flow test? could not measure pump output - no flowmeter at site

estimated service life remaining? Exceeds AWU Useful Life

pump curves available for each unit? No

number of service calls/repairs in the last year? None

pumps operate free from excessive vibration? Yes adequate NPSH available to prevent cavitation? yes

known history of pump/motor failures? If so, explain the nature of the failure(s). None

dedicated fire pumps available (hydro pneumatic pump stations only)? NA

date of last fire-pump test (hydro pneumatic pump stations only)? NA

measured fire-pump capacity (hydro pneumatic pump stations only)? NA

all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)? NA

standby power supply available for fire pumps (hydro pneumatic pump stations only)? NA

N/A

N/A

15.00 20.00

4.00 4.00

20.00

16.00

15.00

9.00 4.00

4.00

N/A

N/A

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N/A

N/A

						V/I Duning the Name have	
			South Tahoe PUD	Location Description:	Next to H St Tank	K/J Project Number:	1.270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	HSTBS	Date:	3/8/2012
						Condition Assessment	77.
				Pump Station Facility Name:	H St. Booster	Inspectors:	Peter Lavallee and Mark Gray
				Pressure Zones Served:	₩ C+ 7ono	Adjacent Pressure Zones:	Statalina Zona
				Flessure Zolles Serveu.	H St. Zone	Aujacent Fressure Zones.	Stateline Zone
				Piping & Valves			
Fn	5	4		ovement or vibration? no supports pipes resting on bottom of vault			
PM	3	4		ect piping and valves? coatings are adequate with some rust showing on the valves	and piping		
Fn	1	4	4.00 pipes adequately sized to prevent excess				
Fn Fn	1	3	4.00 isolation valves pr 3.00 valves are suitable for efficien	ovided for all pumps? yes			
Fn	3	2		al injection provided? No			
INFORMATION	N/A	N/A		pe of chemical added? NA			
Fn	1	5	5.00 sample tap(s) provided to m				
PM	2	4	8.00 estimated s	service life remaining? 28 years according to AWU Useful Life			
			Other Critical Mecha	• • •			
INFORMATION	N/A	N/A	N/A surge tank or surge anticip		sure at FOnsi		
Fn INFORMATION	1 N/A	3 N/A	N/A chemical tanks onsite, volume, and secondary co	oressure relief valves? Yes the valve is in good condition and holds the system press	sure at 50psi		
INFORMATION	N/A	N/A		ompliant with NSF 60? NA			
PM	3	4		service life remaining? Exceeds AWU Useful Life			
				SCADA system			
Fn	5	3	15.00 pump station flow meter is adequate to monito	r pump performance? no flowmeter present			
Fn	5	2	10.00 flow totals recorded at regular inte				
Fn	1	2	2.00 pressure instrumentation is adequate to monito				
Fn Fn	1	3		ailures and reliability? Yes and monitored by District Operations and reviewed annually? The alarm log is maintained but it is not reviewed annually			
INFORMATION	2 N/A	N/A	6.00 alarm log maintained ar N/A type of telemetry used (radio, fiber optic, leased lii				
R	1	4		. failures in last year)? There have been no communication errors in the last year			
				No adequate nower during outage			
R	5	3	15.00 adequate power (UPS) available to run all telemetry and instrumentation o				
R	2	3		port readily available? Spare parts for the SCADA system are available at the District	t offices or readily through the manufacturer		
PM	2	4	8.00 estimated s	service life remaining? Estimate 10 years based on AWU Useful Life			
				Electrical Power			
INFORMATION	N/A	N/A		y generator size (kW)? NA			
R	1	5		e to run all equipment Yes			
R	5	5		present and reliable? No			
INFORMATION	N/A	N/A	N/A fuel st	corage capacity (gals)? NA			
R	N/A	5	N/A fuel supply adequate for st				
R Fn	3	3	9.00 time needed to mobiliz 3.00 known electrical hazards the	e portable generator? 1-2 hours depending on external conditions			
rii R	5	3		port readily available? NA			
PM	5	4		service life remaining? NA			
				Additional Data			
			Nameplate duty conditions (rated flow and head, nomina				
INFORMATION				Pump No. 1 150gpm, 137 feet, 7.5hp			
INFORMATION INFORMATION				Pump No. 2			
INFORMATION				Pump No. 3 Pump No. 4			
S.MATION							
				Legend			
				PM Physical Mortality			
				Fn Functionality			
				R Reliability FE Financial Efficiency			
				C Capacity			
				- Coponity			
					<u> </u>	<u>'</u>	

		1				
	South Tahoe PUD	Location Description	: Next to H St Tar	nk	K/J Project Number: 1270004*00	
	Water System Optimization Plan	Pump Station Facility ID #	t: HSTBS		Date:	3/8/2012
		Pump Station Facility Name			Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served	H St. Zone	Ac	djacent Pressure Zones:	Stateline Zone
	Photo Evidence for PM, Fn, R, FE					
Section 1			PHOTOS			
2011/03/20	2011/05/2	20 02 41 PM		2011/05/20 02:41 PM		2011/65//20 67 di EM
2011/08	520.02:41 PM			201 1/05/20 000 AT 3/M	CANCEL STATE OF THE STATE OF TH	2011/05/20 02:42 PM
	2011/06	720 02:41 PM		2011/05/20 02:41 PM		26011/05/20 02 150 FM
		1				

	0. 11.7.1			V/I Duningt Number	
	South Tahoe PUD	Location Description:	Next to H St Tank	K/J Project Number:	1270004*00
	Water System Optimization Plan	Pump Station Facility ID #:	HSTBS	Date:	3/8/2012
				Condition Assessment	
		Pump Station Facility Name:	H St. Booster	Inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served:	H St. Zone	Adjacent Pressure Zones:	Stateline Zone
		-			
			•		
-					

		South Tahoe PUD	Location Description	On David L	ane	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID #	t: DLBP3		Date:	3/7/201	2
			Pump Station Facility Name	David Lane Bo	ooster	Condition Assessment Inspectors:	Peter Lavallee and	Phill Torney
			Pressure Zones Served	d: Heavenly z	one	Adjacent Pressure Zones:	Stateline Z	one
		Notes: 1. Capacity score will be based on hydraulic model		Fail Capacity	ure Mode Scoring (1 - 5)	el of Service		
		Capacity score will be based on Hydraulic Hodel For Reliability to be determined based on CMMS maintenance records	Physical Mortality	(see note 1)	functionality	reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure every > 20 yrs	1: best available technology	
			2: minor defects only	2: exceeds design requirement	2: exceeds some requirements		2: financial efficiency is high	
			moderate deterioration significant deterioration	3: meets design requirement 4: less than design requirement	meets all requirements fails some requirements		financial efficiency is average financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements		5: asset should be replaced	
			,			The same of the sa		
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.50	2.60	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	5.00	10.60	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	40%	N/A	-::
	+ + + + + + + + + + + + + + + + + + + +	Factored Score		N/A	3	4.24	N/A	7.24
	+ + + + + + + + + + + + + + + + + + + +	Criticality Score					5%	0.36
		Building Structure Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A N/A	1.50	1.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	4.83	3.00	N/A	
ECK	100%	Criticality Weighting Factor (0 - 100%)	30%	N/A	50%	20%	N/A	
ILCK	15678	Factored Score		N/A	2.42	0.6	N/A	5.42
		Criticality Score					5%	0.27
		Pumps						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)		3.00	1.00	1.25	3.67	Total Factored Score
		Weighted Final Score (1-25)		12.00	3.50	4.50	12.67	
HECK	100%	Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	7.40
		Factored Score Criticality Score		2.4	1.05	0.9	1.9 25%	7.40 1.85
		Piping & Valves					23%	1.05
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.67	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	80%	N/A	N/A	
		Factored Score	0.8	N/A	2.93	N/A	N/A	3.73
		Criticality Score					10%	0.37
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	Tabel Face 10
	+ + + + + + + + + + + + + + + + + + + +	Unweighted Failure Mode Score (1-5)		N/A	1.00	2.33	N/A	Total Factored Score
ILCK	1000/	Weighted Final Score (1-25)		N/A N/A	2.80 40%	7.33 40%	N/A N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	40%	2.93	N/A N/A	5.65
	+ +	Criticality Score		N/A	1.12	2.53	20%	1.13
		Other Critical Mechanical Equipment						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)	12.00	N/A	3.00	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score		N/A	2.4	N/A	N/A	4.80
		Criticality Score					10%	0.48
		Electrical Power				1		
	+ + + + + + + + + + + + + + + + + + + +	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
	+ + + + + + + + + + + + + + + + + + + +	Unweighted Failure Mode Score (1-5)		N/A N/A	1.00 3.00	2.80 7.80	N/A N/A	Total Factored Score
HECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	3.00 60%	7.80 40%	N/A N/A	
ILCN	100%	Factored Score		N/A N/A	1.8	3.12	N/A N/A	4.92
				.4				
		Criticality Score					25%	1.23

	South Tahoe PUD	Location Description:	On David Lane	K/J Project Number: 1270004*0	0
	Water System Optimization Plan	Pump Station Facility ID #:	DLBP3	Date:	3/7/2012
				Condition Assessment	
		Pump Station Facility Name:	David Lane Booster	Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Heavenly zone	Adjacent Pressure Zones:	Stateline Zone

				CONDITION ASSESSMENT OFFICE AND A SECOND ASSESSMENT OF A SECOND ASSE
Fallows Manda Town	C	Importance	Matakand Cours	CONDITION ASSESSMENT CHECKLIST
Failure Mode Type	Score	Weighting (1-5)		
			Pump Station Site	
Fn	1	4	4.00 key O&M staff have access to site?	Yes
Fn	1	4	4.00 adequate vehicle access for maintenance?	
R	2	3	6.00 is site within 100-yr flood plain?	No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	3	5	15.00 is site vulnerable to wildfires?	Yes there are wooded lots adjacent to the facility
R	4	4	16.00 is site close to known active seismic faults?	1,190 ft. from the nearest fault
R	3	4	12.00 any unstable site conditions (if yes, describe)?	Potential issue with proximity to trees
R	1	4	4.00 site drainage adequate to prevent flooding of buildings and critical equipment?	Yes
				None existing at the site
Fn	3	3	9.00 site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	None existing at the site
Fn	1	3	3.00 other known problems?	None existing at the site
			Building Structure	
Fn	4	3	12.00 adequate security measures and monitoring to prevent unauthorized access?	
INFORMATION	N/A	N/A	N/A date building was constructed?	
Fn	1	4	4.00 adequate equipment clearances to facilitate routine O&M?	
PM	1	4	, , , ,	Block building with no coatings and the roof is in good condition
Fn	1	3	3.00 adequate openings for ingress/egress?	
Fn	1	3	3.00 interior lighting adequate for routine O&M?	
Fn	1	4	4.00 building designed to withstand snow load and not create safety issue?	
R	1	2	2.00 building meets code compliance requirements?	
R	1	4	4.00 known fire or haz-mat conditions that could be mitigated?	
Fn	1	3	3.00 other known problems?	
PM	3	4		2 years based on AWU Useful Life
	-			
			Pumps	
INFORMATION	N/A	N/A	N/A no. of pumps?	
INFORMATION	N/A	N/A	, , ,	Centrifugal Pumps
INFORMATION	N/A	N/A	N/A pump manufacturer?	
PM	1	3	3.00 pumps rebuilt (list year) and describe work done?	
FE	5	4	20.00 pump curves available for each unit?	
R	1	4	4.00 known history of pump/motor failures? If so, explain the nature of the failure(s).	
R	1	4	4.00 number of service calls/repairs in the last year?	
C	3	4	, , ,	Total for all three pumps running is 1250gpm (rh) firm capacity approx 1,000 gpm w/ one unit out of service
PM	2	4		Exterior coatings are adequate and show minimal deterioration
FE	5	3		wire-to-water efficiency ranges between 54% - 59%
FF	1	3	3.00 motor high efficiency and no excessive noise?	
R	1	4	4.00 pumps operate free from excessive ribration?	
Fn	1	4	4.00 adequate NPSH available to prevent cavitation?	
INFORMATION	N/A	N/A	N/A dedicated fire pumps available (hydro pneumatic pump stations only)?	
INFORMATION	N/A	N/A	N/A all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)?	
INFORMATION	N/A	N/A	N/A date of last fire-pump test (hydro pneumatic pump stations only)?	
INFORMATION	N/A	N/A	N/A measured fire-pump capacity (hydro pneumatic pump stations only)?	NA .
INFORMATION	N/A	N/A	N/A standby power supply available for fire pumps (hydro pneumatic pump stations only)?	NA
R	2	3		No spare parts on hand but have a backup pumps to use while parts are ordered
Fn	1	3	3.00 other known problems?	
PM	3	4	12.00 estimated service life remaining?	2 years based on AWU Useful Life (rh) useful life appears to be at least 20 yrs assuming routine maintenance performend
T				

			Cough Takes DUD	Leasting Recognition		V/I Project Number	
			South Tahoe PUD	Location Description:	On David Lane	K/J Project Number: 12	270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	DLBP3	Date:	3/7/2012
						Condition Assessment	
				Pump Station Facility Name:	David Lane Booster	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Hanvanluzana	Adjacent Pressure Zones:	Stateline Zone
				Pressure Zones Served.	Heavenly zone	Aujacent Plessure Zones.	Stateline Zone
				Piping & Valves			
Fn	1	4		ovement or vibration? Concrete supports as well as steel posts that are bolted to t	the concrete floor		
PM	1	4		ect piping and valves? Coatings show no signs of defects			
Fn Fn	1	4	4.00 pipes adequately sized to prevent excessi 4.00 isolation valves pr	ive noise or headloss? Yes ovided for all pumps? Yes			
Fn	1	3		t and reliable service? Yes. Suction valves are original but the discharge valves are	new in 2007		
Fn	1	2		al injection provided? Yes			
INFORMATION Fn	N/A 1	N/A 5	N/A typ 5.00 sample tap(s) provided to m	e of chemical added? Sodium Hypochlorite			
PM	1	4	1 1171	ervice life remaining? 32 years based on AWU Useful Life			
INFORMATION	21/2	N/A	Other Critical Mecha N/A surge tank or surge anticip				
INFORMATION Fn	N/A 1	N/A 3		pressure relief valves? Yes and in good condition. Valve has add issues with opera	ation in the past		
INFORMATION	N/A	N/A		ontainment provided? 30 gal tank onsite but no secondary containment	·		
INFORMATION	N/A	N/A		ompliant with NSF 60? Yes			
PM	3	4	12.00 estimated s	ervice life remaining? Exceeds AWU Useful Life			
				SCADA system			
Fn	1	3		r pump performance? Yes the flow meter is a Siemens mag meter installed in 2009	9		
Fn Fn	1	2	2.00 flow totals recorded at regular inte 2.00 pressure instrumentation is adequate to monitor	ervals? How frequent? Daily and hand logged into log book			
Fn	1	4		ailures and reliability? Yes and monitored by District Operations			
Fn	1	3	3.00 alarm log maintained an	nd reviewed annually? The alarm log is maintained but it is not reviewed annually			
INFORMATION R	N/A 1	N/A 4	N/A type of telemetry used (radio, fiber optic, leased lir 4.00 communication system is reliable (approximate no. of comm.	ne, cell modem, etc.)? Radio failures in last year)? There have been no communication errors in the last year			
K	1	4	4.00 communication system is reliable (approximate no. or comm.	There is not adequate power			
R	5	3	15.00 adequate power (UPS) available to run all telemetry and instrumentation or	n main power failure?	the officer and the bloom of the second second		
R PM	2	3		port readily available? Spare parts for the SCADA system are available at the Distri ervice life remaining? Estimate 10 years based on AWU Useful Life	ict offices or readily through the manufacturer		
				,			
				Electrical Power			
INFORMATION R	N/A 1	N/A 5		/ generator size (kW)? NA e to run all equipment Yes			
R	5	5		present and reliable? No			
INFORMATION	N/A	N/A		orage capacity (gals)? NA			
R R	N/A 3	5 3	N/A fuel supply adequate for sta 9.00 time needed to mobilize	andby power service? NA e portable generator? 1-2 hours depending on external conditions			
Fn	1	3	3.00 known electrical hazards tha				
R	5	3		port readily available? NA			
PM	5	4	N/A estimated s	ervice life remaining? NA			
				Additional Data			
			Nameplate duty conditions (rated flow and head, nomina	I motor horsepower):			
INFORMATION				Pump No. 1 500 gpm, 440feet, 100hp Pump No. 2 500 gpm, 440feet, 100hp			
INFORMATION INFORMATION				Pump No. 3 500 gpm, 440feet, 100hp			
INFORMATION				Pump No. 4			
				Portable generator hookup for one pump			
				Legend			
				PM Physical Mortality			
				Fn Functionality R Reliability			
				FE Financial Efficiency			
				C Capacity			

South Tahoe PUD	Location Description:	On David Lane	K/J Project Number: 1270004*00	
South fallog POD		On David Lane	Ny Froject Number: 12/0004*00	
Water System Optimization Plan	Pump Station Facility ID #:	DLBP3	Date:	3/7/2012
	Pump Station Facility Name:	David Lane Booster	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
	rump station racinty Name.	David Lane Booster	mspectors.	Peter Lavallee and Phili Forney
	Pressure Zones Served:	Heavenly zone	Adjacent Pressure Zones:	Stateline Zone
Photo Evidence for PM, Fn, R, FF	FI I	1		
Filoto Evidence for Fili, fil, fil, fil		PHOTOS		
			LECHNIA STATE	

								
		South Tahoe PUD	Location Description	1: Apache Dr. Behind the Tahoe	Paradise Golf Course	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID #	#: APBSP1 and A	PBSP2	Date:	3/8/201	2
			Pump Station Facility Name	South Apache B	Booster	Condition Assessment Inspectors:	Peter Lavallee and	l Mark Gray
			Pressure Zones Served	d: Iroquois Zo	one	Adjacent Pressure Zones:	Arrowhead	Zone
		Notes: 1. Capacity score will be based on hydraulic model	Dhysical Markeliky	Fail: Capacity	ure Mode Scoring (1 - 5)	el of Service	Financial Ffficianos	
		For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	Physical Mortality	(see note 1)	functionality	reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	significantly exceeds design requirement exceeds design requirement	exceeds all requirements exceeds some requirements		best available technology financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	3: meets all requirements		3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site						
	+ +	Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	1.75	2.60	N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	5.75	10.60	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	
		Factored Score	N/A	N/A	3.45	4.24	N/A	7.69
		Criticality Score					5%	0.38
		Building Structure						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	3.50 14.00	N/A N/A	2.83 9.50	3.00 11.00	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	30%	N/A	50%	20%	N/A	
CHECK	100%	Factored Score	4.2	N/A	4.75	2.2	N/A	11.15
		Criticality Score					5%	0.56
		Pumps						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)	4.00	4.00	2.50	1.50	4.33	Total Factored Score
		Weighted Final Score (1-25)	14.33	16.00	8.00	5.25	14.67	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score	15% 2.15	20% 3.2	30% 2.4	20% 1.05	15% 2.2	11.00
		Criticality Score	2.15	3.2	2:4	1:05	2.2	2.75
		Piping & Valves					25%	2.75
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)	4.00	N/A	1.50	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)	16.00	N/A	4.67	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score	3.2	N/A	3.73	N/A	N/A	6.93
		Criticality Score					10%	0.69
		SCADA System	Calada	21/2		C-1 1	N/A	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 2.00	N/A N/A	Calculated 1.00	Calculated 2.33	N/A N/A	Total Factored Score
	+ +	Weighted Final Score (1-5)	8.00	N/A N/A	2.80	7.33	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	40%	40%	N/A	
		Factored Score	1.6	N/A	1.12	2.93	N/A	5.65
		Criticality Score					20%	1.13
		Other Critical Mechanical Equipment						
		Is Failure Mode Score Calculated or Assigned?	Assigned	N/A	Assigned	N/A	N/A	Total Factored Corne
		Unweighted Failure Mode Score (1-5)	1.00 1.00	N/A	1.00	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	1.00 80%	N/A N/A	N/A N/A	
CITECK	100%	Factored Score		N/A N/A	0.8	N/A N/A	N/A	1.00
		Criticality Score					10%	0.10
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	2.40	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.00	9.60	N/A	
		Criticality Weighting Factor (0 - 100%)	20%	N/A	60%	20%	N/A	
CHECK	100%							
CHECK	100%	Factored Score		N/A	1.8	1.92	N/A	4.52
CHECK	100%			N/A	1.8		N/A 25% verall Total Factored Score (Out of 25) =	4.52 1.13 6.75

			South Tahoe PUD	Location Description:	Apache Dr. Behind the Tahoe Paradise Golf Course	K/J Project Number: 1270004*00	
			Water System Optimization Plan	Pump Station Facility ID #:		Date:	3/8/2012
				Pump Station Facility Name:	South Apache Booster	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
				Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Arrowhead Zone
				_			
Failure Mode Type	Score	Importance Weighting (1-5) Weighted Score			CONDITION ASSESSMENT CHECKLIST		

Fn 1 4 4.00 Fn 1 4 4.00	Pump Station Site key O&M staff have access to site? Yes
Fn 1 4 4.00	
	adequate vehicle access for maintenance? Single parking area for vehicles at the booster station
R 3 3 9.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R 4 5 20.00	is site vulnerable to wildfires? γes
R 4 4 16.00	is site close to known active seismic faults? 5,750 ft. to the nearest fault
R 1 4 4.00	any unstable site conditions (if yes, describe)? None
R 1 4 4.00	site drainage adequate to prevent flooding of buildings and critical equipment? There are no site drainage issues at this facility
Fn 4 3 12.00 site lighting, fencing,	and security monitoring adequate to discourage unauthorized access/vandalism? No site security but there has not been any indication of unauthorized access
Fn 1 3 3.00	other known problems? none
	Building Structure
Fn 2 3 6.00	adequate security measures and monitoring to prevent unauthorized access? The building is locked
INFORMATION N/A N/A N/A	date building was constructed? 1959
Fn 5 4 20.00	adequate equipment clearances to facilitate routine O&M? The facility is very confined and there is not enough clearance to work
PM 2 4 8.00	condition of exterior coatings adequate to protect structure? Yes the wood building is in good condition and the coatings have no visual defects
Fn 5 3 15.00	adequate openings for ingress/egress? Single door that is shorter than a standard door
Fn 3 3 9.00	interior lighting adequate for routine O&M? Yes (rh) difficult to see down below catwalk
Fn 1 4 4.00	building designed to withstand snow load and not create safety issue? The building met the requirements at the time of construction
R 1 2 2.00	building meets code compliance requirements? The building met the requirements at the time of construction
R 5 4 20.00	known fire or haz-mat conditions that could be mitigated? The size of the building is not conducive to work and there are trees that are in contact with the building
Fn 1 3 3.00	other known problems? none
PM 5 4 20.00	estimated service life remaining? Exceeds AWU Useful Life
	Pumps
INFORMATION N/A N/A N/A	no. of pumps? 3
INFORMATION N/A N/A N/A	pump types? centrifugal pumps
INFORMATION N/A N/A N/A	pump manufacturer? A.W. Chesterton
PM 5 3 15.00	pumps rebuilt (list year) and describe work done? Insufficient data
FE 5 4 20.00	pump curves available for each unit? No
R 1 4 4.00	known history of pump/motor failures? If so, explain the nature of the failure(s).
R 1 4 4.00	number of service calls/repairs in the last year? none the facility is in lag to the North Apache Booster Station which replaced it
C 4 4 16.00	what is firm capacity of pump station based on flow test? 515 gpm based on flow test
PM 3 4 12.00	coatings adequate to provide corrosion protection? Coatings have dings and parts missing and there is rust in some locations
FE 5 3 15.00	pumps operate efficiently (>70% bowl efficiency)? wire-to-water efficiency ranges from 51% - 60%
FE 3 3 9.00	motor high efficiency and no excessive noise? high-pitch noise from pump/motor assy (problem correct per district review comments dated 11/28/12)
R 1 4 4.00	pumps operate free from excessive vibration? Yes
Fn 1 4 4.00	adequate NPSH available to prevent cavitation? yes
INFORMATION N/A N/A N/A	dedicated fire pumps available (hydro pneumatic pump stations only)? NA
INFORMATION N/A N/A N/A all fit	ire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)? NA
INFORMATION N/A N/A N/A	date of last fire-pump test (hydro pneumatic pump stations only)? NA
INFORMATION N/A N/A N/A	measured fire-pump capacity (hydro pneumatic pump stations only)? NA
	dby power supply available for fire pumps (hydro pneumatic pump stations only)? NA
R 3 3 9.00	spare parts readily available? The parts would need to be ordered from the manufacturer
Fn 4 3 12.00	other known problems? removal of the pumps is difficult
PM 4 4 16.00	estimated service life remaining? Exceeds AWU Useful Life (rh) estimate 5 yrs based on excessive noise, low efficiency and age

			Sc	outh Tahoe PUD	Location Description:	Apache Dr. Behind the Tahoe Paradise Golf Course	K/J Project Number:	1270004*00
ı				Victor Control Outlining Ton	Duran Station Facility ID #		Deter	2/2022
			W	Vater System Optimization Plan	Pump Station Facility ID #:	APBSP1 and APBSP2	Date: Condition Assessment	3/8/2012
					Pump Station Facility Name:	South Apache Booster	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Arrowhead Zone
Fn	1	4	4.00	Piping & Valves pipe supports adequate to prevent movement or vibration?	The nine supports are steel strans that are stranged to	the ceiling and they are adequate		
PM	4	4	16.00	coatings adequate to protect piping and valves?	Coatings have deteriorated and there is rust coming th			
Fn	1	4	4.00	pipes adequately sized to prevent excessive noise or headloss?				
Fn Fn	1	4	4.00 3.00	isolation valves provided for all pumps? valves are suitable for efficient and reliable service?				
Fn	4	2	8.00		No. There is no space for chemical injection			
INFORMATION	N/A	N/A	N/A	type of chemical added?				
Fn PM	4	5 4	5.00 16.00	sample tap(s) provided to measure water quality? estimated service life remaining?				
1 101	7	4	10.00		, years sused on Awo Oscidi Life			
				Other Critical Mechanical Equipment				
INFORMATION	N/A	N/A	N/A	surge tank or surge anticipator valve condition?		W W .		
Fn INFORMATION	1 N/A	1 N/A	1.00 N/A	chemical tanks onsite, volume, and secondary containment provided?	NA- Assigned lowest score of one given to prevent articles NA	ificially lowered scores		
INFORMATION	N/A	N/A	N/A	chemical additives compliant with NSF 60?	NA			
PM	1	1	1.00	estimated service life remaining?	NA- Assigned lowest score of one given to prevent arti	ificially lowered scores		
				SCADA custom				
Fn	1	3	3.00	SCADA system pump station flow meter is adequate to monitor pump performance?	Yes and it is connected to SCADA			
Fn	1	2	2.00	flow totals recorded at regular intervals? How frequent?				
Fn	1	2	2.00	pressure instrumentation is adequate to monitor pump performance?		n		
Fn	1	4	4.00	automated alarm callout for critical failures and reliability?				
Fn INFORMATION	1 N/A	3 N/A	3.00 N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	The alarm log is maintained but it is not reviewed annu	ually		
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)?		year		
R	5	3	15.00		No backup power so not adequate during a power out			
R	1	3	3.00		Spare parts for the SCADA system are available at the D	District offices or readily through the manufacturer		
PM	2	4	8.00	estimated service life remaining?	Estimate 10 years based on AWU Useful Life			
				Electrical Power				
INFORMATION	N/A	N/A	N/A	standby generator size (kW)?	NA			
R	1	5	5.00	adequate power available to run all equipment				
R	5	5	25.00	adequate standby power present and reliable?				
INFORMATION R	N/A N/A	N/A 5	N/A N/A	fuel storage capacity (gals)? fuel supply adequate for standby power service?				
R R	N/A 4	3	12.00		1-2 hours depending on external conditions and there	are hookups in place for a portable generator		
Fn	1	3	3.00	known electrical hazards that could be mitigated?	None			
R	2	3	6.00	spare parts/service support readily available?	Yes at the District's main plant			
PM	1	4	4.00	estimated service life remaining?	NA			
				Additional Data				
				Nameplate duty conditions (rated flow and head, nominal motor horsepower):				
INFORMATION				Pump No. 1				
INFORMATION				Pump No. 2				
INFORMATION INFORMATION				Pump No. 3 Pump No. 4	40 np			
INIONWATION				Puliip No. 4				
				Legend	<u> </u>			<u> </u>
					Physical Mortality			
					Functionality Reliability			
				•	Financial Efficiency			
					Capacity			

Woter System Optimization Plan Pump Station Facility Name: Pump Station Facility Name: Station Agestorm Research Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Processor Zones Zon		South Tahoe PUD	Loca	tion Description: Apar	che Dr. Behind the Tahoe Paradise Golf Course	K/J Project Number: 1270004*00	
Prings Station Facility Name: Pressure Zones Served: Pressure Zones		Water System Optimization Plan	Pump Sta	ntion Facility ID #:	APBSP1 and APBSP2		3/8/2012
PHOTOS PHOTOS PHOTOS PHOTOS PHOTOS PHOTOS			Pump Station	on Facility Name:	South Apache Booster		Peter Lavallee and Mark Gray
PHOTOS PHOTOS			Pressu	ıre Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Arrowhead Zone
PHOTOS PHOTOS			Photo Evidence for PM. Fn. R. FE		l		
NO.					PHOTOS		
NO.		229117/05/220 (04:85 PM		2011/05/20 04:35 PM		Zorlin/os-	//20 04%S5 PM
		2011/05/20 04:25 PM		20 11/05/20 04:88 Pt		NO 2011/06/2	20 04:35 PM
		_					
	+ + + + + + + + + + + + + + + + + + + +	 					

		South Tahoe PUD	Location Descriptio	n: Apache D	r	K/J Project Numbe	r: 1270004*00	
		South funder of	Education Description	The Apacile D		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1270004 00	
		Water System Optimization Plan	Pump Station Facility ID	#: NAPBS1, NAPBS2, a	nd NAPBS3	Dat	-,-,-	012
			Pump Station Facility Nam	e: North Apache E	la actor	Condition Assessment Inspector		ad Mark Cray
			Tump Station Facility Ham	North Apache E	sooster	mspector	Peter Lavallee all	iu iviaik Gray
			Pressure Zones Serve	d: Iroquois Zo	one	Adjacent Pressure Zone	Comanche and Arr	rowhead Zones
		N		Failu	ure Mode Scoring (1 - 5)			
		Notes: 1. Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Lev	rel of Service	Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records For Gittin like Which the Fortuna to be determined at Picture 1.	*	(see note 1)	functionality	reliability	•	
		For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	significantly exceeds design requirement exceeds design requirement	exceeds all requirements exceeds some requirements	1: failure every > 20 yrs 2: failure every 11 to 20 yrs	best available technology financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 7 to 10 yrs	3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 6 yrs 5: failure < 3 yrs	4: financial efficiency is low 5: asset should be replaced	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
-		Unweighted Failure Mode Score (1-5) N/A	N/A	1.75	2.20	N/A	Total Factored Score
	1000	Weighted Final Score (1-25	-	N/A	5.75	9.00	N/A	
	100%	Criticality Weighting Factor (0 - 100% Factored Score		N/A N/A	60% 3.45	40% 3.6	N/A N/A	7.05
		Criticality Score		.4/.	3.13	5.0	5%	0.35
		Building Structure	•					
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5		N/A	1.00	1.00	N/A	Total Factored Score
	100%	Weighted Final Score (1-25	•	N/A N/A	3.33 50%	3.00	N/A N/A	
CK	100%	Criticality Weighting Factor (0 - 100% Factored Score	,	N/A N/A	1.66666667	0.6	N/A N/A	3.47
		Criticality Score		.4			5%	0.17
		Pumps	5					
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5		1.00	1.00	1.25	1.00	Total Factored Score
	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%		4.00	3.50 30%	3.50 20%	3.33 15%	
	100%	Factored Score		0.8	1.05	0.7	0.5	3.60
		Criticality Score					25%	0.90
		Piping & Valves	5					
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5		N/A	1.00	N/A	N/A	Total Factored Score
	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%		N/A N/A	3.67 80%	N/A N/A	N/A N/A	
	100%	Factored Score		N/A	2.93	N/A	N/A	3.73
		Criticality Score					10%	0.37
		SCADA System						
		Is Failure Mode Score Calculated or Assigned	? Calculated	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5		N/A N/A	1.00 2.80	1.00 3.33	N/A N/A	Total Factored Score
	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%		N/A N/A	40%	40%	N/A N/A	
	100%	Factored Score		N/A	1.12	1.33	N/A	3.25
		Criticality Score	2				20%	0.65
		Other Critical Mechanical Equipment						
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	N/A	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5 Weighted Final Score (1-25		N/A N/A	1.00	N/A N/A	N/A N/A	Total ractored Score
	100%	Criticality Weighting Factor (0 - 100%		N/A N/A	80%	N/A N/A	N/A N/A	
		Factored Score	0.8	N/A	2.4	N/A	N/A	3.20
		Criticality Score					10%	0.32
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	Total Fortered C
		Unweighted Failure Mode Score (1-5		N/A N/A	3.00	1.00	N/A N/A	Total Factored Score
	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%		N/A N/A	9.00 60%	4.20	N/A N/A	
	100/0	Factored Score		N/A	5.4	0.84	N/A	7.04
		Criticality Score					25%	1.76
							Overall Total Factored Score (Out of 25) =	4.53

						W/15	
			South Tahoe PUD	Location Description:	Apache Dr.	K/J Project Number:	1270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	NAPBS1, NAPBS2, and NAPBS3	Date:	3/8/2012
						Condition Assessment	
				Pump Station Facility Name:	North Apache Booster	Inspectors:	Peter Lavallee and Mark Gray
				Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Comanche and Arrowhead Zones
				·			
Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST		
		3 3 3 3 4 5 7		Pump Station Site			
En	1	1	4.00	key O&M staff have access to site? Ves			

Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST
				Pump Station Site	
Fn	1	4	4.00	key O&M staff have access to site? Ye	es es
Fn	1	4	4.00	adequate vehicle access for maintenance? Ye	es es
R	2	3	6.00		o. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	3	5	15.00	is site vulnerable to wildfires? Ye	es, vacant lots behind but in a residential area with no large open space nearby
R	4	4	16.00	is site close to known active seismic faults? 7,3	
R	1	4	4.00	any unstable site conditions (if yes, describe)? No	o unstable site conditions
R	1	4	4.00 site drainage adequate to p	revent flooding of buildings and critical equipment? Ye	es
Fn	4	3	12.00 site lighting, fencing, and security monitoring adeq	quate to discourage unauthorized access/vandalism?	here is no site security around the perimeter of the facility
Fn	1	3	3.00	other known problems? No	o other known problems with the site
				Building Structure	
Fn	1	3	3.00 adequate security measur		he building has intrusion alarms which are tied to the SCADA monitoring at the main plant
INFORMATION	N/A	N/A	N/A	date building was constructed? 20	010
Fn	1	4	4.00 adequa	te equipment clearances to facilitate routine O&M? Ye	es
PM	1	4		of exterior coatings adequate to protect structure? Ye	
Fn	1	3	3.00	adequate openings for ingress/egress? Ye	
Fn	1	3	3.00	interior lighting adequate for routine O&M? Ye	
Fn	1	4	4.00 building designed	to withstand snow load and not create safety issue? Ye	es es
R	1	2	2.00	building meets code compliance requirements? Ye	
R	1	4	4.00 known	n fire or haz-mat conditions that could be mitigated? No	o known haz mat or fire conditions
Fn	1	3	3.00	other known problems? No	o other known problems with the building
PM	1	4	4.00	estimated service life remaining? 28	8 years based on AWU Useful Life
				Pumps	
INFORMATION	N/A	N/A	N/A	no. of pumps? 3	
INFORMATION	N/A	N/A	N/A	pump types? Ve	ertical Turbines
INFORMATION	N/A	N/A	N/A	pump manufacturer? Flo	loway Pumps
PM	1	3	3.00	pumps rebuilt (list year) and describe work done? No	
FE	1	4	4.00	pump curves available for each unit? Ye	es es
R	1	4	4.00 known history of pump/motor	or failures? If so, explain the nature of the failure(s). No	o pump or motor failures since construction
R	1	4		number of service calls/repairs in the last year? No	
С	1	4	4.00 what	is firm capacity of pump station based on flow test? fir	rm capacity is 900 gpm based on flow test
PM	1	4		coatings adequate to provide corrosion protection? No	ew coatings with no visual defects
FE	1	3	3.00	pumps operate efficiently (>70% bowl efficiency)? wi	vire-to-water efficiency ranges from 72% - 75%
FE	1	3	3.00	motor high efficiency and no excessive noise? ye	es .
R	1	4	4.00	pumps operate free from excessive vibration? Th	here is no record of excessive vibration at this station
Fn	1	4	4.00	adequate NPSH available to prevent cavitation? ye	es
INFORMATION	N/A	N/A	N/A dedicated fire pum	nps available (hydro pneumatic pump stations only)? NA	Α
INFORMATION	N/A	N/A	N/A all fire pumps are UL/FM rated for	r fire service (hydro pneumatic pump stations only)? NA	A
INFORMATION	N/A	N/A	N/A date of last fire	e-pump test (hydro pneumatic pump stations only)? NA	A
INFORMATION	N/A	N/A	N/A measured fire-pu	mp capacity (hydro pneumatic pump stations only)? NA	Α
INFORMATION	N/A	N/A	N/A standby power supply available for	r fire pumps (hydro pneumatic pump stations only)? NA	A
R	2	3	6.00	spare parts readily available? So	ome parts are in stock for the pumps other parts are available through the manufacturer
Fn	1	3	3.00	other known problems? No	o other known problems
PM	1	4	4.00	estimated service life remaining? 28	8 years based on AWU Useful Life

						_	
			6. II 7. I BUD			V/I Duois et Niverhou	
			South Tahoe PUD	Location Description:	Apache Dr.	K/J Project Number:	270004*00
			Water System Optimization Plan	Pump Station Facility ID #:	NAPBS1, NAPBS2, and NAPBS3	Date:	3/8/2012
			water system optimization rian	1 unip station ruently 15 #.	NAFB31, NAFB32, dilu NAFB33	Condition Assessment	3/0/2012
				Pump Station Facility Name:	North Apache Booster	Inspectors:	Peter Lavallee and Mark Gray
				r unip station ruently runner	NOITH Apache Boostei	mspectors.	reter Lavariee and Iviair Gray
				Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Comanche and Arrowhead Zones
						.,	
			n:	sing 9 Values			
Fn	1	4		ping & Valves nent or vibration? Yes they are coated steel supports that are epoxy bolted	to the floor and grouted beneath the plate		
PM	1	4		siping and valves? Coatings are new in 2010 and there are no visual defects			
Fn	1	4	4.00 pipes adequately sized to prevent excessive n				
Fn Fn	1	3		ed for all pumps? All pumps have isolation valves.			
Fn	1	2		d reliable service? Valves are new, efficient, and reliable jection provided? Yes			
INFORMATION	N/A	N/A		chemical added? Sodium Hypochlorite			
Fn	1	5		ire water quality? Ports with bent copper are available for use to sample w			
PM	1	4	4.00 estimated servi	ce life remaining? 58 years for steel piping and 48 years for valves based on	AWU Useful Life		
			Other Critical Mechanic	al Equipment			
INFORMATION	N/A	N/A	N/A surge tank or surge anticipator				
Fn	1	3	·	sure relief valves? 4" Pressure Relief Valves on discharge			
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A chemical tanks onsite, volume, and secondary contain N/A chemical additives complete.				
PM	N/A 1	N/A 4	,	ce life remaining? 23 years based on AWU Useful Life			
	_	•		Service servic			
				CADA system			
Fn	1	3		mp performance? Yes the flow meter is a Siemens mag meter installed in 20	210		
Fn Fn	1	2	2.00 flow totals recorded at regular interval. 2.00 pressure instrumentation is adequate to monitor pur	s? How frequent? Daily and hand logged into log book			
Fn	1	4		es and reliability? Yes and monitored by District Operations			
Fn	1	3	3.00 alarm log maintained and re	viewed annually? The alarm log is maintained but it is not reviewed annual	У		
INFORMATION	1	N/A 4	N/A type of telemetry used (radio, fiber optic, leased line, c 4.00 communication system is reliable (approximate no. of comm. fail		,		
R	1	4	4.00 communication system is reliable (approximate no. or comm. fail	ures in last year)? There have been no communication errors in the last year			
R	1	3	3.00 adequate power (UPS) available to run all telemetry and instrumentation on ma				
R	1	3		readily available? Spare parts for the SCADA system are available at the Dis	trict offices or readily through the manufacturer		
PM	1	4	4.00 estimated servi	ce life remaining? 10 years based on AWU Useful Life			
			Ele	ectrical Power			
INFORMATION	N/A	N/A		nerator size (kW)? 150kW, 237 bhp @1800RPM Diesel			
R	1	5		run all equipment The generator is sized to handle all three pumps and asso	ciated controls		
R INFORMATION	1 N/A	5 N/A	5.00 adequate standby power pre: N/A fuel storag	sent and reliable? Yes ge capacity (gals)? 200 gallons			
R	1	5	5.00 fuel supply adequate for standle				
R	N/A	3	N/A time needed to mobilize po	rtable generator? NA			
Fn R	3 2	3	9.00 known electrical hazards that co 6.00 spare parts/service support	uld be mitigated? Arc Flash labeling has not been completed on the contro readily available? Yes some parts are housed within the station and others	panels and other electrical equipment		
PM	1	4		readily available? Tes some parts are noused within the station and others ce life remaining? 23 years based on AWU Useful Life	would need to be obtained from the manufacturer		
				,			
				lditional Data			
INFORMATION			Nameplate duty conditions (rated flow and head, nominal mo		wor=E0hn 179E DDM Impollor setting 0.135" off hotto		
INFORMATION INFORMATION				Pump No. 1 Rated Flow=500gpm, Head=280', Size=10JKL, 7 Stage, Por Pump No. 2 Rated Flow=500gpm, Head=280', Size=10JKL, 7 Stage, Por			
INFORMATION				Pump No. 3 Rated Flow=500gpm, Head=280', Size=10JKL, 7 Stage, Por	· · · · · ·		
INFORMATION				Pump No. 4			
				Legend			
				PM Physical Mortality			
				Fn Functionality			
				R Reliability			
				FE Financial Efficiency C Capacity			
				o capacity		1	1

	South Tahoe PUD	Location Description:	Apache Dr.	K/J Project Number:	1270004*00
	Water System Optimization Plan	Pump Station Facility ID #:	NAPBS1, NAPBS2, and NAPBS3	Date:	3/8/2012
				Condition Assessment	
		Pump Station Facility Name:	North Apache Booster	Inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Comanche and Arrowhead Zones
		•		=	
		7	1	1	

Photo Evidence for PM, Fn, R, FE













			T					
		South Tahoe PUD	Location Description	n: Keller Rd	d	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID	#: KLRBP1 and KI	:LRBP2	Date:	3/7/:	2012
			Down Chatian Facility Name			Condition Assessment		
			Pump Station Facility Name	e: Keller Boos	ter	Inspectors:	Peter Lavallee a	and Phill Torney
			Pressure Zones Served	d: Keller Zon	ne	Adjacent Pressure Zones:	Statelin	ne Zone
				Cail	ure Mode Scoring (1 - 5)			
		Notes: 1. Capacity score will be based on hydraulic model	DI 1 122 112	Capacity		el of Service		
		For Reliability to be determined based on CMMS maintenance records	- Physical Mortality	(see note 1)	functionality	reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	significantly exceeds design requirement exceeds design requirement	exceeds all requirements exceeds some requirements		best available technology financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 7 to 10 yrs	3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned?	-	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	3.50	2.40	N/A	Total Factored Score
-04	4000/	Weighted Final Score (1-25)		N/A	11.50	9.60	N/A	
CK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	60%	40% 3.84	N/A N/A	10.74
		Criticality Score		1977	913	3.6 .	5%	0.54
		Building Structure						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	1.50	N/A	1.67	1.00	N/A	Total Factored Score
CIV	100%	Weighted Final Score (1-25)	6.00 30%	N/A N/A	5.33 50%	3.00 20%	N/A N/A	
CK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	2.67	0.6	N/A N/A	5.07
		Criticality Score					5%	0.25
		Pumps						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)		2.00	1.00	1.75	2.33	Total Factored Score
CK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	5.00 15%	8.00 20%	3.50 30%	6.25	8.67 15%	
:CK	100%	Factored Score		1.6	1.05	1.25	1.3	5.95
		Criticality Score					25%	1.49
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
CK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	3.67 80%	N/A N/A	N/A N/A	
CK	100%	Factored Score		N/A	2.93	N/A	N/A	3.73
		Criticality Score		1777		1711	10%	0.37
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	W
		Unweighted Failure Mode Score (1-5)		N/A	1.00	2.33	N/A	Total Factored Score
CK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	2.80	7.33 40%	N/A N/A	
Cit	100/3	Factored Score		N/A	1.12	2.93	N/A	4.85
		Criticality Score					20%	0.97
		Other Critical Mechanical Equipment						
		Is Failure Mode Score Calculated or Assigned?		N/A	N/A	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
CK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	1.00 80%	N/A N/A	N/A N/A	
υN.	100%	Factored Score		N/A N/A	0.8	N/A N/A	N/A N/A	1.00
		Criticality Score					10%	0.10
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	3.20	N/A	Total Factored Score
CV	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	3.00 60%	14.00 20%	N/A N/A	
CK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	1.8	20%	N/A N/A	6.20
				.47.		2.0		
		Criticality Score					25%	1.55

	South Tahoe PUD	Location Description:	Keller Rd	K/J Project Number:	1270004*00
	Water System Optimization Plan	Pump Station Facility ID #:	KLRBP1 and KLRBP2	Date:	3/7/2012
				Condition Assessment	
		Pump Station Facility Name:	Keller Booster	Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	Stateline Zone
					1

Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score	CONDITION ASSESSMENT CHECKLIST
			Pump Station Site	
Fn	1	4	4.00 key O&M staff have access to site? Yes	
Fn	3	4	12.00 adequate vehicle access for maintenance? Minim	mal Access-one maybe two vehicles. Small turnout only
R	3	3	9.00 is site within 100-yr flood plain? No. Th	This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	3	5	15.00 is site vulnerable to wildfires? Yes Ad	Adjacent to a large vacant lot but within a residential area
R	4	4	16.00 is site close to known active seismic faults? 925 fe	
R	1	4	4.00 any unstable site conditions (if yes, describe)? None	e
R	1	4	4.00 site drainage adequate to prevent flooding of buildings and critical equipment? Yes	
Fn	5	3	15.00 site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	his site is terrible. There is lots of graffiti and vandalism. It has been painted a dozen times
Fn	5	3	15.00 other known problems? Vanda	dalism is a primary concern at this site, access is very difficult and dangerous as crews are forced to back onto a blind curve
			Building Structure	
Fn	5	3	15.00 adequate security measures and monitoring to prevent unauthorized access? No	
INFORMATION	N/A	N/A	N/A date building was constructed? 1964	
Fn	1	4	4.00 adequate equipment clearances to facilitate routine O&M? Yes	
PM	1	4	4.00 condition of exterior coatings adequate to protect structure? Good	d because it has been painted multiple times and a new roof was installed approximately two years ago
Fn	1	3	3.00 adequate openings for ingress/egress? Yes	
Fn	1	3	3.00 interior lighting adequate for routine O&M? Yes	
Fn	1	4	4.00 building designed to withstand snow load and not create safety issue? Yes	
R	1	2	2.00 building meets code compliance requirements? Met re	requirements at the time of construction
R	1	4	4.00 known fire or haz-mat conditions that could be mitigated? None	
Fn	1	3	3.00 other known problems? None	e
PM	2	4	8.00 estimated service life remaining? Exceed	eds AWAU Useful Life (rh) estimated useful life is approx 18 yrs assuming 20-yr roof life
			Pumps	
INFORMATION	N/A	N/A	N/A no. of pumps? 2	
INFORMATION	N/A	N/A	N/A pump types? Vertica	ical multistage turbine
INFORMATION	N/A	N/A	N/A pump manufacturer? Gould	d
PM	1	3	3.00 pumps rebuilt (list year) and describe work done? Installe	Illed about 5 years ago
FE	5	4	20.00 pump curves available for each unit? Yes	
R	1	4	4.00 known history of pump/motor failures? If so, explain the nature of the failure(s). None s	
R	2	4	8.00 number of service calls/repairs in the last year? 2 calls	
C	2	4	8.00 what is firm capacity of pump station based on flow test? 252 gp	
PM	1	4		ings are adequate at this location for facilities that are visible
FE	1	3	3.00 pumps operate efficiently (>70% bowl efficiency)? wire-to	
FE	1	3	3.00 motor high efficiency and no excessive noise? Assum	
R	1	4	4.00 pumps operate free from excessive vibration? No exc	xcessive vibration
Fn	1	4	4.00 adequate NPSH available to prevent cavitation? yes	
INFORMATION	N/A	N/A	N/A dedicated fire pumps available (hydro pneumatic pump stations only)? NA	
INFORMATION	N/A N/A	N/A	N/A all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)? NA	
INFORMATION	N/A N/A	N/A	N/A date of last fire-pump test (hydro pneumatic pump stations only)? NA N/A measured fire-pump capacity (hydro pneumatic pump stations only)? NA	
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A measured fire-pump capacity (hydro pneumatic pump stations only)? NA N/A standby power supply available for fire pumps (hydro pneumatic pump stations only)? NA	
R	3	1N/A 3		pare pump or spare parts they would need to be ordered
Fn	1	3	3.00 spare parts readily available: No s	
PM	2	4	·	e eds AWU Useful Life (rh) appears to be 15 yrs useful life based on flow test and observed pump condition
FIVI		7	5.50 Extended Service menternaming: Exteet	coordinate (in) appears to be 25 yes useful into based on now test and observed pump condition

		T						
				South Tahoe PUD	Location Description:	Keller Rd	K/J Project Number: 1	270004*00
				Water System Optimization Plan	Pump Station Facility ID #:	KLRBP1 and KLRBP2	Date:	3/7/2012
				water system optimization Fian	rump station racinty ib #.	KLRDP1 dilu KLRDP2	Condition Assessment	5///2012
					Pump Station Facility Name:	Keller Booster	Inspectors:	Peter Lavallee and Phill Torney
					, , , , , , , , , , , , , , , , , , , ,	Keller Booster		Teter Lavance and Timi Torriey
					Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	Stateline Zone
							-	
				Piping & Valves	1			
Fn	1	4	4.00	pipe supports adequate to prevent movement or vibration?				
PM	1	4	4.00	coatings adequate to protect piping and valves?				
Fn Fn	1	4	4.00 4.00	pipes adequately sized to prevent excessive noise or headloss? isolation valves provided for all pumps?				
Fn	1	3	3.00	valves are suitable for efficient and reliable service?	Yes			
Fn INFORMATION	N/A	2 N/A	2.00 N/A	chemical injection provided? type of chemical added?	None and potential plans for this station			
Fn	1	5	5.00	sample tap(s) provided to measure water quality?	Yes			
PM	1	4	4.00	estimated service life remaining?	12 years based on AWU Useful Life			
			 	Other Critical Mechanical Equipment				
INFORMATION	N/A	N/A	N/A	surge tank or surge anticipator valve condition?	NA			
Fn INFORMATION	1 N/A	1 N/A	1.00 N/A	pressure relief valves? chemical tanks onsite, volume, and secondary containment provided?	NA- Lowest score of one given to prevent artificially lowered	scores		
INFORMATION	N/A	N/A	N/A	chemical additives compliant with NSF 60?	NA			
PM	1	1	1.00	estimated service life remaining?	NA- Lowest score of one given to prevent artificially lowered	scores		
				SCADA system				
Fn	1	3	3.00	pump station flow meter is adequate to monitor pump performance?				
Fn	1	2	2.00	flow totals recorded at regular intervals? How frequent?				
Fn Fn	1	4	2.00 4.00	pressure instrumentation is adequate to monitor pump performance? automated alarm callout for critical failures and reliability?				
Fn	1	3	3.00		The alarm log is maintained but it is not reviewed annually			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?				
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)?		f-:		
R	5	3	15.00	adequate power (UPS) available to run all telemetry and instrumentation on main power failure?				
R PM	1	3	3.00 4.00		Spare parts for the SCADA system are available at the Distric Estimate 10 years based on AWU Useful Life	t offices or readily through the manufacturer		
1101	1	-	4.00	estimated service me remaining:				
				Electrical Power				
INFORMATION R	N/A	N/A 5	N/A 5.00	standby generator size (kW)? adequate power available to run all equipment				
R	1 5	5	25.00	adequate power available to run an equipment adequate standby power present and reliable?				
INFORMATION	N/A	N/A	N/A	fuel storage capacity (gals)?				
R R	5 3	5	25.00 9.00	fuel supply adequate for standby power service? time needed to mobilize portable generator?	NA A couple hours depending on the situation and other externation	al hazards		
Fn	1	3	3.00	known electrical hazards that could be mitigated?	None			
R PM	2	3	6.00 8.00	spare parts/service support readily available?				
PIVI		4	6.00	estimated service life remaining?	INA			
				Additional Data				
				Nameplate duty conditions (rated flow and head, nominal motor horsepower):	252			
INFORMATION INFORMATION				Pump No. 1 Pump No. 2				
INFORMATION				Pump No. 3				
INFORMATION			-	Pump No. 4	This station is run off of VFD drives.			
					This station is full on or VID drives.			
				Legend				
			-		Physical Mortality Functionality			
					Reliability			
					Financial Efficiency			
				C	Capacity			
		I.	1	1	1			

	South Tahoe PUD	Location Description:	Keller Rd	K/J Project Number:	1270004*00
	Water System Optimization Plan	Pump Station Facility ID #:	KLRBP1 and KLRBP2	Date:	3/7/2012
				Condition Assessment	
		Pump Station Facility Name:	Keller Booster	Inspectors:	Peter Lavallee and Phill Torney
				· · · · · · · · · · · · · · · · · · ·	
		Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	Stateline Zone
			<u> </u>		

Photo Evidence for PM, Fn, R, FE

PHOTOS











			T					
		South Tahoe PUD	Location Description	: On Pioneer	Trail	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID #	CCBP1 and C	CBP2	Date:	3/8/201	2
			Pump Station Facility Name	Cold Creek Tank Booster Station (Cold Creek Tank Booster Station (aka Upper Cold Creek BS)		S: Peter Lavallee and Mark Gray	
			Pressure Zones Served	: Montgomery	Estates	Adjacent Pressure Zones:	Stateline Z	one
		Notes: 1. Capacity score will be based on hydraulic model		Fail Capacity	ure Mode Scoring (1 - 5)	of Service		
		Capacity score will be based on Hydraulic Hodel For Reliability to be determined based on CMMS maintenance records	Physical Mortality	(see note 1)	functionality	reliability	Financial Efficiency	
		3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure every > 20 yrs	1: best available technology	
			2: minor defects only 3: moderate deterioration	2: exceeds design requirement 3: meets design requirement	2: exceeds some requirements 3: meets all requirements		financial efficiency is high financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned?	-	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5)		N/A N/A	1.25 4.25	2.40 9.60	N/A N/A	Total Factored Score
HECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	4.25 60%	9.60 40%	N/A N/A	
HECK	100%	Factored Score	·	N/A	2.55	3.84	N/A	6.39
		Criticality Score					5%	0.32
		Building Structure						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	3.00	N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.33	3.00	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	30%	N/A	50%	20%	N/A	
		Factored Score		N/A	1.666666667	0.6	N/A	5.87
		Criticality Score					5%	0.29
		Pumps		N/A	Calculated	Coloniated	Calminted	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		1.00	1.00	Calculated 2.00	Calculated 5.00	Total Factored Score
		Weighted Final Score (1-25)		4.00	3.50	6.75	16.67	
HECK	100%	Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
		Factored Score	1.35	0.8	1.05	1.35	2.5	7.05
		Criticality Score					25%	1.76
		Piping & Valves		,		_		
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	Tatal Fastanad Casa
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
HECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	3.67 80%	N/A N/A	N/A N/A	
ILCK	100%	Factored Score		N/A	2.93333333	N/A	N/A	3.73
		Criticality Score				.97.	10%	0.37
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
· · · · · · · · · · · · · · · · · · ·		Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	2.80	3.33	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A N/A	40%	40% 1.33333333	N/A N/A	2.25
		Factored Score Criticality Score		N/A	1.12	1.33333333	N/A 20%	3.25 0.65
	+ + +	Other Critical Mechanical Equipment					20%	0.03
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
	+ + +	Unweighted Failure Mode Score (1-5)		N/A N/A	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.00	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	60%	N/A	20%	
		Factored Score		N/A	1.8	N/A	N/A	2.60
		Criticality Score					10%	0.26
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Corne
	+ + +	Unweighted Failure Mode Score (1-5)		N/A N/A	1.00 3.00	1.60 7.60	N/A N/A	Total Factored Score
HECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	3.00	7.60	N/A N/A	
TECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	1.8	1.52	N/A N/A	7.32
		Criticality Score		.4/	1.0	1.02		1.83
		Criticality Score					25%	1.83

	South Tahoe PUD	Location Description:	On Pioneer Trail	K/J Project Number:	1270004*00
	South fulloc 1 05	zocación zescripción	OTT OFFICE THAI	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1270004-00
	Water System Optimization Plan	Pump Station Facility ID #:	CCBP1 and CCBP2	Date:	3/8/2012
				Condition Assessment	
		Pump Station Facility Name:	Cold Creek Tank Booster Station (aka Upper Cold Creek BS)	Inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served:	Montgomery Estates	Adjacent Pressure Zones:	Stateline Zone

Failure Mode Type	Score	Importance Weighting (1-5) Weig	eighted Score	CONDITION ASSESSMENT CHECKLIST
				Pump Station Site
Fn	1	4	4.00	key O&M staff have access to site? Yes
Fn	1	4	4.00	adequate vehicle access for maintenance? Yes
R	3	3	9.00	is site within 100-yr flood plain? Yes this site is Designated as Zone AE which base flood elevations have been determined for the 100 year flood.
R	3	5	15.00	is site vulnerable to wildfires? Yes it is sitting next to the meadow
R	4	4	16.00	is site close to known active seismic faults? 2,000 ft. to the nearest fault
R	1	4	4.00	any unstable site conditions (if yes, describe)? None
R	1	4	4.00	site drainage adequate to prevent flooding of buildings and critical equipment? Yes
Fn	2	3	6.00 sit	ite lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? Single Forest Service gate to prevent entry to the site. This site is used as parking for the mountain bike trail heads at the back of the property
Fn	1	3	3.00	other known problems? None
	_			
				Building Structure
Fn	1	3	3.00	adequate security measures and monitoring to prevent unauthorized access? The building is locked
INFORMATION	N/A	N/A	N/A	date building was constructed? 1970
Fn	1	4	4.00	adequate equipment clearances to facilitate routine O&M? Yes
PM	2	4	8.00	condition of exterior coatings adequate to protect structure? The exterior paint on the metal building has flaked off in some locations, but is generally in good condition
Fn	1	3	3.00	adequate opinings for ingress/egress? Yes
Fn	1	3	3.00	interior lighting adequate for routine 0&M? Yes
Fn	1	4	4.00	building designed to withstand snow load and not create safety issue? Yes at the design loads at the time of construction
R	1	2	2.00	
R	1	4	4.00	building meets code compliance requirements? Yes as of the construction date known fire or haz-mat conditions that could be mitigated? None
	1	·	3.00	other known problems? None
Fn PM	4	3	16.00	estimated service life remaining? Exceeds AWU Useful Life
FIVI	4	4	10.00	Estimated service in exemanning: Educeds Awo Oseful Life
				Pumps
INFORMATION		21/2	21/2	
INFORMATION	N/A	N/A	N/A	no. of pumps? 2
INFORMATION	N/A	N/A	N/A	pump types? Centrifugal
INFORMATION	N/A	N/A	N/A	pump manufacturer? Peerless and Aurora
PM	1	3	3.00	pumps rebuilt (list year) and describe work done? New seals and bearings in 2012
FE	5		20.00	pump curves available for each unit? No
R	1	4	4.00	known history of pump/motor failures? If so, explain the nature of the failure(s). None
R	1	4	4.00	number of service calls/repairs in the last year? Rebuilt 2012
C	1	4	4.00	what is firm capacity of pump station based on flow test? Not Completed, but assume it is adequate since pump station has been rebuilt.
PM	3		12.00	coatings adequate to provide corrosion protection? Coatings deteriorated on pumps
FE	5		15.00	pumps operate efficiently (>70% bowl efficiency)? Not Completed
FE	5		15.00	motor high efficiency and no excessive noise? Not Completed
R	1	4	4.00	pumps operate free from excessive vibration? Yes
Fn	1		4.00	adequate NPSH available to prevent cavitation? Assumed yes
INFORMATION	N/A	N/A	N/A	dedicated fire pumps available (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	date of last fire-pump test (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	measured fire-pump capacity (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	standby power supply available for fire pumps (hydro pneumatic pumps stations only)? NA
R	5		15.00	spare parts readily available? NA
Fn	1	3	3.00	other known problems? NA
PM	3	4	12.00	estimated service life remaining? Estimate 10 years on pumps

				South Tahoe PUD	Location Description:	On Pioneer Trail	K/J Project Number:	1270004*00
				Water System Optimization Plan	Pump Station Facility ID #:	CCBP1 and CCBP2	Date:	3/8/2012
							Condition Assessment	
					Pump Station Facility Name:	Cold Creek Tank Booster Station (aka Upper Cold Creek BS)	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Montgomery Estates	Adjacent Pressure Zones:	Stateline Zone
				Piping & Valves				
Fn PM	1	4	4.00	pipe supports adequate to prevent movement or vibration?				
Fn	1	4	4.00 4.00	coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise or headloss?				
Fn	1	4	4.00	isolation valves provided for all pumps?	Yes			
Fn	1	3	3.00	valves are suitable for efficient and reliable service?				
Fn INFORMATION	N/A	N/A	2.00 N/A	chemical injection provided? type of chemical added?				
Fn	1	5	5.00	sample tap(s) provided to measure water quality?	Yes			
PM	1	4	4.00	estimated service life remaining?	30 years according to AWU Useful Life			
				Other Critical Mechanical Equipment				
INFORMATION	N/A	N/A	N/A	surge tank or surge anticipator valve condition?	NA .			
Fn	1	3	3.00	pressure relief valves?	Yes new pressure relief valve in 2012			
INFORMATION	N/A	N/A	N/A	chemical tanks onsite, volume, and secondary containment provided?	30 gal tanks with no secondary containment			
INFORMATION PM	N/A 1	N/A 4	N/A 4.00	chemical additives compliant with NSF 60? estimated service life remaining?	30 years according to AWU useful life			
	-				so years according to Arre ascrarine			
				SCADA system				
Fn	1	3	3.00	pump station flow meter is adequate to monitor pump performance?				
Fn Fn	1	2	2.00	flow totals recorded at regular intervals? How frequent? pressure instrumentation is adequate to monitor pump performance?				
Fn	1	4	4.00	automated alarm callout for critical failures and reliability?				
Fn	1	3	3.00		The alarm log is maintained but it is not review	ved annually		
INFORMATION R	N/A 1	N/A 4	N/A 4.00	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? communication system is reliable (approximate no. of comm. failures in last year)?		ce hooster nut hack into service		
R	1	3	3.00	adequate power (UPS) available to run all telemetry and instrumentation on main power failure?				
R	1	3	3.00			e at the District offices or readily through the manufacturer		
PM	1	4	4.00	estimated service life remaining?	Estimate 10 years based on AWU Useful Life			
				Electrical Power				
INFORMATION	N/A	N/A	N/A	standby generator size (kW)?	105kW			
R	5	5	25.00	adequate power available to run all equipment		ing an easement for Liberty Energy		
R	1	5	5.00	adequate standby power present and reliable?				
INFORMATION R	N/A 1	N/A 5	N/A 5.00	fuel storage capacity (gals)? fuel supply adequate for standby power service?				
R	N/A	3	N/A	time needed to mobilize portable generator?				
Fn	1	3	3.00	known electrical hazards that could be mitigated?	None			
R PM	<u>1</u> 5	3	3.00 20.00	spare parts/service support readily available? estimated service life remaining?				
r'IVI	ა	4	20.00	estimated service the remaining:	EXCECUS ANYO OSCIAI EIIC			
				Additional Data				
				Nameplate duty conditions (rated flow and head, nominal motor horsepower):				
INFORMATION					60HP, 3525 RPM 60HP, 3525 RPM			
INFORMATION INFORMATION			1	Pump No. 2 Pump No. 3	00NF, 3525 KPIVI			
INFORMATION				Pump No. 4				
				·	See Photo below of coupling which has no sup	port and is not seated correctly		
			-	1				
				Legend PM	Physical Mortality			
					Functionality			
					Reliability			
			-		Financial Efficiency			
				C	Capacity			
		1	1		ı			

	South Tahoe PUD	Location Description:	On Pioneer Trail	K/J Project Number: 1270004*00	
	Water System Optimization Plan	Pump Station Facility ID #:	CCBP1 and CCBP2	Date:	3/8/2012
		Pump Station Facility Name:	Cold Creek Tank Booster Station (aka Upper Cold Creek BS)	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served:	Montgomery Estates	Adjacent Pressure Zones:	Stateline Zone
	Photo Evidence for PM, Fn	n. R. FE			
	Those Exactle for this, the	,, 1,, 1, 1	PHOTOS		
2010/01	01+235-131 2010/01/01 12:15 PM	2010/01/01 12/16 PA	2010/01/01 12 16 PM		2010/01/01 12:16 PM

		South Tahoe PUD	Location Description	n: Black Bart Ct &	Rd 2421	K/J Project Numbe	er: 1270004*00	
		Water System Optimization Plan	Pump Station Facility ID	#: BLBTBP1, BLBTBP2, a	and BLBTBP3	Dat	-,)12
			Pump Station Facility Nam			Condition Assessme Inspecto		
			rump Station Facility Nam	Black Bart Bo	oster	Пізресто	Peter Lavallee a	па магк Gray
			Pressure Zones Serve	d: Montgomery Esta	ates Zone	Adjacent Pressure Zone	Stateline	Zone
		Notes: 1. Capacity score will be based on hydraulic model		Fail: Capacity	ure Mode Scoring (1 - 5)	rel of Service		
		For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	(see note 1)	functionality	reliability	— Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure every > 20 yrs	1: best available technology	
			minor defects only moderate deterioration	2: exceeds design requirement 3: meets design requirement	2: exceeds some requirements 3: meets all requirements	2: failure every 11 to 20 yrs 3: failure every 7 to 10 yrs	financial efficiency is high financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 6 yrs	4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Duman Chatian Cita						
	+ + +	Pump Station Site Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5		N/A	1.50	2.80	N/A	Total Factored Score
		Weighted Final Score (1-25	-	N/A	5.00	10.80	N/A	
	100%	Criticality Weighting Factor (0 - 100%		N/A	60%	40%	N/A	
	+ + + + + + + + + + + + + + + + + + + +	Factored Score Criticality Score		N/A	3	4.32	N/A 5%	7.32 0.37
		Building Structure					5%	0.37
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5		N/A	1.50	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25	20.00	N/A	4.83	3.00	N/A	
	100%	Criticality Weighting Factor (0 - 100%		N/A	50%	20%	N/A	
		Factored Score		N/A	2.42	0.6	N/A	9.02
		Criticality Score					5%	0.45
		Pumps Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5		1.00	1.00	1.50	3.67	Total Factored Score
		Weighted Final Score (1-25		4.00	3.50	5.25	12.67	
	100%	Criticality Weighting Factor (0 - 100%		20%	30%	20%	15%	
		Factored Score		0.8	1.05	1.05	1.9	5.90
		Criticality Score					25%	1.48
		Piping & Valves Is Failure Mode Score Calculated or Assigned		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5		N/A	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25		N/A	3.67	N/A	N/A	
	100%	Criticality Weighting Factor (0 - 100%		N/A	80%	N/A	N/A	
		Factored Score		N/A	2.93	N/A	N/A	4.13
		Criticality Score					10%	0.41
		SCADA System Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5	1.00	N/A	1.00	2.67	N/A	Total Factored Score
		Weighted Final Score (1-25		N/A	2.80	8.33	N/A	
	100%	Criticality Weighting Factor (0 - 100%		N/A	40%	40%	N/A	
		Factored Score		N/A	1.12	3.33	N/A	5.25
		Criticality Score					20%	1.05
		Other Critical Mechanical Equipment Is Failure Mode Score Calculated or Assigned		N/A	N/A	N/A	N/A	
	+ + +	Unweighted Failure Mode Score (1-5		N/A N/A	1.00	N/A N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25	1.00	N/A	1.00	N/A	N/A	
	100%	Criticality Weighting Factor (0 - 100%	20%	N/A	80%	N/A	N/A	
		Factored Score		N/A	0.8	N/A	N/A	1.00
		Criticality Score					10%	0.10
	 	Electrical Power Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-5		N/A N/A	1.00	2.00	N/A N/A	Total Factored Score
		Onweighted Failure Mode Store (1-5						
		Weighted Final Score (1-25	20.00	N/A	3.00	8.00	N/A	
	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%	20%	N/A	60%	20%	N/A	
	100%		20% e 4					7.40 1.85

			South Tahoe PUD	Location Description:	Black Bart Ct & Rd. 2421	K/J Project Number: 1270004*00	
			Water System Optimization Plan	Pump Station Facility ID #:	BLBTBP1, BLBTBP2, and BLBTBP3	Date:	3/8/2012
						Condition Assessment	
				Pump Station Facility Name:	Black Bart Booster	Inspectors:	Peter Lavallee and Mark Gray
				Pressure Zones Served:	Montgomery Estates Zone	Adjacent Pressure Zones:	Stateline Zone
Failure Mode Type	Score	Importance Weighting (1-5) Weighted Score		CONDITION ASSESSMENT CHECKLIST			
			Pump Station Site				

Failure Mode Type	Score	Importance	Weighted Score	CONDITION ASSESSMENT CHECKLIST		
ranure wode Type	30016	weighting (1-5)				
_			Pump Station Sit			
Fn	1	4	4.00 key O&M staff have access to site			
Fn	1	4	4.00 adequate vehicle access for maintenance			
R	5	3		? Yes this site is Designated as Zone AE which base flood elevations have been determined for the 100 year flood.		
R	3	5		? Yes it is adjacent to the meadow		
R	4	4	16.00 is site close to known active seismic fault			
R	1	4	4.00 any unstable site conditions (if yes, describe			
K	1	4	4.00 site drainage adequate to prevent flooding of buildings and critical equipmen	i There are no site dramage issues		
Fn	2	2	9.00 site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism	No there is no security around the perimeter of the site		
Fn	1	3	9.00 site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism 3.00 other known problem:	I None		
***	-		3.00	- 1.000		
			Building Structur	e		
Fn	1	3	3.00 adequate security measures and monitoring to prevent unauthorized access			
INFORMATION	N/A	N/A	N/A date building was constructed			
Fn	1	4	4.00 adequate equipment clearances to facilitate routine O&N	? Yes		
PM	5	4	20.00 condition of exterior coatings adequate to protect structure	? Coatings on the exterior of the metal building are starting to flake off		
Fn	1	3	3.00 adequate openings for ingress/egres:	? ² Yes		
Fn	1	3	3.00 interior lighting adequate for routine O&N	? Yes		
Fn	1	4	4.00 building designed to withstand snow load and not create safety issue	? The building was designed to the code of its time to handle snow load		
R	1	2		Met the requirements at the time of construction		
R	1	4	4.00 known fire or haz-mat conditions that could be mitigated			
Fn	4	3		? Insulation is starting to sag in the ceiling		
PM	5	4	20.00 estimated service life remaining	? Exceeds AWU Useful Life (rh) building needs major rehab work or complete replacment		
			Pump	s		
INFORMATION	N/A	N/A	N/A no. of pump:			
INFORMATION	N/A	N/A		? Centrifugal Pumps		
INFORMATION	N/A	N/A		7 #1 and #2 are Peerless Pumps, and #3 is Aurora		
PM	2	3	6.00 pumps rebuilt (list year) and describe work done	? Pump Number 3 rebuilt in 2007		
FE	5	4	20.00 pump curves available for each uni			
R	1	4	4.00 known history of pump/motor failures? If so, explain the nature of the failure(s			
R	1	4	4.00 number of service calls/repairs in the last yea			
С	1	4	4.00 what is firm capacity of pump station based on flow tes			
PM	1	4		? Exterior coatings of the parts are in excellent condition		
FE	5	3	15.00 pumps operate efficiently (>70% bowl efficiency			
FE	1	3	3.00 motor high efficiency and no excessive noise			
R	1	4	4.00 pumps operate free from excessive vibration			
Fn	1	4	4.00 adequate NPSH available to prevent cavitation			
INFORMATION	N/A	N/A	N/A dedicated fire pumps available (hydro pneumatic pump stations only			
INFORMATION	N/A	N/A	N/A all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only			
INFORMATION	N/A	N/A	N/A date of last fire-pump test (hydro pneumatic pump stations only			
INFORMATION	N/A	N/A	N/A measured fire-pump capacity (hydro pneumatic pump stations only			
INFORMATION	N/A	N/A	N/A standby power supply available for fire pumps (hydro pneumatic pump stations only			
R	3	3		? Order from a supply as there are no parts on hand		
Fn	1	3	3.00 other known problem:			
PM	3	4	12.00 estimated service life remaining	? Exceeds AWU Useful Life (rh) estimated useful life approx 5 years based on extreme low efficiency		

South Tahoe PUD Water System Optimization Plan Pump Station Facility ID #: BLETBP1, BLETBP2, and BLETBP3 Date: Pump Station Facility ID #: BLETBP1, BLETBP2, and BLETBP3 Condition Assessment Inspectors: Pump Station Facility Name: Black Bart Rooster Black Bart Rooster Inspectors: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones Condition Assessment Inspectors: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones Condition Assessment Inspectors: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones Condition Assessment Inspectors: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones Condition Assessment Inspectors: Adjacent Pressure Zones Condition Assessment Inspectors: Condition Assessment Inspectors: Condition Assessment Inspectors	3/8/2012 Peter Lavallee and Mark Gray Stateline Zone ———————————————————————————————————
Water System Optimization Plan Pump Station Facility ID #: BLBTBP1, BLBTBP2, and BLBTBP3 Date Condition Assessment Inspectors: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Adjacent Pressure Zones: Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Pressure Zones Adjacent Pressure Zones Adjacent Pressure Zones Adjacent Pressure Zones	Peter Lavallee and Mark Gray
Pump Station Facility Name: Pump Station Facility Name: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Pressure Zones: Pressure Zones Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjacent Pressure Zones: Adjace	Peter Lavallee and Mark Gray
Pump Station Facility Name: Pump Station Facility Name: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Piping & Valves Pi	
Pressure Zones Served: Montgomery Estates Zone Adjacent Pressure Zones: Piping & Valves	
Piping & Valves Fin 1 4 4.00 pipe supports adequate to prevent movement or vibration? Pipe supports are adequate PM 1 4 4.00 coatings adequate to protect piping and valves? Fin 1 4 4.00 pipes adequately sized to prevent exessive noise or headloss? Yes Fin 1 4 4.00 isolation valves provided for all pumps? Fin 1 3 3.00 valves are suitable for efficient and reliable service. None Fin 1 2 2.00 chemical injection provided? Ves INFORMATION N/A N/A N/A N/A N/A Surge tank or surge tank or	Stateline Zone
Piping & Valves Fin 1 4 4.00 pipe supports adequate to prevent movement or vibration? Pipe supports are adequate PM 1 4 4.00 coatings adequate to protect piping and valves? Fin 1 4 4.00 pipes adequately sized to prevent exessive noise or headloss? Yes Fin 1 4 4.00 isolation valves provided for all pumps? Fin 1 3 3.00 valves are suitable for efficient and reliable service. None Fin 1 2 2.00 chemical injection provided? Ves INFORMATION N/A N/A N/A N/A N/A Surge tank or surge tank or	Stateline Zone
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Fin 1 4 4.00 pipe supports adequate to prevent movement or vibration? PM 1 4 4.00 coatings adequate to protect piping and valves? Fin 1 4 4.00 pipes adequately sized to prevent excessive noise or headloss? Fin 1 4 4.00 pipes adequately sized to prevent excessive noise or headloss? Fin 1 3 3.00 valves are suitable for efficient and reliable service? Fin 1 2 2.00 chemical injection provided Fin 1 2 2.00 chemical injection provided Fin 1 5 5.00 sample tap(s) provided to measure water quality? F	
PM 1 4 4.00 coatings adequate to protect piping and valves? Fn 1 4 4.00 pipes adequately sized to prevent excessive noise or headloss? Fn 1 4 4.00 isolation valves provided for all pumps? Fn 1 3 3.00 valves are suitable for efficient and reliable service? Fn 1 2 2.00 chemical injection provided? Fn 1 5 5.00 sample tap(s) provided to measure water quality? Fn 1 5 5.00 estimated service life remaining? Fn 1 5 5.00 Sample tap(s) provided to measure water quality? Fn 1 5 5.00 sample tap(s) provided to measure water quality? Fn 1 5 5.00 Sample tap(s) provided to measure water quality? Fn 1 5 5.00 Sample tap(s) provided to measure water quality? Fn 1 5 5.00 Sample tap(s) provided to measure water quality? Fn 1 5 5.00 Sample tap(s) provided to measure water quality? Fn 1 5 5.00 Sample tap(s) provided to measure water quality? Fn 1 5 5.00 Sample tap(s) provided to measure water quality? Fn 2 4 8.00 Settinated service life remaining? Fn 2 5 5.00 Sample tap(s) provided to measure water quality? Fn 2 5 5.00 Sample tap(s) provided to measure water quality? Fn 3 5 5.00 Sample tap(s) provided to measure water quality? Fn 4 8.00 Settinated service life remaining? Fn 5 5.00 Sample tap(s) provided to measure water quality? Fn 6 5 5.00 Sample tap(s) provided to measure water quality? Fn 6 5 5.00 Sample tap(s) provided to measure water quality? Fn 6 5 5.00 Sample tap(s) provided to measure water quality? Fn 7 5 5 5.00 Sample tap(s) provided to measure water quality? Fn 6 5 5.00 Sample tap(s) provided to measure water quality? Fn 7 5 5 5.00 Sample tap(s) provided to measure water quality? Fn 8 5 5 5.00 Sample tap(s) provided to measure water quality? Fn 6 5 5 5.00 Sample tap(s) provided to measure water quality? Fn 8 5 5 5.00 Sample tap(s) provided to measure water quality? Fn 8 5 5 5.00 Sample tap(s) provided to measure water quality? Fn 8 5 5 5.00 Sample tap(s) provided to measure water quality? Fn 9 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
Fin 1 4 4.00 pipes adequately sized to prevent excessive noise or headloss? Fin 1 4 4.00 sisolation valves provided for all pumps? Fin 1 3 3.00 valves are suitable for efficient and reliable service? Fin 1 2 2.00 chemical injection provided? Fin 1 5 5.00 sample tap(s) provided to measure water quality? Fin 1 5 5.00 sample tap(s) provided to measure water quality? Fin 1 5 5.00 Some estimated service life remaining? Fin 1 5 N/A N/A N/A Surge tank or surge anticipator valve condition? Fin 1 5 N/A N/A N/A N/A Surge tank or surge anticipator valve condition? Fin 1 5 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	
Fn 1 2 2.00 chemical injection provided? Yes INFORMATION N/A N/A N/A N/A Surge tank or surge anticipator valve condition? N/A N/A N/A N/A N/A N/A Surge tank or surge anticipator valve condition? N/A N/A N/A N/A N/A N/A N/A Surge tank or surge anticipator valve condition? N/A N/A N/A N/A N/A N/A N/A N/A Surge tank or surge anticipator valve condition?	
Fn 1 2 2.00 Chemical injection provided? Yes INFORMATION N/A N/A N/A N/A N/A Sample tap(s) provided to measure water quality? Yes and turned down non-threaded Ps and turned Ps and turned Ps and turned Ps and turned Ps and turned Ps and turned Ps and turned Ps and turned Ps and turned Ps and turned Ps and turned Ps an	
INFORMATION N/A N/A N/A N/A type of chemical added? Fn 1 5 5.00 sample tap(s) provided to measure water quality? PM 2 4 8.00 estimated service life remaining? Other Critical Mechanical Equipment INFORMATION N/A N/A N/A N/A Surge tank or surge anticipator valve condition? NA N/A N/A N/A N/A N/A N/A Surge tank or surge anticipator valve condition? NA N/A N/A N/A N/A N/A N/A N/A Surge tank or surge anticipator valve condition?	
Fn 1 5 5.00 sample tap(s) provided to measure water quality? Yes and turned down non-threaded PM 2 4 8.00 estimated service life remaining? 15 years based on AWU Useful Life Other Critical Mechanical Equipment INFORMATION N/A N/A N/A N/A Surge tank or surge anticipator valve condition? NA	-
Other Critical Mechanical Equipment INFORMATION N/A N/A N/A N/A surge tank or surge anticipator valve condition? NA	
INFORMATION N/A N/A N/A N/A surge tank or surge anticipator valve condition? NA	
INFORMATION N/A N/A N/A N/A surge tank or surge anticipator valve condition? NA	
INFORMATION N/A N/A N/A chemical tanks onsite, volume, and secondary containment provided? NA INFORMATION N/A N/A N/A N/A chemical additives compliant with NSF 60? NA	
INFORMATION N/A N/A N/A N/A chemical additives compliant with NSF 60? NA PM 1 1 1.00 estimated service life remaining? NA- Lowest score of one given to prevent artificially lowered scores	
SCADA system	
Fn 1 3 3.00 pump station flow meter is adequate to monitor pump performance? Yes the flow meter is a Siemens mag meter installed in 2009	
Fn 1 2 2.00 flow totals recorded at regular intervals? How frequent? Daily and hand logged into log book Fn 1 2 2.00 pressure instrumentation is adequate to monitor pump performance? Yes	
Fin 1 4 4.00 automated alarm callout for critical failures and reliability? Yes and monitored by District Operations	
Fn 1 3 3.00 alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewed annually	
INFORMATION N/A N/A N/A type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio	
R 1 4 4.00 communication system is reliable (approximate no. of comm. failures in last year)? There have been no communication errors in the last year	
R 5 3 15.00 adequate power (UPS) available to run all telemetry and instrumentation on main power failure?	
R 2 3 6.00 spare parts/service support readily available? Spare parts for the SCADA system are available at the District offices or readily through the manufacturer	
PM 1 4 4.00 estimated service life remaining? Estimate 10 years based on AWU Useful Life	
Electrical Power	
INFORMATION N/A N/A N/A Standby generator size (kW)? NA	
R 1 5 5.00 adequate power available to run all equipment	
R 4 5 20.00 adequate standby power present and reliable? Yes with a portable generator	
INFORMATION N/A N/A N/A fuel storage capacity (gals)? NA	
R N/A 5 N/A fuel supply adequate for standby power service? NA R 3 3 9.00 time needed to mobilize portable generator? 1 hour or less due to proximity to main plant	
Fn 1 3 3.00 known electrical hazards that could be mitigated? None	
R 2 3 6.00 spare parts/service support readily available? Yes at District Plant	
PM 5 4 20.00 estimated service life remaining? NA	
Additional Data	
Nameplate duty conditions (rated flow and head, nominal motor horsepower):	
INFORMATION Pump No. 1 200gpm, 25HP	
INFORMATION Pump No. 2 200gpm, 25HP	
INFORMATION Pump No. 3 450gpm, 60HP INFORMATION Pump No. 4	
PUMP NO. 4	
Legend	
PM Physical Mortality	
Fn Functionality	
R Reliability FE Financial Efficiency	
C Capacity	

0004*00	K/J Project Number: 1270004*00	Black Bart Ct & Rd. 2421	Location Description:	South Tahoe PUD			
3/8/2012	Date:	BLBTBP1, BLBTBP2, and BLBTBP3	Pump Station Facility ID #:	Water System Optimization Plan			
	Condition Assessment						
Peter Lavallee and Mark Gray	Inspectors:	Black Bart Booster	Pump Station Facility Name:				
Stateline Zone	Adjacent Pressure Zones:	Montgomery Estates Zone	Pressure Zones Served:				
	Adjacent Pressure Zones:	Montgomery Estates Zone	Pressure Zones Served:				

Photo Evidence for PM, Fn, R, FE

PHOTOS











			T					
		South Tahoe PUD	Location Description	n: Cold Creek	Trail	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Pump Station Facility ID	#: CCBPUMP1 and C	ССВРИМР2	Date:	3/7/2	2012
			Pump Station Facility Name	Gold Coool Tool	. Donasta	Condition Assessment Inspectors:	Debastovalles	and Dhill Tage
			rump station racinty Name	e: Cold Creek Tank	Booster	inspectors.	Peter Lavallee a	nd Phill Torney
			Pressure Zones Served	d: Upper Montgome	ery Estates	Adjacent Pressure Zones:	Montgome	ery Estates
		Notes:		Fail	ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	- Physical Mortality	Capacity		el of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop		(see note 1)	functionality	reliability	,	
			new or excellent condition minor defects only	significantly exceeds design requirement exceeds design requirement	exceeds all requirements exceeds some requirements		best available technology financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	3: meets all requirements		3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		Pump Station Site						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
	+ +	Unweighted Failure Mode Score (1-5)	-	N/A	1.50	2.60	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	5.00	10.80	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	40%	N/A	
		Factored Score		N/A	3	4.32	N/A	7.32
		Criticality Score					5%	0.37
		Building Structure						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 3.00	N/A N/A	Calculated 2.83	Calculated 2.50	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	9.00	9.00	N/A N/A	701017 00107 00 0007 0
HECK	100%	Criticality Weighting Factor (0 - 100%)	30%	N/A	50%	20%	N/A	
		Factored Score		N/A	4.5	1.8	N/A	9.90
		Criticality Score					5%	0.50
		Pumps						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)		1.00	1.00	1.75	4.67	Total Factored Score
HECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	10.67 15%	4.00	3.50 30%	6.75	15.67 15%	
TECK	100%	Factored Score		0.8	1.05	1.35	2.35	7.15
		Criticality Score		-			25%	1.79
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	2.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	7.00	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	80% 5.6	N/A N/A	N/A N/A	8.40
		Criticality Score		IN/A	3.0	N/A	10%	0.84
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	1.20	1.33	N/A	Total Factored Score
<u> </u>		Weighted Final Score (1-25)	8.00	N/A	3.40	4.33	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	40%	40%	N/A	
		Factored Score Criticality Score		N/A	1.36	1.73	N/A 20%	4.69 0.94
		Other Critical Mechanical Equipment					20%	0.54
		Is Failure Mode Score Calculated or Assigned?		N/A	N/A	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)	1.00	N/A	1.00	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score		N/A	0.8	N/A	N/A	1.00
		Criticality Score					10%	0.10
		Electrical Power		1				
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.00	Calculated 0.80	N/A N/A	Total Factored Score
	+ +	Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	3.00	0.80 3.60	N/A N/A	rotal ractored score
HECK	100%	Criticality Weighting Factor (0 - 100%)		N/A N/A	60%	20%	N/A N/A	
		Factored Score	0.8	N/A	1.8	0.72	N/A	3.32
		A 14 19 A						
		Criticality Score					25% verall Total Factored Score (Out of 25) =	0.83 5.36

	South Tahoe PUD	Location Description:	Cold Creek Trail	K/J Project Number:	1270004*00
	Water System Optimization Plan	Pump Station Facility ID #:	CCBPUMP1 and CCBPUMP2	Date:	3/7/2012
				Condition Assessment	
		Pump Station Facility Name:	Cold Creek Tank Booster	Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Upper Montgomery Estates	Adjacent Pressure Zones:	Montgomery Estates

Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score	CONDITION ASSESSMENT CHECKLIST
				Pump Station Site
Fn	1	4	4.00	key O&M staff have access to site? Yes
Fn	1	4	4.00	adequate vehicle access for maintenance? Yes
R	3	3	9.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	5	5	25.00	is site vulnerable to wildfires? Yes the site is adjacent to a forest
R	3	4	12.00	is site close to known active seismic faults? 3,886 ft. to the nearest fault
R	1	4	4.00	any unstable site conditions (if yes, describe)? None
R	1	4	4.00	site drainage adequate to prevent flooding of buildings and critical equipment? Yes
Fn	3	3	9.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? No security around the site
Fn	1	3	3.00	other known problems? None
				Building Structure
Fn	5	3	15.00	adequate security measures and monitoring to prevent unauthorized access? The building is locked to prevent access
INFORMATION	N/A	N/A	N/A	date building was constructed? 1980
Fn	2	4	8.00	adequate equipment clearances to facilitate routine O&M? Yes
PM	3	4	12.00	condition of exterior coatings adequate to protect structure? It is a metal building and the paint on the exterior is in adequate condition
Fn	3	3	9.00	adequate openings for ingress/egress? Single door to enter which is adequate for this small pump station
Fn	3	3	9.00	interior lighting adequate for routine O&M? Yes
Fn	1	4	4.00	building designed to withstand snow load and not create safety issue? Yes and met the load requirements at the time of construction
R	1	2	2.00	building meets code compliance requirements? Met the code requirements at the time of construction
R	4	4	16.00	known fire or haz-mat conditions that could be mitigated? There is insulation that is deteriorating and falling from the ceiling which could create a fire danger
Fn	3	3	9.00	other known problems? None
PM	3	4	12.00	estimated service life remaining? Exceeds AWU Useful Life (rh) approx 10 yrs useful life until major maintenance required
				Pumps
INFORMATION	N/A	N/A	N/A	no. of pumps? 2
INFORMATION	N/A	N/A	N/A	pump types? Centrifugal Pumps - this is a hydro-pneumatic pump station
INFORMATION	N/A	N/A	N/A	pump manufacturer? Berkeley Pumps
PM	4	3	12.00	pumps rebuilt (list year) and describe work done? No rebuilds
FE	5	4	20.00	pump curves available for each unit? Yes
R	1	4	4.00	known history of pump/motor failures? If so, explain the nature of the failures(s). None
R	1	4	4.00	number of service calls/repairs in the last year? None
C PM	1	4	4.00 4.00	what is firm capacity of pump station based on flow test? 83 gpm based on flow test - need to verify location of flowmeter (upstream or downstream of hydropneumatic tank)
FE PM	5	3	15.00	coatings adequate to provide corrosion protection? coatings on the pumps are adequate
FE FE	4	3	12.00	pumps operate efficiently (>70% bowl efficiency)? wire-to-water efficiency 33% - unsure if accurate - verify placment of flowmeter motor high efficiency and no excessive noise? excessive noise?
R R	4	4	16.00	pumps operate free from excessive vibration? Yes, loud bang on pumps when first turning on but then no issues
Fn	1	4	4.00	adequate NPSH available to prevent cavitation? Yes, loud bang on pumps when first turning on but then no issues
INFORMATION	N/A	N/A	N/A	dedicated fire pumps available (hydro pneumatic pump stations only)? None
INFORMATION	N/A	N/A N/A	N/A	all fire pumps are UL/FM rated for fire service (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	date of last fire-pump test (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	measured fire-pump capacity (hydro pneumatic pump stations only)? NA
INFORMATION	N/A	N/A	N/A	standby power supply available for fire pumps (hydro pneumatic pump stations only)?
R	1	3	3.00	Standay power supply available for the pumps injury preuntatic princip statutor sorting. [Pumps to the pump statutor sorting pump in the station spare parts readily available?] Extra pump in the station
Fn	1	3	3.00	other known problems? None
PM	4	4	16.00	estimated service life remaining? Exceeds AWU Useful Life (rh) approx 5 years based on low efficiency and unusual noises at pump/motor assy
r ivi		7	10.00	Commence and the fermanning:
		1		

		ı					
			South Takes BUD	Location Description	Cold Coool Too!	K/J Project Number: 12	70004*00
			South Tahoe PUD	Location Description:	Cold Creek Trail	K/J Froject Number: 12	7/0004*00
			Water System Optimization Plan	Pump Station Facility ID #:	CCBPUMP1 and CCBPUMP2	Date:	3/7/2012
						Condition Assessment	
				Pump Station Facility Name:	Cold Creek Tank Booster	Inspectors:	Peter Lavallee and Phill Torney
						Adianat Danis 7	
				Pressure Zones Served:	Upper Montgomery Estates	Adjacent Pressure Zones:	Montgomery Estates
Fn	5	4		& Valves ryibration? Pipe supports are steel but are not bolted to the floor	or connected to the nine		
PM	5	4	20.00 coatings adequate to protect piping	and valves? Minimal coatings on the exterior of the pipes and coat	ngs have dings and scrapes		
Fn Fn	1	4		r headloss? Yes (rh) pipe arrangement is awkward which makes ma	intance difficult		
Fn Fn	1	3	4.00 isolation valves provided for 3.00 valves are suitable for efficient and relia				
Fn	3	2	6.00 chemical injectio	provided? None			
INFORMATION Fn	N/A 1	N/A 5	N/A type of chem 5.00 sample tap(s) provided to measure wa	ical added? NA			
PM	2	4		remaining? 28 years according to AWU Useful Life			
			Other Critical Mechanical Ec	uinmant			
INFORMATION	N/A	N/A	N/A surge tank or surge anticipator valve				
Fn	1	1	1.00 pressure r	lief valves? NA- Lowest score of one given to prevent artificially lo	wered scores		
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A chemical tanks onsite, volume, and secondary containmer N/A chemical additives compliant v				
PM	1	1		remaining? NA- Lowest score of one given to prevent artificially lo	vered scores		
			SCAD	A system			
Fn	1	3		•	2009 (rh) verify placement of flowmeter suitable to measure pump	output	
Fn	1	2		v frequent? Daily and hand logged into log book			
Fn Fn	1	4	2.00 pressure instrumentation is adequate to monitor pump pe 4.00 automated alarm callout for critical failures and	reliability? Yes and monitored by District Operations			
Fn	2	3	6.00 alarm log maintained and reviewe	d annually? The alarm log is maintained but it is not reviewed annu	ally		
INFORMATION R	N/A 1	N/A 4	N/A type of telemetry used (radio, fiber optic, leased line, cell mo 4.00 communication system is reliable (approximate no. of comm. failures i		ear		
- K	1	-	4.00 communication system is reliable (approximate not of communication	Yes there is a permanent backup generator within the			
R R	2	3	3.00 adequate power (UPS) available to run all telemetry and instrumentation on main po 6.00 spare parts/service support readii	ver failure? y available? Spare parts for the SCADA system are available at the I			
PM	2	4		remaining? Estimate 10 years based on AWU Useful Life	and the contest of reduity amongst the manufacture.		
				10			
INFORMATION	N/A	N/A		al Power r size (kW)? 20kW			
R	1	5	5.00 adequate power available to run al	equipment Yes			
R INFORMATION	1	5	5.00 adequate standby power present a 4.00 fuel storage cap	nd reliable? Yes acity (gals)? 50 gal			
R R	1	5	5.00 fuel supply adequate for standby pov	ver service? Yes			
R Fn	N/A 1	3	N/A time needed to mobilize portable				
R R	1	3	3.00 known electrical hazards that could be 3.00 spare parts/service support readii	v available? Yes at District's Main Plant			
PM	1	4		remaining? Exceeds AWU Useful Life (rh) appears to be well maint	ained, estimated useful life is 5 yrs until major rebuild required		
			Additio	nal Data			
			Nameplate duty conditions (rated flow and head, nominal motor h	orsepower):			
INFORMATION INFORMATION				Pump No. 1 45gpm,7.5hp, Pump No. 2 45gpm,7.5hp,			
INFORMATION				Pump No. 3			
INFORMATION				Pump No. 4	is not seated correctly		
				See Photo below of coupling which has no support and	is not seated correctly		
				Legend	l I	,	1
				PM Physical Mortality Fn Functionality			
				R Reliability			
				FE Financial Efficiency C Capacity			
				Сарасиу			
			Photo Evidence for P	M, Fn, R, FE			
					PHOTOS		

	South Tahoe PUD	Location Description:	Cold Creek Trail	K/J Project Number: 1270004*00	
	Water System Optimization Plan	Pump Station Facility ID #:	CCBPUMP1 and CCBPUMP2	Date:	3/7/2012
		Pump Station Facility Name:	Cold Creek Tank Booster	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Upper Montgomery Estates	Adjacent Pressure Zones:	Montgomery Estates
		_	FIIOTOS	•	
CANCER STREET,					

Appendix A2

Wells

South Tahoe PUD
Water System Optimization Plan
Summary of Well Condition and Capacity Evaluation

Failure Mode Scoring Summary - Criticality Scores

Supply Well -

						Supply Well -				
	California					Sanitary Seal,				Overall Total
	Waterworks		Building	Well	Piping &	Casing and	Wellhead		Electrical	Factored Score
Wells Facility ID #:	Standard	Well Site	Structure	Pump	Valves	Screen	Treatment	SCADA System	Power	(Out of 25) =
BVWLHD	0.47	0.26	0.26	1.16	0.32	1.51	0.64	0.21	1.06	5.87
BKWL	0.43	0.21	0.24	1.34	0.37	2.39	0.35	0.19	0.92	6.43
ARHDWL3	0.50	0.18	0.17	1.31	0.32	2.37	0.53	0.21	1.19	6.77
3658101	0.50	0.21	0.17	1.40	0.32	2.37	0.35	0.19	0.91	6.42
ECWLHD	0.50	0.21	0.26	1.40	0.32	2.07	0.44	0.19	0.69	6.06
VHWL	0.53	0.28	0.18	1.42	0.37	2.01	0.44	0.19	0.69	6.10
APRTWL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ATWL2	0.50	0.26	0.18	1.06	0.37	2.16	0.44	0.23	0.85	6.04
BRWL2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHRISWL	0.62	0.21	0.29	1.40	0.92	2.44	0.00	0.68	0.38	6.92
CLMTWL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CLGWL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GLWLHD5	0.50	0.18	0.18	1.29	0.34	2.07	0.53	0.18	0.73	6.00
HWLHD2	0.50	0.31	0.19	1.26	0.32	2.07	0.53	0.22	0.77	6.17
PLWLHD	0.54	0.19	0.18	1.20	0.32	2.24	0.53	0.17	1.09	6.44
SSWL	0.50	0.27	0.19	1.32	0.32	2.25	0.44	0.22	1.57	7.08
TLWL1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TLWL2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TLWL3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MVWL	0.66	0.31	0.23	1.73	0.86	2.38	0.44	0.22	1.57	8.38
MRTNWL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BVWLHD BKWL ARHDWL3 3658101 ECWLHD VHWL APRTWL ATWL2 BRWL2 CHRISWL CLMTWL CLGWL GLWLHD5 HWLHD5 HWLHD2 PLWLHD SSWL TLWL1 TLWL2 TLWL3 MVWL	Waterworks Standard	Waterworks Wells Facility ID #: Standard Well Site BVWLHD 0.47 0.26 BKWL 0.43 0.21 ARHDWL3 0.50 0.18 3658101 0.50 0.21 ECWLHD 0.50 0.21 VHWL 0.53 0.28 APRTWL 0.00 0.00 ATWL2 0.50 0.26 BRWL2 0.00 0.00 CHRISWL 0.62 0.21 CLMTWL 0.00 0.00 CLGWL 0.00 0.00 GLWLHD5 0.50 0.18 HWLHD2 0.50 0.31 PLWLHD 0.54 0.19 SSWL 0.50 0.27 TLWL1 0.00 0.00 TLWL2 0.00 0.00 MVWL 0.66 0.31	Wells Facility ID #: Standard Well Site Structure BVWLHD 0.47 0.26 0.26 BKWL 0.43 0.21 0.24 ARHDWL3 0.50 0.18 0.17 3658101 0.50 0.21 0.26 VHWL 0.53 0.28 0.18 APRTWL 0.00 0.00 0.00 ATWL2 0.50 0.26 0.18 BRWL2 0.00 0.00 0.00 CHRISWL 0.62 0.21 0.29 CLMTWL 0.00 0.00 0.00 CLGWL 0.00 0.00 0.00 GLWLHD5 0.50 0.18 0.18 HWLHD2 0.50 0.31 0.19 PLWLHD 0.54 0.19 0.18 SSWL 0.50 0.27 0.19 TLWL1 0.00 0.00 0.00 TLWL2 0.00 0.00 0.00 TLWL3 0.00	Wells Facility ID #: Standard Well Site Structure Pump BVWLHD 0.47 0.26 0.26 1.16 BKWL 0.43 0.21 0.24 1.34 ARHDWL3 0.50 0.18 0.17 1.31 3658101 0.50 0.21 0.26 1.40 VHWL 0.53 0.28 0.18 1.42 APRTWL 0.00 0.00 0.00 0.00 ATWL2 0.50 0.26 0.18 1.06 BRWL2 0.00 0.00 0.00 0.00 CHRISWL 0.62 0.21 0.29 1.40 CLMTWL 0.00 0.00 0.00 0.00 CLGWL 0.00 0.00 0.00 0.00 CLMTWL 0.00 0.00 0.00 0.00 GLWLHD5 0.50 0.18 0.18 1.29 HWLHD2 0.50 0.31 0.19 1.26 PLWLHD 0.54	Wells Facility ID #: Standard Well Site Structure Pump Valves BVWLHD 0.47 0.26 0.26 1.16 0.32 BKWL 0.43 0.21 0.24 1.34 0.37 ARHDWL3 0.50 0.18 0.17 1.31 0.32 3658101 0.50 0.21 0.26 1.40 0.32 VHWL 0.53 0.28 0.18 1.42 0.37 APRTWL 0.00 0.00 0.00 0.00 0.00 ATWL2 0.50 0.26 0.18 1.06 0.37 BRWL2 0.00 0.00 0.00 0.00 0.00 CHRISWL 0.62 0.21 0.29 1.40 0.92 CLMTWL 0.00 0.00 0.00 0.00 0.00 CLGWL 0.00 0.00 0.00 0.00 0.00 GLWLHD5 0.50 0.18 0.18 1.29 0.34 HWLHD2<	California Waterworks Building Structure Well Piping & Piping & Casing and Valves Sanitary Seal, Casing and Casing and Casing and Structure BVWLHD 0.47 0.26 0.26 1.16 0.32 1.51 BKWL 0.43 0.21 0.24 1.34 0.37 2.39 ARHDWL3 0.50 0.18 0.17 1.31 0.32 2.37 3658101 0.50 0.21 0.26 1.40 0.32 2.37 ECWLHD 0.50 0.21 0.26 1.40 0.32 2.07 VHWL 0.53 0.28 0.18 1.42 0.37 2.01 APRTWL 0.00 0.00 0.00 0.00 0.00 0.00 0.00 ATWL2 0.50 0.26 0.18 1.06 0.37 2.16 BRWL2 0.00 0.00 0.00 0.00 0.00 0.00 CHRISWL 0.62 0.21 0.29 1.40 0.92 2.44 CLIMTWL	Materworks Materworks Standard Well Site Structure Pump Pump Valves Casing and Valled Melle	California Waterworks Saulding Well Piping & Casing and Vellhead Standard St	Materworks Standard Well Site Structure Piping & Casing and Wellhead Structure Piping & Casing and Wellhead Structure Piping & Structure

		South Tahoe PUD	Location Description:	On San Francisco Dr. in the Al	Tahoe Neighborhood	K/J Project Numb	per: 1270004*00	
			·					
		Water System Optimization Plan	Wells Facility ID #:	BVWLHD)	Condition Assessm		012
			Wells Facility Name:	Bayview W	/ell	Inspecto		Glenn Roderick
			Pressure Zones Served:	Stateline Zo	one	Adjacent Pressure Zor	nes: Heavenly Valley, Keller, Twin Peaks,	and Montgomery Estates Zones
				Faile	ure Mode Scoring (1 - 5)			
		Notes: 1. Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Leve	of Service	Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	functionality 1: exceeds all requirements	reliability 1: failure every > 40 yrs	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 21 to 40 yrs	2: financial efficiency is high	
				greater than 90% of design requirements greater than 85% of design requirements	meets all requirements fails some requirements	3: failure every 11 to 20 yrs 4: failure every 5 to 10 yrs	financial efficiency is average financial efficiency is low	
				5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standar	d					
		Is Failure Mode Score Calculated or Assigned	? N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-		N/A	1.30	1.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-2: Criticality Weighting Factor (0 - 100%		N/A N/A	5.10 70%	3.75 30%	N/A N/A	
		Factored Final Scor	e N/A	N/A	3.57	1.125	N/A	4.70
		Criticality Scor					10%	0.47
		Well Sit		NI/A	Coloniana	Caladian	p./A	
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-5		N/A N/A	Calculated 1.67	Calculated 2.50	N/A N/A	Total Factored Score
		Weighted Final Score (1-25	N/A	N/A	3.33	9.25	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%	6) N/A	N/A	70%	30%	N/A	-2:
		Factored Final Scor Criticality Scor		N/A	2.33	2.775	N/A 5%	5.11 0.26
		Building Structur					5,2	V.20
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5		N/A	1.00	3.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-2: Criticality Weighting Factor (0 - 100%		N/A N/A	3.33 60%	9.00	N/A N/A	
CHECK	100%	Factored Final Scor		N/A	2	2.7	N/A	5.10
		Criticality Scor					5%	0.26
		Well Pum Is Failure Mode Score Calculated or Assigned		Calculated	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5		1.00	5.00	1.40	3.67	Total Factored Score
		Weighted Final Score (1-25	9.33	3.00	10.00	3.80	13.00	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Scor		20% 0.60	30% 3.00	20% 0.76	15% 1.95	7.71
		Criticality Scor		0.80	3.00	0.76	15%	1.16
		Piping & Valve						
		Is Failure Mode Score Calculated or Assigned		Calculated	Calculated	N/A	N/A	T-4-1 F4 d C
		Unweighted Failure Mode Score (1-5 Weighted Final Score (1-2		1.00 3.00	1.00 3.00	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%		60%	30%	N/A	N/A	
		Factored Final Scor	e 0.45	1.80	0.90	N/A	N/A	3.15
		Criticality Scor Supply Well - Sanitary Seal, Casing and Scree					10%	0.32
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5	5) 1.00	N/A	4.00	2.00	1.00	Total Factored Score
CHECK	100%	Weighted Final Score (1-2:		N/A N/A	14.50 50%	9.50 20%	3.00	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Scor		N/A N/A	7.25	1.90	0.60	10.08
		Criticality Scor	e				15%	1.51
		Wellhead Treatmen						
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-5		N/A N/A	Calculated 1.60	Calculated 2.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-2	N/A	N/A	5.80	2.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%	6) N/A	N/A	60%	40%	N/A	
		Factored Final Scor Criticality Scor		N/A	3.48	0.80	N/A 15%	4.28 0.64
		SCADA Syster					1370	0.04
		Is Failure Mode Score Calculated or Assigned	? Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5		N/A	1.40	2.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-2: Criticality Weighting Factor (0 - 100%		N/A N/A	4.00 60%	4.33 30%	N/A N/A	
CITECK	100/0	Factored Final Scor		N/A	2.40	1.30	N/A	4.10
		Criticality Scor	e				5%	0.21
		Electrical Powe		N/A	Colomba 1	Coloni t 1	21/4	
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-5		N/A N/A	Calculated 1.00	Calculated 3.20	N/A N/A	Total Factored Score
		Weighted Final Score (1-2	4.00	N/A	3.00	13.60	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%	5) 20%	N/A	60%	20%	N/A	
		Factored Final Scor Criticality Scor		N/A	1.80	2.72	N/A 20%	5.32 1.06
		Criticality Scor	-				Overall Total Factored Score (Out of 25) =	1.06 5.87

	South Tahoe PUD	Location Description:	On San Francisco Dr. in the Al Tahoe Neighborhood	K/J Project Number:	1270004*00
	Water System Optimization Plan	Wells Facility ID #:	BVWLHD	Date:	2/22/2012
				Condition Assessment	
		Wells Facility Name:	Bayview Well	Inspectors:	Peter Lavallee and Glenn Roderick
		Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Heavenly Valley, Keller, Twin Peaks, and Montgomery Estates Zones

Failure Mode		Importance		CONDITION ASSESSMENT CHECKLIST
Type	Score (1 - 5)		Final Score	CONDITION ASSESSMENT CHECKLIST
7,-				Calif. Waterworks Standards
R	1	4	4	compliant with Calif. DWR Bulletin 74-817 Yes
R	1	4	4	compliant with AWWA Standards A100-06 (wells)? Yes
Fn	1	3	3	adequate equipment clearances to facilitate routine O&M? There are adequate clearances for work to be performed
Fn	1	4	4	equipment accessible for removal? Yes the well is outside under a fake landscaping rock. All internal piping and mechanical would be removed through double doors.
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment? No site drainage issues
Fn	1	3	3	wellhead minimum 18" above finished grade or floor? Well head is 21" above the floor
R	1	2	2	well electrical controls not in vault? Well electrical controls are within the building
Fn	1	3	3	well equipped with ability to add chlorination facilities? Yes
				sample taps available to obtain water quality prior to disinfection (between wellhead and check valve) and after disinfection?
- Fn	1	4	4	valve) and after disinfection?
Fn Fn	2	5	10	sample tap non-threaded downed-turned? Both sample taps are down turned. Tap before chlorination has no threads but the tap after chlorination is a threaded brass nipple.
Fn Fn	3	5	15	bact i sample tap not screened or aerated? It is not screened or aerated well able to be pumped to waste with waste discharge line protected from backflow? Discharge to lay flat hoses to sanitary sewer with air gap
Fn Fn	1	3	3	wen able to be pumped to waste with waste discharge line protected from boschioly. Business to samilarly sever with all gap well meter provided; The well has a Siemens mag meter
Fn Fn	1	4	4	Well meter provided? The went has a siemens mag meter chemical additives NSF 60 compliant? Yes
- '''	*	7		oromon doubtrear of 30 companies
				Well Site
Fn	1	2	2	adequate vehicle access for year-round maintenance Yes
R	1	3	3	aucquate venture access for year-industry manners and the state of the
R	4	4	16	is site vulnerable to wildfires? [Yes the proximity to the meadow and vacant wooded lots behind increase the vulnerability to wildfires
R	4	4	16	is site close to known active seismic faults? Closest fault line is 5780 feet away
R	1	2	2	any unstable site conditions (if yes, describe)? No known unstable site conditions
				site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? No site fencing around property. The facility was designed to look like a single family dwelling which reduces unauthorized access to the site
Fn	1	2	2	access/vandalism?
Fn	3	2	6	other known problems? the district has received noise complaints from the adjacent property owners
				Building Structure
Fn	1	3	3	adequate security measures and monitoring to prevent unauthorized access? There are intrusion alarms on the doors which are tied to SCADA and monitored by District Operations
INFORMATION	N/A	N/A	N/A	date building was constructed? 2006
PM	1	3	3	condition of exterior coatings adequate to protect structure? Yes the building is still in like new condition.
Fn	1	4	4	adequate openings for ingress/egress? There is adequate openings for ingress/egress
Fn Fn	1	3	3	interior lighting adequate for routine O&M? The lighting is adequate to perform work
Fn Fn	1	2	2	building designed to withstand snow load and not create safety issue? The building is designed for snow loads building meets code compliance requirements? building meets the building code requirements of 2006
FII R	3	3	9	building meets code compliance requirements, business are ununing toole requirements of 2000 known fire or haz-mat conditions that could be mitigated. There are trees within 10 feet of the structure known fire or haz-mat conditions that could be mitigated. There are trees within 10 feet of the structure.
Fn	1	4	4	other known problems with the building structure
PM	1	5	5	estimated service life remaining? 24 years based on AWU Useful Life
	-	1 1		
				Well Pump
INFORMATION	N/A	N/A	N/A	pump type/ Submersible
INFORMATION	N/A	N/A	N/A	pump raput Section Pump raput Pump rap
INFORMATION	,	3	0	pump capacity] 3898gpm @340ft TDH
PM	1	4	4	pump rebuilt (list year) and describe work done; None since installed
Fe	1	4	4	pump curves available? Yes
R	1	2	2	known history of pump/motor failures? If so, explain the nature of the failure(s). No pump and motor failures have occurred since the well was put into production
R	1	2	2	number of service calls/repairs in the last year? None
INFORMATION		3	0	what is firm capacity of well pump based on flow test? 3513gpm at 105psi and 1716RPM
С	1	3	3	Does zone serviced by pump have adaquate capacity to be served? Evaluation in block diagram
PM	5	4	20	coatings adequate to provide corrosion protection? coatings on pump could not be evaluated as the pump was in operation but they were installed in 2006
Fe	5	5	25	pumps operate efficiently (>70% bowl efficiency) insufficient data
R	1	4	4	pumps operate free from excessive vibration? No concerns with excessive vibration on this pump
Fn	5	2	10	adequate NPSH available to prevent cavitation? insufficient data
Fe	5	2	10	motor high efficiency and no excessive noise? insufficient data
R R	3	2	6	spare parts readily available? No parts for pump in stock. The pump would need to be pulled and the failure part identified and ordered other known problems? No other known problems with the pump
R PM	1	5	5	other known problems / No other known problems with the pump estimated service life remaining? 24 years based on AWU Useful Life
■ PIVI	1	4	4	estimated service me remaining r ₁ 24 years based on AWO Userui Life

				South Tahoe PUD	Location Description:	On San Francisco Dr. in the Al Tahoe Neighborhood	K/J Project Number: 12	70004*00
				Water System Optimization Plan	Wells Facility ID #:	BVWLHD	Date:	2/22/2012
					Wells Facility Name:	Bayview Well	Condition Assessment Inspectors:	Peter Lavallee and Glenn Roderick
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Heavenly Valley, Keller, Twin Peaks, and Montgomery Estates Zones
							,	, , , , , , , , , , , , , , , , , , , ,
_		_		Piping & Valves			and otherwise	
Fn PM	1	5	5			and grouted beneath the bolt plates. They are adequate to prevent movement iping and there were no visual defects on the exterior of the piping	and vibration	
C	1	3	3	pipes adequately sized to prevent excessive noise or headloss?		ping and there were no visual defects on the extensi of the piping		
Fn	1	2	2	valves are suitable for efficient and reliable service?	Valves are suitable and the District has had no i	issues with them since they were installed in 2006		
PM	1	4	4	estimated service life remaining?	54 years for steel pipe based on AWU Useful Lif	fe		
				Supply Well - Sanitary Seal, Casing and Screen				
PM	1	3	3		Yes no issues since construction			
PM Fe	1	3	3	well screen is in good condition? well-driller's log is available?	Yes no issues since construction Yes			
R	1	4	4	50 ft. sanitary seal?				
R	3	5	15	safe distance from known groundwater contamination hazards (MTBE, TCE, etc.)?		ion, sentinel wells over 2,250 feet away have indicated an MTBE plume		
INFORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted?				
PM Fn	3	3	9	last year well was redeveloped? sounding tube or other means to measure depth to water surface?		termine suction HGI		
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack?		termine suction rige		
PM	1	5	5		Typical useful life for a well 50 years. 44 yrs ren	maining useful life		
				Wellhead Treatment				
Fn F-	1	2	2	chemical storage tanks have secondary containment?		that cumplies the codium hypochlorite		
Fn Fn	1 1	3	3	if multiple chemicals used, adequate separation of different chemicals?	There are no visual defects in the piping/tubing NA only one disinfectant	g that supplies the social hypochionte		
Fn	3	4	12			When this occurs the pump would be replaced with an in stock pump while it w	as being recalibrated	
Fn	2	5	10		The dosage is checked and adjusted daily and w	· · · · · · · · · · · · · · · · · · ·		
R	2	1	2	spare parts and service support readily available?				
INFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)?	Sociali hypochionice with two tanks at Soogaile	ons each		
				SCADA system				
Fn	1	4	4	pump flow meter is adequate to monitor pump performance?	Yes the Siemens mag meter is hooked up to SCA	ADA		
Fn	2	1	2	flow totals recorded at regular intervals? How frequent?	the flow totals are recorded daily by hand	1 Ab - 4		
Fn Fn	1	4	2	pressure instrumentation is adequate to monitor pump performance? automated alarm callout for critical failures and reliability?		i that monitor system pressures		
Fn	2	4	8		The alarm log is maintained but it is not reviewe	red annually		
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	Radio			
R	1	2	2	communication system is reliable (approximate no. of comm. failures in last year)?				
R	4	2		uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power failure?		e brought to the site in the event of a power outage		
R	1	3	3		Parts are readily available through the manufac	cturer or at the District offices		
PM	1	4	4	estimated service life remaining?	6 years based on AWU Useful Life			
				Electrical Power				
INFORMATION	N/A	N/A	N/A	standby generator size (kW)?	NA			
R	1	5	5		There is adequate power to run all of the equip			
R INFORMATION	5 N/A	5 N/A	25 N/A	adequate standby power present and reliable? fuel storage capacity (gals)?		enerator would need to be mobilized to the site. However, there are no quick ho	ockups for power at this site so wiring the portable	e generator in would take some additional time
R R	4	N/A 5	N/A 20	fuel supply adequate for standby power service?				
R	5	3	15			depending on the conditions. However, hookup of the portable generator could	d take additional time	
Fn	1	3	3			Flash assessment and labeling was just completed		
R PM	1	3	3 4		Spare parts are readily available at the District of 19 years based on AWU Useful Life	οπices or through the manufacturer		
PIVI	1	4	4	estimated service life remaining?	13 years based on AWO Oserul Life			
				Additional Data				
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):				
				Legend	Physical Mortality			
					Functionality			
				R	Reliability			
					Financial Efficiency			
				C	Capacity			

	South Tahoe PUD	Location Description:	On San Francisco Dr. in the Al Tahoe Neighborhood	K/J Project Number:	1270004*00
	Water System Optimization Plan	Wells Facility ID #:	BVWLHD	Date:	2/22/2012
		,		Condition Assessment	
		Wells Facility Name:	Bayview Well	Inspectors:	Peter Lavallee and Glenn Roderick
		Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Heavenly Valley, Keller, Twin Peaks, and Montgomery Estates Zones

Photo Evidence for PM, Fn, R, FE

PETER - PHOTO ON FAR RIGHT WITH BLUE PIPE WE BELIEVE IT GOES TO ANOTHER WELL SITE AS OTHER PHOTOS SHOW BLACK PIPE - Tim Williams
TIM- IT IS THE LIGHTING IN THE ROOM. PLEASE SEE THE AIR RELEASE IN THE PICTURE JUST NEXT TO IT FOR COMPARISON. I THOUGHT YOU WERE RIGHT TILL I WENT BACK TO THE STATION!

PHOTOS











		South Tahoe PUD	Location Description:	Bakersfield	d Dr.	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID #	BKWL		Date:	2/23/2	2012
			·			Condition Assessment		
			Wells Facility Name	Bakersfield	Well	Inspectors:	Peter Lavallee a	nd Phill Torney
			Pressure Zones Served	Arrowhe	ead	Adjacent Pressure Zones:	Flagpole, Country Club, Iroquoi	s, and Christmas Valley Zones
				P.:	lous Basiles Cassiles (A. F.)			
		Notes: 1. Capacity score will be based on hydraulic model	Physical Mortality	Capacity	lure Mode Scoring (1 - 5)	of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records	1: new or excellent condition	1: meets or exceeds design requirements	functionality 1: exceeds all requirements	reliability	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 21 to 40 yrs	2: financial efficiency is high	
			moderate deterioration significant deterioration	greater than 90% of design requirements greater than 85% of design requirements	meets all requirements fails some requirements		financial efficiency is average financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standard						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A N/A	N/A N/A	1.20 4.60	1.00 3.75	N/A N/A	Total Factored Scor
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
		Factored Final Score	N/A	N/A	3.22	1.125	N/A	4.35
		Criticality Score Well Site					10%	0.43
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	1.33	2.25	N/A	Total Factored Sco
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	N/A N/A	N/A N/A	2.67 70%	8.00 30%	N/A N/A	
		Factored Final Score	N/A	N/A	1.87	2.4	N/A	4.27
		Criticality Score Building Structure					5%	0.21
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	1.50	N/A	1.17	2.00	N/A	Total Factored Sco
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	6.50 10%	N/A N/A	3.83 60%	6.00 30%	N/A N/A	
CHECK	100%	Factored Final Score	0.65	N/A	2.3	1.8	N/A	4.75
		Criticality Score					5%	0.24
		Well Pump Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)	3.00	1.00	5.00	1.40	5.00	Total Factored Scor
0115014	1000/	Weighted Final Score (1-25)	12.00 15%	3.00	10.00 30%	3.80 20%	18.33 15%	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	1.80	0.60	3.00	0.76	2.75	8.91
		Criticality Score					15%	1.34
		Piping & Valves				1 21/4	N/A	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 2.00	Calculated 1.00	Calculated 1.00	N/A N/A	N/A N/A	Total Factored Scor
		Weighted Final Score (1-25)	9.50	3.00	3.00	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	10% 0.95	60% 1.80	30% 0.90	N/A N/A	N/A N/A	3.65
		Criticality Score		1.00	0.50	N/A	10%	0.37
· · · · · · · · · · · · · · · · · · ·		Supply Well - Sanitary Seal, Casing and Screen						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 5.00	Calculated 3.00	N/A 5.00	Total Factored Scor
		Weighted Final Score (1-25)	12.50	N/A	17.50	14.50	15.00	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	50%	20%	20%	4=00
		Factored Final Score Criticality Score		N/A	8.75	2.90	3.00 15%	15.90 2.39
		Wellhead Treatment						
-		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Scor
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A N/A	N/A N/A	1.00 3.20	1.00	N/A N/A	Total Pationed 300
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	
		Factored Final Score Criticality Score		N/A	1.92	0.40	N/A 15%	2.32 0.35
		SCADA System					15/0	0.55
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	2.00 8.00	N/A N/A	1.00 3.33	1.33 3.33	N/A N/A	Total Factored Scor
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	3.33	N/A N/A	
		Factored Final Score		N/A	2.00	1.00	N/A	3.80
		Criticality Score Electrical Power					5%	0.19
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	1.00	1.50	N/A	Total Factored Sco
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	8.00 20%	N/A N/A	3.00 60%	6.00 20%	N/A N/A	
CITECK	100/6	Factored Final Score		N/A	1.80	1.20	N/A	4.60
							20%	

				South Tahoe PUD	Location Description:	Bakersfield Dr.	K/J Project Number: 127	0004*00
				Water Contain Ontinian Disc	W-U- 5		Patri	2/24/24
				Water System Optimization Plan	Wells Facility ID #:	BKWL	Date:	2/23/2012
					Wells Facility Name:	Bakersfield Well	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
					vens ruente rume.	Bukersheld Well	mspectors.	recer Edvance and Timi Torriey
					Pressure Zones Served:	Arrowhead	Adjacent Pressure Zones:	Flagpole, Country Club, Iroquois, and Christmas Valley Zones
					-			
						COMPLETION ACCESSATING CHECKLIST		
Failure Mode Type	Score (1 - 5)	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
	•			Calif. Waterworks Standards				
R	1	4	4	compliant with Calif. DWR Bulletin 74-81?				
R Fn	1	3	3	compliant with AWWA Standards A100-06 (wells)? adequate equipment clearances to facilitate routine O&M?		equipment		
Fn	1	4	4			ccess to pump and motor for well is removed through a roof hatch by cra	ne which has adequate parking next to the building for set	ир
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn R	1	3	3 2	wellhead minimum 18" above finished grade or floor?	The well electrical controls are located outsid			
Fn	1	3	3	wall aguinned with ability to add chlorination facilities?	The well is currently equipped to direct inject	sodium hypochlorite		
_				sample taps available to obtain water quality prior to disinfection (between wellhead and check valve) and after disinfection?	Sample taps are available before and after di	sinfection		
Fn Fn	1	4 5	4 5		sample taps are copper, turned down, and no			
Fn	3	5	15		bacti sample tap is not screened or aerated			
_		_	_				ant and then lay flat hose to the sanitary sewer system wit	h an air gap. There is also a port just above the wellhead to attach a lay flat
Fn Fn	1	2	3	well able to be pumped to waste with waste discharge line protected from backflow?	The well is metered with a Siemens mag meter			
Fn	1	4	4		Yes the facility has no constraints around the			
Fn	1	2	2	Well Site adequate vehicle access for year-round maintenance?	Vac			
R	2	3	6	is site within 100-yr flood plain?	No. This site is indicated as other areas Zone	D on the FEMA flood map. Which means flood hazards are undetermined	but possible.	
R	2	4	8			treet from the site that is part of a larger forested area and state park		
R R	1	2	16 2	is site close to known active seismic faults? any unstable site conditions (if yes, describe)?				
K	<u> </u>			site lighting, fencing, and security monitoring adequate to discourage unauthorized	No site security with minimal lighting. The fac	ility was designed to look like a home which reduces notential for unauth	orized access	
Fn	2	2	4			anty was designed to look like a notife which reduces potential for diladiti	011204 400033	
Fn	1	2	2	other known problems?	No other known problems			
				Building Structure				
Fn	2	3	6	adequate security measures and monitoring to prevent unauthorized access?		ng is secured with door lock that utilizes the District Cyber Keys		
INFORMATION PM	N/A	N/A	N/A	date building was constructed?		the paint appears to still be in good condition. The siding is T-111 and the	roof is asphalt shingles.	
Fn	1	4	4	adequate openings for ingress/egress?		3		
Fn	1	3	3	interior lighting adequate for routine O&M?		1		
Fn Fn	1	2	2	building designed to withstand snow load and not create safety issue? building meets code compliance requirements?				
R	2	3	6	known fire or haz-mat conditions that could be mitigated?	Proximity of the few trees that remain on the	lot		
Fn PM	2	4 5	4 10	·	No other known problems with the building s 12 years based on AWU Useful Life Table	structure		
LIAI		3	10	esumated service life remaining?	12 years based on Avvo Oseidi Life Table			
				Well Pump				
INFORMATION	N/A	N/A	N/A	pump type?				
INFORMATION INFORMATION	N/A	N/A 3	N/A 0	pump manufacturer? pump capacity?	1290 gpm based on flow test @ 56 Hz			
PM	2	4	8	pump rebuilt (list year) and describe work done?	the pump has not been rebuilt since installati	ion		
Fe R	5 1	4 2	20	pump curves available? known history of pump/motor failures? If so, explain the nature of the failure(s).	Pump Curves are available for review.			
R R	1	2	2	number of service calls/repairs in the last year?				
INFORMATION		3	0	what is firm capacity of well pump based on flow test?	1290 gpm			
C Pm	5	3 4	3 20	Does zone serviced by pump have adaquate capacity to be served?		ion of coatings not possible at this time with the pump being submerged v	within the well	
Fe	5	5	25	pumps operate efficiently (>70% bowl efficiency)		2		
R	1	4	4			tion and have not caused a problem at this well.		
Fn Fe	5	2	10 10	adequate NPSH available to prevent cavitation? motor high efficiency and no excessive noise?				
R	3	2	6	spare parts readily available?	No parts available in District offices but parts			
R	1	5	5		No other known problems with pumps and m	notors		
PM	2	4	8	estimated service life remaining?	12 years based on AWU Useful Life			

				South Tahoe PUD	Location Description:	Bakersfield Dr.	K/J Project Number: 12	270004*00
				Water System Optimization Plan	Wells Facility ID #:	BKWL	Date:	2/23/2012
					Wells Facility Name:	Bakersfield Well	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
					Dunasura Zanas Camuado		Adjacent Proceure Zones	
					Pressure Zones Served:	Arrowhead	Adjacent Pressure Zones:	Flagpole, Country Club, Iroquois, and Christmas Valley Zo
-					7			
_		_		Piping & Valves				
Fn PM	3	4 5	4 15		Pipe supports are steel that are bolted to the concrete floorCoating has started flaking and peeling away from the pipe ir	locations on exterior of pipe. Some rust has started	developing. See photos	
С	1	3	3	pipes adequately sized to prevent excessive noise or headloss?	Pipes are adequately sized			
Fn	1	2	2		? Valves are reliable and in like new condition and are the origi	nal installed valves. Coatings on valves also look to b	e in good condition with no visual defects	
PM	1	4	4	estimated service life remaining.	? 42 years based on AWU Useful Life Table			
				Supply Well - Sanitary Seal, Casing and Screen				
PM	5	3	15	well casing is in good condition				
PM Fe	5	3	15 15	well screen is in good condition? well-driller's log is available?				
R	1	4	4	50 ft. sanitary seal				
R	5	5	25	safe distance from known groundwater contamination hazards (MTBE, TCE, etc.)?	? MTBE has been identified as a contaminant in this well and to	reatment was put in place at this wellhead if the leve	ls rose above the current policy levels. Arsenic is also a potent	ial contaminant in this well.
FORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted				
PM Fn	5 5	2	10 15	last year well was redeveloped sounding tube or other means to measure depth to water surface:				
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack				
PM	2	5	10		? Typ well 50 yrs. 38 years of remaining useful life			
Fn	1	2	2	Wellhead Treatment chemical storage tanks have secondary containment:	-			
Fn	1	2	2		? chemical piping and tubing is in good condition and bulk sodi	um hypochlorite storage was added in 2010		
Fn	1	3	3	if multiple chemicals used, adequate separation of different chemicals				
Fn	1	4	4		? No calibration is done on the pump other than dosing calibra	tion		
Fn R	1	5	5	spare parts and service support readily available?	Pose is observed and modified daily Yes in District offices			
NFORMATION	N/A	N/A	N/A		? Direct Injection Sodium Hypochlorite with a 300 gal storage t	ank.		
				SCADA system				
Fn	1	4	4	pump flow meter is adequate to monitor pump performance				
Fn	1	1	1	flow totals recorded at regular intervals? How frequent				
Fn	1	2	2	pressure instrumentation is adequate to monitor pump performance				
Fn Fn	1	4	4	automated alarm callout for critical failures and reliability	? Alarm log is maintained but is not reviewed annually			
NFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)				
R	1	2	2	communication system is reliable (approximate no. of comm. failures in last year)?		d		
R	1	2	2	uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power	Permanent backup generator on site			
R	2	3	6		? Spare parts are available at the District offices and through t	ne manufacturer		
PM	2	4	8	estimated service life remaining	P Estimated 10 year service life remaining.			
				Floridad Bound	_			
NFORMATION	N/A	N/A	N/A	Electrical Power standby generator size (kW)?				
R	1	5	5		t There is adequate power to run all equipment			
R	1	5	5		? The standby power was designed to run all equipment within	the well building		
NFORMATION	N/A	N/A	N/A 5	fuel storage capacity (gals)				
R IFORMATION	1 N/A	5 N/A	5 N/A	fuel supply adequate for standby power service time needed to mobilize portable generator				
Fn	1	3	3		? No known electrical hazards and the arc flash labels have bee	en placed in this facility		
R	3	3	9	spare parts/service support readily available	Popare parts are available from the manufacturer			
PM	2	4	8	estimated service life remaining	7 years based on AWU Useful Life			
				Additional Data	a			
NFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower)				
				Legenc	d			
			<u> </u>		/ Physical Mortality n Functionality			
		1	1	Į Fr	III ancionality			
					R Reliability			
				·	R Reliability E Financial Efficiency			

South Tahoe PUD	Location Description:	Bakersfield Dr.	K/J Project Number:	1270004*00
Water System Optimization Plan	Wells Facility ID #:	BKWL	Date:	2/23/2012
			Condition Assessment	
	Wells Facility Name:	Bakersfield Well	Inspectors:	Peter Lavallee and Phill Torney
	Pressure Zones Served:	Arrowhead	Adjacent Pressure Zones:	Flagpole, Country Club, Iroquois, and Christmas Valley Zor
Photo Evidence for PM, Fn, R, FE				
		PHOTOS		
2011/05/06 11:8	56 AM	2011/05/06 11:56/A		2011/05/06 11:57 A

		South Tahoe PUD	Location Description:	Corner of Arrowhead Ave. and Hopi	Ave, 1961 Arrowhead Ave	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	ARHDWL3	1	Date:	3/8/	/2012
			Wells Facility Name:	Arrowhead We	ell #3	Condition Assessment Inspectors:	Peter Lavallee	and Mark Gray
			Pressure Zones Served:	Arrowhead Zo	one	Adjacent Pressure Zones:	Christmas Valley, Iroquo	is, and Country Club Zones
						-		
		Notes:	Dharlad Mandalla		re Mode Scoring (1 - 5)	of Service	Floorist Fff storm	
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	reliability	_ Financial Efficiency	
			1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 40 yrs	1: best available technology	
				2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 21 to 40 yrs	2: financial efficiency is high	
				3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 20 yrs	3: financial efficiency is average	
				4: greater than 85% of design requirements	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standard						
				NI/A	Calculated	Calculated	N/A	
	+ +	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.40	Calculated 1.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A N/A	5.60	3.75	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	70%	30%	N/A	
	100,0	Factored Final Score		N/A	3.92	1.125	N/A	5.05
		Criticality Score	•				10%	0.50
		Well Site						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	2.00	N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	2.00	7.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
		Factored Final Score		N/A	1.4	2.1	N/A	3.50
		Criticality Score					5%	0.18
		Building Structure						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.33	3.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	30%	N/A	
		Factored Final Score		N/A	2	0.9	N/A	3.45
		Criticality Score					5%	0.17
		Well Pump			,	,		
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	Calculated	Total Factored Score
		Unweighted Failure Mode Score (1-5)		1.00	5.00	1.40	3.67	Total Factored Score
CHECK	1000/	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		3.00 20%	10.00 30%	3.80	13.00 15%	
CHECK	100%	Factored Final Score		0.60	3.00	0.76	1.95	8.71
		Criticality Score		0.00	3.00	0.70	15%	1.31
		Piping & Valves					15%	1.31
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		1.00	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		3.00	3.00	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		60%	30%	N/A	N/A	
		Factored Final Score		1.80	0.90	N/A	N/A	3.15
		Criticality Score					10%	0.32
		Supply Well - Sanitary Seal, Casing and Screen						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)		N/A	5.00	3.00	5.00	Total Factored Score
		Weighted Final Score (1-25)		N/A	17.50	14.50	15.00	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	50%	20%	20%	
		Factored Final Score	1.13	N/A	8.75	2.90	3.00	15.78
		Criticality Score					15%	2.37
		Wellhead Treatment						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	2.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	5.25	1.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	40%	N/A	_
		Factored Final Score		N/A	3.15	0.40	N/A 15%	3.55
		Criticality Score					15%	0.53
		SCADA System			1 01111		1111	
	+ + +	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5)		N/A N/A	1.00	2.00 4.67	N/A N/A	Total ractored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	3.33 60%	30%	N/A N/A	
CITECK	100%	Factored Final Score		N/A N/A	2.00	1.40	N/A N/A	4.20
	+ + +	Criticality Score		I IN/A	2.00	1.40	N/A 5%	0.21
	+ + +	Criticality Score					5/6	U.21
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	3.25	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.00	12.75	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	60%	20%	N/A	
		Factored Final Score	1.60	N/A	1.80	2.55	N/A	5.95
		Criticality Score					20%	1.19

				South Tahoe PUD	Location Description:	Corner of Arrowhead Ave. and Hopi Ave, 1961 Arrowhead Ave	K/J Project Number: 127000	14*00
					·	, .		
				Water System Optimization Plan	Wells Facility ID #:	ARHDWL3	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Arrowhead Well #3	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Arrowhead Zone	Adjacent Pressure Zones:	Christmas Valley, Iroquois, and Country Club Zones
		Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score (1 - 5)	Weighting (1-5)	Final Score			CONDITION ASSESSIMENT CHECKEST		
				Calif. Waterworks Standards				
R	1	4	4	compliant with Calif. DWR Bulletin 74-81?				
R Fn	1	4	3	compliant with AWWA Standards A100-06 (wells)? adequate equipment clearances to facilitate routine O&M?				
Fn	1	4	4		Yes, the well is a pitless adapter so all removal of	occurs outside		
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn R	1	3 2	2	wellhead minimum 18" above finished grade or floor? well electrical controls not in vault?				
Fn	1	3	3	well equipped with ability to add chlorination facilities?	Chlorination is currently onsite			
				sample taps available to obtain water quality prior to disinfection (between wellhead and check	Yes			
Fn Fn	1	4	5	valve) and after disinfection?	Yes they are non-threaded and turned down in	the well house and arsenic treatment facility		
Fn	5	5	25		Yes the bacti sample tap is not screened or aera			
Fn	1	2	2	well able to be pumped to waste with waste discharge line protected from backflow?		an air gap and the water goes into the sewer		
Fn Fn	1	3	3 4	well meter provided? chemical additives NSF 60 compliant?				
111	1	4	4	chemical additives NSF ob compilant:	103			
				Well Site				
Fn	1	2	2	adequate vehicle access for year-round maintenance?		AL FERRAL (I		
R R	1	3 4	6	is site within 100-yr flood plain? is site vulnerable to wildfires?		on the FEMA flood map. Which means flood hazards are undetermined but possible	e.	
R	4	4	16	is site close to known active seismic faults?				
R	1	2	2	any unstable site conditions (if yes, describe)?	None			
Fn	1	2	2	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	The site is completely fenced and there have be	en no issues with unauthorized		
Fn	1	2	2	other known problems?	None			
				Duilding Churching	Multiple structures Well Building Valve Building	g, Arsenic Treatment, MTBE Treatment, and Waste Tank		
Fn	1	3	3	adequate security measures and monitoring to prevent unauthorized access?	The facility is locked and the District has had no	issues with unauthorized access into the facility		
INFORMATION	N/A	N/A	N/A	date building was constructed?	Well and valve house in 2002, Arsenic in 2009			
PM	2	2	6	condition of exterior coatings adequate to protect structure?		he exterior coatings are great, Well building is wood exterior and the coatings are s	tarting to fail., the valve building is a metal buildin	g with no coating issues. The waste tank coatings are in excellent
Fn	1	4	4	adequate openings for ingress/egress?				
Fn	1	3	3	interior lighting adequate for routine O&M?	Yes			
Fn Fn	1	2	2	building designed to withstand snow load and not create safety issue? building meets code compliance requirements?				
R	1	3	3	known fire or haz-mat conditions that could be mitigated?				
Fn	1	4	4	other known problems?				
PM	1	5	5	estimated service life remaining?	20 years for well and valve house, 27years for a	rsenic treatment building		
				Well Pump				
INFORMATION	N/A	N/A	N/A	pump type?				
INFORMATION INFORMATION	N/A	N/A	N/A	pump manufacturer?	Gould 394 gpm based on flow test			
PM	5	4	20	pump capacity? pump rebuilt (list year) and describe work done?				
Fe	1	4	4	pump curves available?	Pump curves are now available			
R R	1	2 2	2	known history of pump/motor failures? If so, explain the nature of the failure(s). number of service calls/repairs in the last year?				
INFORMATION	1	3	0	what is firm capacity of well pump based on flow test?				
С	1	3	3	Does zone serviced by pump have adaquate capacity to be served?	Evaluation in block diagram			
Pm Fe	5 5	4 5	20 25	coatings adequate to provide corrosion protection? pumps operate efficiently (>70% bowl efficiency)		was not pulled		
R	1	4	4	pumps operate efficiently (270% bowl efficiency) pumps operate free from excessive vibration?				
Fn	5	2	10	adequate NPSH available to prevent cavitation?				
Fe R	5 3	2	10 6	motor high efficiency and no excessive noise?		the pump would need to be sent in to be rebuilt		
R	1	5	5	other known problems?	None			
PM	2	4	8	estimated service life remaining?	20 years based on AWU Useful Life			

				South Tahoe PUD	Location Description:	Corner of Arrowhead Ave. and Hopi Ave, 1961 Arrowhead Ave	K/J Project Number: 1270004	00
				Western Continue Continue and an Olive	Malla Facilita ID #		B-4	- 17-17
				Water System Optimization Plan	Wells Facility ID #:	ARHDWL3	Date:	3/8/2012
					Wells Facility Name:	Arrowhead Well #3	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
					vens ruemey rume.	Allowined Well #3	mspectors.	Teter Edvance and Ividik Gray
					Pressure Zones Served:	Arrowhead Zone	Adjacent Pressure Zones:	Christmas Valley, Iroquois, and Country Club Zones
					1			
				Piping & Valves				
Fn PM	1	4	5	pipe supports adequate to prevent movement or vibration?		oor. e defects in the valve house, the well house, and the arsenic treatment facility		
C	1	3	3	pipes adequately sized to prevent excessive noise or headloss?	Yes	acreed in the valve house, the first house, and the dischie treatment radiity		
Fn PM	1	2	2 4	valves are suitable for efficient and reliable service?				
PIVI	1	4	4	estinated service life remaining:	52 years based on AWU Useful Life			
				Supply Well - Sanitary Seal, Casing and Screen				
PM PM	5	3	15 15	well casing is in good condition? well screen is in good condition?				
Fe	5	3	15	well-driller's log is available?				
R	1	4	4	50 ft. sanitary seal?	Yes it is 240'			
D.	-	5	35	approximate distance from closest known groundwater contamination hazards (septic tank, leachfield, MTBE/TCE plume, etc.)?	The facility currently treats Arsenic and there is a	n MTBE treatment facility also. No other contaminates have been identified at t	his point.	
NFORMATION	N/A	N/A	25 N/A	last year of down-hole inspection and what defects were noted?				
PM	5	2	10	last year well was redeveloped?	insufficient data			
Fn	5	3	15	sounding tube or other means to measure depth to water surface?				
Fn PM	5 1	5	20 5	gravel-fill pipe provided at well head to monitor condition of filter pack?	Typ useful life 50 yrs. 40 yrs remaining useful life			
	-	3		estinated service menericalisms.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
				Wellhead Treatment				
Fn Fn	5 1	2	10	chemical storage tanks have secondary containment?	None Tubing is in good condition with no visible defect:			
NFORMATION	N/A	N/A	N/A	if multiple chemicals used, adequate separation of different chemicals?		3		
Fn	1	4	4	adequate equipment for meter-pump calibration?				
Fn R	1	5	5	frequency of dose calibration?				
INFORMATION	N/A	N/A	1 N/A	spare parts and service support readily available? treatment system type and capacity (tank storage)?		drums on site		
	·	,	Ĺ	, , , , , ,				
				SCADA system				
Fn Fn	1	1	1	pump flow meter is adequate to monitor pump performance? flow totals recorded at regular intervals? How frequent?				
Fn	1	2	2	pressure instrumentation is adequate to monitor pump performance?	There are pressure gauges throughout the well the	hat monitor system pressures		
Fn	1	4	4	automated alarm callout for critical failures and reliability?	Yes and it is monitored by District Operations	J ===II.		
Fn INFORMATION	1 N/A	4 N/A	4 N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	The alarm log is maintained but it is not reviewed Radio	annually		
R	1	2	2	communication system is reliable (approximate no. of comm. failures in last year)?	No communication issues in the last year			
	_			uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power failure?	No backup power and no hookups for a portable	generator multiple ways to feed without this well in service		
R R	2	3	6	spare parts/service support readily available?	Parts are readily available through the manufactu	urer or at the District offices		
PM	2	4	8		Estimated 10 years service life left			
				FI 15				
INFORMATION	N/A	N/A	N/A	Electrical Power standby generator size (kW)?				
R	1 1	5 5	5 S	adequate power available to run all equipment				
R	5	5	25	adequate standby power present and reliable?	NA			
NFORMATION NFORMATION	N/A N/A	N/A N/A	N/A N/A	fuel supply adequate for standby power service?				
R	5 N/A	3	15		1-2 hours depending on outside conditions but no	o hookups on site		
Fn	1	3	3	known electrical hazards that could be mitigated?	None			
R PM	2	3	6 8	spare parts/service support readily available?	Yes at District Plant 15 years based on AWU Useful Life			
1 101		7		estimated service me remaining:	15 years based on AWO Oscial Elic			
				Additional Data				
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):				
			+		This well is currently in lag to Bakersfield and Sou The well house also has a surge tank which is in g	onth Upper Truckee. It is run only to keep the well fresh on Wednesdays.		
					Piping in valve house has been disconnected and	is no longer and service		
					Arsenic treatment system is off because the med	lia needs to be replaced		
				Legend PM	Physical Mortality			
				Fn	Functionality			
					Reliability			
			1		Financial Efficiency Capacity			

		<u> </u>			
	South Tahoe PUD	Location Description:	Corner of Arrowhead Ave. and Hopi Ave, 1961 Arrowhead Ave	K/J Project Number:	1270004*00
	Water System Optimization Plan	Wells Facility ID #:	ARHDWL3	Date:	3/8/2012
	,			Condition Assessment	
		Wells Facility Name:	Arrowhead Well #3	Inspectors:	
		Pressure Zones Served:	Arrowhead Zone	Adjacent Pressure Zones:	Christmas Valley, Iroquois, and Country Club Zones
	Photo Evidence for PM, Fn, R, I	Ε	I	I	
			PHOTOS		
		201 1/6/u20 03 49 PM			SPECIAL DESIGNATION OF THE PROPERTY OF THE PRO
		No. 3 IT FACURY PROJECT	2011/2012/2013/2019		2011/05/20 03 50 PM
	NOT HERE IN CO.	20113522 00 88 FM	No. of State		
	and the second s				

		South Tahoe PUD	Location Description	1: Corner of Egret and South	Upper Truckee Rd.	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID	#: 365810	1	Date:	3/1	2/2012
			Walls Escility Nam	Co. Honor Touch	W-II #2	Condition Assessment		and Dhill Terrain
			Wells Facility Name	So. Upper Truck	ee Well #3	Inspectors	Peter Lavallee	and Phill Torney
			Pressure Zones Serve	1: Christmas Val	ey Zone	Adjacent Pressure Zones:	Arrowl	head Zone
		Notes:		Fail	ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	functionality 1: exceeds all requirements	reliability 1: failure every > 40 yrs	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements		2: financial efficiency is high	
			moderate deterioration significant deterioration	greater than 90% of design requirements greater than 85% of design requirements	meets all requirements fails some requirements	3: failure every 11 to 20 yrs 4: failure every 5 to 10 yrs	financial efficiency is average financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements		5: asset should be replaced	
		California Watermania Chanda						
		California Waterworks Standa Is Failure Mode Score Calculated or Assigne		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1		N/A	1.40	1.00	N/A	Total Factored Score
		Weighted Final Score (1-	25) N/A	N/A	5.60	3.75	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100 Factored Final Sco		N/A N/A	70% 3.92	30% 1.125	N/A N/A	5.05
		Criticality Sco		19/5	3.32	1.123	10%	0.50
		Well Si	ite					
		Is Failure Mode Score Calculated or Assigne		N/A	Calculated	Calculated	N/A	Takal Face 10
	 	Unweighted Failure Mode Score (1- Weighted Final Score (1-		N/A N/A	1.33 2.67	2.25 8.00	N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100		N/A N/A	70%	30%	N/A N/A	
		Factored Final Sco	ore N/A	N/A	1.87	2.4	N/A	4.27
		Criticality Sco					5%	0.21
		Building Structu Is Failure Mode Score Calculated or Assigne		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1		N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-		N/A	3.33	3.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100 Factored Final Sco		N/A N/A	60%	30% 0.9	N/A N/A	3.30
		Criticality Sco			_		5%	0.17
		Well Pur						
		Is Failure Mode Score Calculated or Assigne		Calculated 1.00	Calculated 5.00	Calculated 1.40	Calculated 5.00	Total Factored Score
		Unweighted Failure Mode Score (1 Weighted Final Score (1-		3.00	10.00	3.80	18.33	Total ractored score
CHECK	100%	Criticality Weighting Factor (0 - 100	15%	20%	30%	20%	15%	
		Factored Final Sco		0.60	3.00	0.76	2.75 15%	9.31
		Criticality Sco					15%	1.40
		Is Failure Mode Score Calculated or Assigne		Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1		1.00	1.00	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1- Criticality Weighting Factor (0 - 100		3.00 60%	3.00	N/A N/A	N/A N/A	
CHECK	100%	Factored Final Sco		1.80	0.90	N/A	N/A	3.15
		Criticality Sco					10%	0.32
		Supply Well - Sanitary Seal, Casing and Scre Is Failure Mode Score Calculated or Assigne		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1		N/A	5.00	3.00	5.00	Total Factored Score
		Weighted Final Score (1-	25) 11.25	N/A	17.50	14.50	15.00	
CHECK	100%	Criticality Weighting Factor (0 - 100 Factored Final Sco		N/A N/A	50% 8.75	20%	20% 3.00	15.78
		Criticality Sco		19/8	0.73	2.30	15%	2.37
		Wellhead Treatme	ent					
		Is Failure Mode Score Calculated or Assigne	ed? N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1- Weighted Final Score (1-		N/A N/A	1.00 3.25	1.00	N/A N/A	Total Pattoreu Store
CHECK	100%	Criticality Weighting Factor (0 - 100	0%) N/A	N/A	60%	40%	N/A	
		Factored Final Sco		N/A	1.95	0.40	N/A 15%	2.35
		Criticality Scc SCADA Syste					15%	0.35
		Is Failure Mode Score Calculated or Assigne	ed? Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1	2.00	N/A	1.00	1.33	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1- Criticality Weighting Factor (0 - 100		N/A N/A	3.33 60%	3.33 30%	N/A N/A	
CITECI	100%	Factored Final Sco		N/A N/A	2.00	1.00	N/A N/A	3.80
		Criticality Sco					5%	0.19
		Electrical Pow	ver .					
		Is Failure Mode Score Calculated or Assigne		N/A	Calculated	Calculated	N/A	Total Francisco d C
		Unweighted Failure Mode Score (1	2.00	N/A	1.00	1.40	N/A	Total Factored Score
		Weighted Final Score (1- Criticality Weighting Factor (0 - 100		N/A N/A	3.00 60%	5.80 20%	N/A N/A	
CHECK	100%				0070		. 1/ 5	
CHECK	100%	Factored Final Sco		N/A	1.80	1.16	N/A	4.56

1		Г						
				South Tahoe PUD	Location Description:	Corner of Egret and South Upper Truckee Rd.	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Wells Facility ID #:	3658101	Date:	3/12/2012
				Water System Optimization Flain	vens ruency is n.	3030101	Condition Assessment	3/12/2012
					Wells Facility Name:	So. Upper Truckee Well #3	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Christmas Valley Zone	Adjacent Pressure Zones:	Arrowhead Zone
Failure Mode Type	Score (1 - 5)	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
ranare wode Type	30010 (1-3)	weighting (1-3)	i mai score	Calif. Waterworks Standards				
R R	1	4 4	4	compliant with Calif. DWR Bulletin 74-81? compliant with AWWA Standards A100-06 (wells)?				
Fn	1	3	3	adequate equipment clearances to facilitate routine O&M?				
Fn	1	4	4	equipment accessible for removal?	Yes			
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn R	1	3 2	3 2	wellhead minimum 18" above finished grade or floor? well electrical controls not in vault?				
Fn	1	3	3	well equipped with ability to add chlorination facilities?				
				sample taps available to obtain water quality prior to disinfection (between wellhead and check				
Fn	1	4	4	valve) and after disinfection? sample tap non-threaded downed-turned?				
Fn Fn	5	5	5 25	bacti sample tap not screened or aerated?				
Fn	1	2	2	well able to be pumped to waste with waste discharge line protected from backflow?				
Fn	1	3	3	well meter provided?	Yes			
Fn	1	4	4	chemical additives NSF 60 compliant?	Yes			
				Well Site				
Fn R	2	2	6	adequate vehicle access for year-round maintenance?		n the FEMA flood map. Which means flood hazards are undetermined but p	assikla	
R R	2	4	8		This site is near open wooded lots	in the FEINA 1000 map. Which means 11000 hazards are undetermined but p	ossible.	
R	4	4	16	is site close to known active seismic faults?				
R	1	2	2	any unstable site conditions (if yes, describe)?	None			
Fn	2	2	4	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	No site security but there are no issues of unauth	orized access		
Fn	1	2	2	other known problems?				
				Building Structure				
Fn	1	3	3	adequate security measures and monitoring to prevent unauthorized access?				
INFORMATION	N/A	N/A	N/A	date building was constructed?				
PM	1	3	3	condition of exterior coatings adequate to protect structure?				
Fn Fn	1	3	3	adequate openings for ingress/egress? interior lighting adequate for routine O&M?				
Fn	1	4	4	building designed to withstand snow load and not create safety issue?		on		
Fn	1	2	2		It met the building codes at the time of construct	ion		
R	1	3	3	known fire or haz-mat conditions that could be mitigated? other known problems?				
Fn PM	1	4 5	4 5		22 years based on AWU Useful life			
				Well Pump				
INFORMATION	N/A	N/A	N/A	pump type?	submersible			
INFORMATION	N/A	N/A	N/A	pump manufacturer?	Byron Jackson			
INFORMATION	3	3	0 12	pump capacity? pump rebuilt (list year) and describe work done?	1400 gpm @85 ft. 1400 gpm @ 233 ft. with boost	ter		
PMI Fe	5	4	20		Pump Curves are available			
R	1	2	2	known history of pump/motor failures? If so, explain the nature of the failure(s).	None			
R	1	2	2	number of service calls/repairs in the last year?				
INFORMATION C	1	3	3	what is firm capacity of well pump based on flow test? Does zone serviced by pump have adaquate capacity to be served?		ich resulted in extreme high specific energy 3,300 kW-hr/Mgal		
Pm	5	4	20	coatings adequate to provide corrosion protection?		ed		
Fe	5	5	25	pumps operate efficiently (>70% bowl efficiency)	very poor energy efficiency			
R	1	4	4	pumps operate free from excessive vibration?	Yes			
Fn	5	2	10	adequate NPSH available to prevent cavitation?				
Fe R	5 3	2	10 6	motor high efficiency and no excessive noise? spare parts readily available?	Parts would need to be ordered from the supplie	r		
R	1	5	5	other known problems?	None			
11			12	T	T	service life due to potential for recirculation. Should pull pump every 5 yrs to		

				South Takes DUD	Location Description	Comment Countries of Countries	K/J Project Number: 1270004*	200
				South Tahoe PUD	Location Description:	Corner of Egret and South Upper Truckee Rd.	K/J Project Number: 1270004*(00
				Water System Optimization Plan	Wells Facility ID #:	3658101	Date:	3/12/2012
							Condition Assessment	
					Wells Facility Name:	So. Upper Truckee Well #3	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Christmas Valley Zone	Adjacent Pressure Zones:	Arrowhead Zone
					¬			
				Piping & Valves	5			
Fn PM	1	4 5	4 5	pipe supports adequate to prevent movement or vibration	 Steel Supports that are bolted to the floor Coatings are in excellent condition with no visible signs 	of deterioration		
C	1	3	3	pipes adequately sized to prevent excessive noise or headloss		of deterioration		
Fn	1	2	2	valves are suitable for efficient and reliable service				
PM	1	4	4	estimated service life remaining	? 52 years based on AWU Useful Life			
				Supply Well - Sanitary Seal, Casing and Screer				
PM	5	3	15	well casing is in good condition	? insufficient data			
PM	5	3	15	well screen is in good condition				
Fe R	5 1	3 4	15 4	well-driller's log is available 50 ft. sanitary seal	Ves it is 56 feet			
	<u> </u>	-	-	approximate distance from closest known groundwater contamination hazards (septic tank	No known contaminates but there is a CO2 air stripper	to reduce the correcivity of the water from the well		
R	5	5	25			to reduce the corrosivity of the water from the well		
NFORMATION PM	N/A 5	N/A 2	N/A 10	last year of down-hole inspection and what defects were noted				
Fn PIVI	5	3	10	last year well was redeveloped' sounding tube or other means to measure depth to water surface'				
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack	? insufficient data			
PM	1	5	5	estimated service life remaining	? Typ useful life 50 yrs. 42 yrs remaining useful life			
				Wellhead Treatment	t			
Fn	1	2	2	chemical storage tanks have secondary containment				
Fn	1	2	2	chemical piping/tubing is in good condition				
NFORMATION Fn	N/A 1	N/A 4	N/A 4	if multiple chemicals used, adequate separation of different chemicals adequate equipment for meter-pump calibration				
Fn	1	5	5	frequency of dose calibration				
R	1	1	1	spare parts and service support readily available	? Yes			
INFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)	? Sodium Hypochlorite 300 gal Tank			
				SCADA system				
Fn	1	4	4	pump flow meter is adequate to monitor pump performance	? Yes the flow meter is hooked up to SCADA			
Fn	1	1	1	flow totals recorded at regular intervals? How frequent	? the flow totals are recorded daily by hand	nitor system procesures		
Fn Fn	1	2	2 4	pressure instrumentation is adequate to monitor pump performance automated alarm callout for critical failures and reliability		mittor system pressures		
Fn	1	4	4		? The alarm log is maintained but it is not reviewed annu	ally		
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)				
R	1	2	2	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe				
R	1	2	2	failure		ble hookups also		
R	2	3	6		Parts are readily available through the manufacturer or	at the District offices		
PM	2	4	8	estimated service life remaining	? 4 years based on AWU Useful Life			
				Electrical Power	r			
NFORMATION	N/A	N/A	N/A	standby generator size (kW)	? 289kW			
R	1	5	5	adequate power available to run all equipmen				
R INFORMATION	N/A	5 N/A	10 N/A	adequate standby power present and reliable fuel storage capacity (gals)		perated in hand mode in order to not overload the generator all at o	ice	
R	1	5	5 5	fuel supply adequate for standby power service	? Yes			
R	N/A	N/A	N/A	time needed to mobilize portable generator	? NA			
Fn R	1 2	3	3 9	known electrical hazards that could be mitigated' spare parts/service support readily available'				
PM	2	4	8		? 17 years based on AWU Useful Life			
					This well is only run on Wednesdays in the winter time	to keep it fresh it is on full time \in the summer time		
NFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower) Booster Pum	: 1400 gpm @ 85ft, 50hp Aurora Pump, Centrifugal, 400gpm, 33 feet, 125 Hp			
				Booster Pulli	CO2 Strippers, Water is pumped from well to tanks and	then boosted out of the tanks to the system		
				Legend	1	•		
					n Physical Mortality Functionality			
					R Reliability			
					Financial Efficiency			
					Capacity			



						T		
		South Tahoe PUD	Location Description	: On Bel Air	e Cir	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID #	: ECWLH	ID	Date:	3/8/	2012
			Wells Facility Name	: Elks Club W	/ell #2	Condition Assessment Inspectors:	Peter I avallee	and Mark Gray
			,		7EII #2		retel Lavallee	and Mark Gray
			Pressure Zones Served	: Country Clu	b Zone	Adjacent Pressure Zones:	Stat	eline
				Fai	lure Mode Scoring (1 - 5)			
		Notes: 1. Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	functionality 1: exceeds all requirements		1: best available technology	
			2: minor defects only 3: moderate deterioration	2: greater than 95% of design requirements 3: greater than 90% of design requirements 4: 10 25% of the interpretation of the inter	2: exceeds some requirements 3: meets all requirements		2: financial efficiency is high 3: financial efficiency is average	
			4: significant deterioration 5: virtually unserviceable	4: greater than 85% of design requirements 5: less than 85% of design requirements	4: fails some requirements 5: Fails all requirements		4: financial efficiency is low 5: asset should be replaced	
		California Waterworks Standar						
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-		N/A N/A	Calculated 1.40	Calculated 1.00	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-2: Criticality Weighting Factor (0 - 100%	N/A	N/A N/A	5.60 70%	3.75 30%	N/A N/A	
SHEON	100/6	Factor (V - 1007) Factored Final Scot Criticality Scot	re N/A	N/A	3.92	1.125	N/A 10%	5.05 0.50
		Well Sit	e			_		0.50
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-	5) N/A	N/A N/A	Calculated 1.00	Calculated 2.50	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-2) Criticality Weighting Factor (0 - 100%		N/A N/A	2.00 70%	9.00 30%	N/A N/A	
-		Factored Final Sco Criticality Sco	re N/A	N/A	1.4	2.7	N/A 5%	4.10 0.21
		Building Structur	e		1	1		J.21
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-	1.00	N/A N/A	Calculated 1.00	Calculated 3.00	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-2: Criticality Weighting Factor (0 - 100%		N/A N/A	3.33 60%	9.00 30%	N/A N/A	
		Factored Final Scor Criticality Scor	re 0.4	N/A	2	2.7	N/A 5%	5.10 0.26
		Well Pum	p					3.2 0
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-	3.67	Calculated 1.00	Calculated 5.00	Calculated 1.40	Calculated 5.00	Total Factored Score
CHECK	100%	Weighted Final Score (1-2: Criticality Weighting Factor (0 - 100%		3.00 20%	10.00 30%	3.80 20%	18.33 15%	
		Factored Final Scor Criticality Scor		0.60	3.00	0.76	2.75 15%	9.31 1.40
		Piping & Valve Is Failure Mode Score Calculated or Assigned		Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-	5) 1.00	1.00	1.00	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-2: Criticality Weighting Factor (0 - 100%	10%	3.00 60%	30%	N/A N/A	N/A N/A	
		Factored Final Scoi		1.80	0.90	N/A	N/A 10%	3.15 0.32
		Supply Well - Sanitary Seal, Casing and Scree Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-) Weighted Final Score (1-)	4.00	N/A N/A	5.00 17.50	1.00 4.50	5.00 15.00	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 1009	10%	N/A N/A	50% 8.75	20% 0.90	20% 3.00	13.78
		Factored Final Scor	re	IV/A	0.73	0.90	15%	2.07
		Wellhead Treatmer Is Failure Mode Score Calculated or Assigned	I? N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-2 Weighted Final Score (1-2		N/A N/A	1.60 4.20	1.00 1.00	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Sco	6) N/A	N/A N/A	60% 2.52	40% 0.40	N/A N/A	2.92
		Criticality Scor	re				15%	0.44
		SCADA Syster Is Failure Mode Score Calculated or Assigned	? Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-2 Weighted Final Score (1-2)	8.00	N/A N/A	1.00 3.33	1.33 3.33	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Sco	10%	N/A N/A	60% 2.00	30% 1.00	N/A N/A	3.80
		Criticality Scot					5%	0.19
		Electrical Powe		N/A	Calculated	Calculated	N/A	
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-1)	1.00	N/A	1.00	1.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-2: Criticality Weighting Factor (0 - 1009	20%	N/A N/A	3.00 60%	4.20 20%	N/A N/A	
		Factored Final Scor		N/A	1.80	0.84	N/A 20%	3.44 0.69
						0	verall Total Factored Score (Out of 25) =	

				South Tahoe PUD	Location Description:	On Bel Aire Cir	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Wells Facility ID #:	ECWLHD	Date:	3/8/2012
				Water System Optimization Figure	wens radincy is in	ECWEND	Condition Assessment	3/0/2012
					Wells Facility Name:	Elks Club Well #2	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Stateline
Failure Mode Type	Score (1 - 5)	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
ranure wode Type	3core (1 - 3)	weighting (1-5)	Fillal Score	Calif. Waterworks Standards				
R	1	4	4	compliant with Calif. DWR Bulletin 74-81?	yes			
R Fn	1	3	3	compliant with AWWA Standards A100-06 (wells)? adequate equipment clearances to facilitate routine O&M?				
Fn	1	4	4	equipment accessible for removal?	Yes, the well is a pitless adapter so all removal occi	ırs outside		
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn R	1 1	3 2	2	wellhead minimum 18" above finished grade or floor? well electrical controls not in vault?				
Fn	1	3	3	well equipped with ability to add chlorination facilities?	Chlorination is currently onsite			
_			_	sample taps available to obtain water quality prior to disinfection (between wellhead and check	Yes			
Fn Fn	1	4 5	<u>4</u> 5	valve) and after disinfection? sample tap non-threaded downed-turned?				
Fn	5	5	25	bacti sample tap not screened or aerated?				
Fn	1	2	2	well able to be pumped to waste with waste discharge line protected from backflow?		er manhole		
Fn Fn	1	3	3 4	well meter provided? chemical additives NSF 60 compliant?				
	<u> </u>			chemical additives have do compliant.				
				Well Site				
Fn	1	2	2	adequate vehicle access for year-round maintenance?		of Francisco		
R R	3	3	6 12		No. This site is indicated as other areas. Zone D on Site is adjacent to a meadow and there is a potenti	the FEMA flood map. Which means flood hazards are undetermined b al for wildfires	ut possible.	
R	4	4	16	is site close to known active seismic faults?				
R	1	2	2	any unstable site conditions (if yes, describe)?	None			
Fn	1	2	2	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	The site as a single fence on the back side of the pa	rcel. The District has not had issues with unauthorized access		
Fn	1	2	2	other known problems?				
					=	tele tre e che di		
Fn	1	2	3	Building Structure adequate security measures and monitoring to prevent unauthorized access?	The ceiling in the generator room has a hole in it w			
INFORMATION	N/A	3 N/A	N/A		2003 addition to existing well and drilled new well	des with unauthorized access into the facility		
PM	1	3	3	condition of exterior coatings adequate to protect structure?	Block building with paint which is in good condition	. The metal roof is also in good condition.		
Fn Fn	1	3	3	adequate openings for ingress/egress?				
Fn	1	4	4	interior lighting adequate for routine O&M? building designed to withstand snow load and not create safety issue?				
Fn	1	2	2	building meets code compliance requirements?	Building met requirements of the code for when it			
R Fn	3 1	3	9	known fire or haz-mat conditions that could be mitigated? other known problems?		currea		
PM	1	5	5		21 years according to AWU Useful Life			
INCOM.	***	N. f -	N/ 15	Well Pump				
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	pump type? pump manufacturer?				
INFORMATION	//	3	0		425gpm (rh) well output was 275 gpm during flow	test		
PM	5	4	20	pump rebuilt (list year) and describe work done?				
Fe R	5 1	4	20	pump curves available? known history of pump/motor failures? If so, explain the nature of the failure(s).	Pump curves are available None			
R	1	2	2	number of service calls/repairs in the last year?	None			
INFORMATION		3	0	what is firm capacity of well pump based on flow test?				
C Pm	5	3 4	3 20	Does zone serviced by pump have adaquate capacity to be served? coatings adequate to provide corrosion protection?		not pulled		
Fe	5	5	25	pumps operate efficiently (>70% bowl efficiency)	insufficient data	•		
R	1	4	4	pumps operate free from excessive vibration?				
Fn Fe	5	2	10 10	adequate NPSH available to prevent cavitation? motor high efficiency and no excessive noise?				
R	3	2	6	spare parts readily available?	Parts are available from the manufacturer and the	pump would need to be sent in to be rebuilt		
R	1	5	5	other known problems?				
PM	1	4	4	esurnated service life remaining?	21 Years based on AWU Useful Life			

				South Tahoe PUD	Location Description:	On Bel Aire Cir	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Wells Facility ID #:	ECWLHD	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Elks Club Well #2	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Stateline
					Fressure Zolles Serveu.	Country Club Zone	Adjacent Fressure Zones.	Statenne
					7			
				Piping & Valves	5			
Fn	1	4	4	pipe supports adequate to prevent movement or vibration?	Steel Supports that are bolted to the concrete floor.			
PM	1	5	5		? Coatings are in excellent condition with no viable defects			
C Fn	1 1	3 2	3 2	pipes adequately sized to prevent excessive noise or headloss: valves are suitable for efficient and reliable service				
PM	1	4	4		51 Years based on AWU Useful Life			
				County Wall Conitons Coal Coning and County				
PM	5	3	15	Supply Well - Sanitary Seal, Casing and Screen well casing is in good condition:				
PM	5	3	15	well screen is in good condition?	? insufficient data			
Fe	5	3	15	well-driller's log is available				
R	1	4	4	50 ft. sanitary seal approximate distance from closest known groundwater contamination hazards (septic tank	resit is 96it			
R	1	5	5	leachfield, MTBE/TCE plume, etc.):	?			
INFORMATION PM	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted				
PIMI Fn	5	3	10 15	last year well was redeveloped: sounding tube or other means to measure depth to water surface:				
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack	? insufficient data			
PM	1	5	5	estimated service life remaining	? Typ useful life 50 yrs. 41 yrs remaining useful life			
				Wellhead Treatment	•			
Fn	5	2	10	chemical storage tanks have secondary containment				
Fn	1	2	2		P Tubing is in good condition with no visible defects			
Fn Fn	N/A 1	3 4	N/A 4	if multiple chemicals used, adequate separation of different chemicals: adequate equipment for meter-pump calibration				
Fn	1	5	5	frequency of dose calibration:				
R	1	1	1	spare parts and service support readily available	? Yes			
INFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)	? Sodium Hypochlorite with direct injection. 30 gal drums on si	te		
				SCADA system	1			
Fn	1	4	4	pump flow meter is adequate to monitor pump performance	? Yes the flow meter is hooked up to SCADA			
Fn Fn	1	2	2	flow totals recorded at regular intervals? How frequent: pressure instrumentation is adequate to monitor pump performance:	? the flow totals are recorded daily by hand	system prossures		
Fn	1	4	4	automated alarm callout for critical failures and reliability		system pressures		
Fn	1	4	4	alarm log maintained and reviewed annually	? The alarm log is maintained but it is not reviewed annually			
NFORMATION	N/A	N/A	N/A 2	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? communication system is reliable (approximate no. of comm. failures in last year)?	No communication issues in the last year			
N.	1	2	2	communication system is reliable (approximate no. or comm. railures in last year); uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power failure:	r	alusa ala		
R	1	2	2	failure	There is a backup generator onsite and there are portable no	lokups also		
R PM	2 2	3 4	6 8	spare parts/service support readily available:	Parts are readily available through the manufacturer or at the 6 years based on AWU Useful Life	e District offices		
				countries de vice inc remaining.	o years based on two oserar are			
				Electrical Power				
INFORMATION R	N/A	N/A 5	N/A	standby generator size (kW)				
R R	1	5	5	adequate power available to run all equipmen adequate standby power present and reliable				
INFORMATION	N/A	N/A	N/A	fuel storage capacity (gals)?	? 250gal			
R R	1 N/A	5 N/A	5 N/A	fuel supply adequate for standby power service: time needed to mobilize portable generator;				
Fn	1	3	3	known electrical hazards that could be mitigated				
R	2	3	6	spare parts/service support readily available	? Yes at District Plant			
PM	1	4	4	estimated service life remaining:	? 16 Years according to AWU Useful Life			
				Additional Data	a			
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower)				
				Legence	d			
			 		1 Physical Mortality 1 Functionality			
				F	Reliability			
					Financial Efficiency			
		1			Capacity			

	South Tahoe PUD	Location Description:	On Bel Aire Cir	K/J Project Number:	1270004*00
	Water System Optimization Plan	Wells Facility ID #:	ECWLHD	Date:	3/8/2012
		Wells Facility Name:		Condition Assessment Inspectors:	
		Wells Facility Name:	Elks Club Well #2	inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Stateline
	Photo Evidence for PM, Fn, R, FE]	1	1 1	
			PHOTOS		
	20x1705/20 03:28 PM	2011.7		2011/08/20 02:27 (10	2011/05/20 03:27 PM
	2011/95/20 03:27 PM	2011/03/20 8	RIZOTM	3011/05/20 03:26 PM	2011/08/20 08:26 %
2011/05/20 03.26 PM					

		South Tahoe PUD	Location Description:	Hwy 89 at corner with Valh	alla Access Road	K/J Project Number	1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	VHWL		Date	:: 3/13	s/2012
			Wells Facility Name:	Valhalla We	II	Condition Assessmen Inspectors		l Jeremy Rutherdale
			Pressure Zones Served:	Gardner Mountain or Stateline Zor	ne depending on valving	Adjacent Pressure Zones	Stateline depe	nding on valving
						-		
		Notes:		Failu	re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level	of Service reliability	Financial Efficiency	
			1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 40 yrs	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 21 to 40 yrs	2: financial efficiency is high	
				greater than 90% of design requirements greater than 85% of design requirements	meets all requirements fails some requirements	3: failure every 11 to 20 yrs 4: failure every 5 to 10 yrs	financial efficiency is average financial efficiency is low	
				5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
					·		-	
		California Waterworks Standard				_		
	+ + + + + + + + + + + + + + + + + + + +	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
	+ + +	Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A N/A	N/A N/A	1.50 5.90	1.00 3.75	N/A N/A	i Stai Pactoreu Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	70%	30%	N/A	
		Factored Final Score	N/A	N/A	4.13	1.125	N/A	5.26
		Criticality Score					10%	0.53
	+ + + + + + + + + + + + + + + + + + + +	Well Site	21/2	N/A	Calculated	Colomba 1	N1/A	
	+ + +	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 2.33	Calculated 2.25	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	4.67	8.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
		Factored Final Score		N/A	3.27	2.4	N/A	5.67
		Criticality Score					5%	0.28
		Building Structure Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)	6.50	N/A	3.33	3.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	30%	N/A	
		Factored Final Score Criticality Score	0.65	N/A	2	0.9	N/A 5%	3.55 0.18
		Well Pump					3%	0.16
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	1.00	5.00	5.00	1.80	3.67	Total Factored Score
		Weighted Final Score (1-25)	4.00	15.00	10.00	4.60	13.00	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		20% 3.00	30%	20% 0.92	15% 1.95	9.47
		Criticality Score		3.00	3.00	0.32	15%	1.42
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		1.00	1.00	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		3.00 60%	3.00 30%	N/A N/A	N/A N/A	
CITECK	100%	Factored Final Score		1.80	0.90	N/A	N/A	3.65
		Criticality Score					10%	0.37
		Supply Well - Sanitary Seal, Casing and Screen						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	Total Factored Score
	+ + +	Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	5.00 17.50	0.50 2.00	5.00 15.00	iotal ractored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A N/A	50%	20%	20%	
		Factored Final Score	1.25	N/A	8.75	0.40	3.00	13.40
		Criticality Score					15%	2.01
		Wellhead Treatment			01.11.1			
	+ + + + + + + + + + + + + + + + + + + +	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.60	Calculated 1.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-5)		N/A	4.20	1.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	
		Factored Final Score		N/A	2.52	0.40	N/A	2.92
	 	Criticality Score					15%	0.44
	+ + +	SCADA System Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
	+ + +	Unweighted Failure Mode Score (1-5)		N/A N/A	1.00	1.33	N/A	Total Factored Score
		Weighted Final Score (1-25)	8.00	N/A	3.33	3.33	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	30%	N/A	
	+ + + + + + + + + + + + + + + + + + + +	Factored Final Score		N/A	2.00	1.00	N/A 5%	3.80
	+ + +	Criticality Score					5%	0.19
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
	+ + + + + + + + + + + + + + + + + + + +	Unweighted Failure Mode Score (1-5)		N/A N/A	1.00 3.00	1.00 4.20	N/A N/A	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	60%	20%	N/A N/A	
		Factored Final Score		N/A	1.80	0.84	N/A	3.44
		Criticality Score					20%	0.69

				South Tahoe PUD	Location Description:	Hwy 89 at corner with Valhalla Access Road	K/J Project Number: 1270004*0	00
				Water System Optimization Plan	Wells Facility ID #:	VHWL	Date:	3/13/2012
							Condition Assessment	
					Wells Facility Name:	Valhalla Well	Inspectors:	Peter Lavallee and Jeremy Rutherdale
					Pressure Zones Served:	Gardner Mountain or Stateline Zone depending on valving	Adjacent Pressure Zones:	Stateline depending on valving
		Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score (1 - 5)	Weighting (1-5)	Final Score					
R	1	4	4	Calif. Waterworks Standards compliant with Calif. DWR Bulletin 74-81?				
R Fn	1 2	4 3	4 6	compliant with AWWA Standards A100-06 (wells)? adequate equipment clearances to facilitate routine O&M?		close to the south wall		
Fn	1	4	4	equipment accessible for removal?		close to the south wall		
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn R	1	2	2	wellhead minimum 18" above finished grade or floor?	Yes Controls are in the building and not in the vault			
Fn	1	3	3	well equipped with ability to add chlorination facilities?	Well has chlorination			
				sample taps available to obtain water quality prior to disinfection (between wellhead and check	Sample taps are installed before and after disinf	fection		
Fn Fn	1	4 5	5	valve) and after disinfection? sample tap non-threaded downed-turned?				
Fn	5	5	25	bacti sample tap not screened or aerated?				
Fn	1	2	2	well able to be pumped to waste with waste discharge line protected from backflow?		ge without entering the distribution system		
Fn Fn	1	3 4	3	well meter provided? chemical additives NSF 60 compliant?				
111	1	4	4	chemical additives NSF Ob Compilant:	103			
				Well Site				
Fn	1	2	2	adequate vehicle access for year-round maintenance?				
R R	2 2	3	6 8		No. This site is indicated as other areas. Zone Di Yes adjacent to open wooded space	on the FEMA flood map. Which means flood hazards are undetermined but possit	DIE.	
R	4	4	16	is site close to known active seismic faults?				
R	1	2	2	any unstable site conditions (if yes, describe)?	None			
Fn	5	2	10	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	There is no fence around the site			
Fn	1	2	2	other known problems?	None			
Fn	1	3	3	Building Structure adequate security measures and monitoring to prevent unauthorized access?	Doors are locked and keyed for District personn	el No known unauthorized access has occurred		
INFORMATION	N/A	N/A	N/A	date building was constructed?		C. NO KIOWII GIIBGGIOTIZEG GECESS TIBS OCCUTTED		
PM	1	3	3	condition of exterior coatings adequate to protect structure?		sseen		
Fn Fn	1	3	3	adequate openings for ingress/egress? interior lighting adequate for routine O&M?				
Fn	1	4	4	building designed to withstand snow load and not create safety issue?		on		
Fn	1	2	2	building meets code compliance requirements?	Met requirements at time of construction			
R Fn	1	3	3	known fire or haz-mat conditions that could be mitigated? other known problems?				
PM	2	5	10		12 years according to AWU Useful Life			
INIT OR I THE STATE OF	A1 *-	N. 7:	10.75	Well Pump				
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	pump type? pump manufacturer?				
INFORMATION	.45	3	0		well output was 730 gpm during flow test - pum	p operated at reduced speed (49.2 Hz)		
PM	1	4	4	pump rebuilt (list year) and describe work done?				
Fe R	1	2	2	pump curves available? known history of pump/motor failures? If so, explain the nature of the failure(s).				
R	1	2	2	number of service calls/repairs in the last year?	Pump new in 2012			
INFORMATION		3	0	what is firm capacity of well pump based on flow test?		np operated at reduced speed (49.2 Hz)		
C Pm	5 1	3	15 4	Does zone serviced by pump have adaquate capacity to be served? coatings adequate to provide corrosion protection?				
Fe	5	5	25	coatings adequate to provide corrosion protection?	insufficient data			
R	1	4	4	pumps operate free from excessive vibration?			· · · · · · · · · · · · · · · · · · ·	
Fn Fe	5	2	10 10	adequate NPSH available to prevent cavitation? motor high efficiency and no excessive noise?				
R	5	2	10	spare parts readily available?	Spare parts would need to be ordered from the	manufacturer		
R	1	5	5	other known problems?				
PM	1	4	4	estimated service life remaining?	30 years based on AWU Useful Life			

				South Tahoe PUD	Location Description:	Hwy 89 at corner with Valhalla Access Road	K/J Project Number: 1270004*	00
						·		
				Water System Optimization Plan	Wells Facility ID #:	VHWL	Date:	3/13/2012
							Condition Assessment	
					Wells Facility Name:	Valhalla Well	Inspectors:	Peter Lavallee and Jeremy Rutherdale
					Pressure Zones Served:	Gardner Mountain or Stateline Zone depending on valving	Adjacent Pressure Zones:	Stateline depending on valving
							,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
					1			
				Piping & Valves				
Fn	1	4	4	pipe supports adequate to prevent movement or vibration?				
PM C	3	5	15 3	coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise or headloss?	Some coatings have worn off and some rust is visib	e on some of the components		
Fn	1	2	2	valves are suitable for efficient and reliable service?	Yes			
PM	1	4	4	estimated service life remaining?	47 years based on AWU Useful Life			
				Supply Well - Sanitary Seal, Casing and Screen				
PM	5	3	15	well casing is in good condition?				
PM	5	3	15	well screen is in good condition?	insufficient data			
Fe R	5 1	3 4	15 4	well-driller's log is available? 50 ft. sanitary seal?	ves it is 100ft			
N	1	4	4	approximate distance from closest known groundwater contamination hazards (septic tank,	None			
R	_	5	0	leachfield, MTBE/TCE plume, etc.)?	'			
INFORMATION PM	N/A 5	N/A 2	N/A 10	last year of down-hole inspection and what defects were noted? last year well was redeveloped?				
Fn	5	3	15	sounding tube or other means to measure depth to water surface?				
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack?	insufficient data			
PM	2	5	10	estimated service life remaining?	Typ useful life 50 yrs. 37 yrs remaining useful life			
				Wellhead Treatment				
Fn	5	2	10	chemical storage tanks have secondary containment?	No secondary containment			
Fn	1	2	2	chemical piping/tubing is in good condition?				
Fn Fn	N/A 1	3 4	N/A 4	if multiple chemicals used, adequate separation of different chemicals? adequate equipment for meter-pump calibration?				
Fn	1	5	5		Adjusted when the pump is in service			
R INFORMATION	1	1 N/A	1 N/A	spare parts and service support readily available?	Yes Sodium Hypochlorite with direct injection multiple	20 gal tanks ansita		
INFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)?	South Hypothiorite with direct injection multiple	so gai tanks onsite		
				SCADA system				
Fn Fn	1	1	4 1	pump flow meter is adequate to monitor pump performance? flow totals recorded at regular intervals? How frequent?				
Fn	1	2	2	pressure instrumentation is adequate to monitor pump performance?	There are pressure gauges throughout the well that	monitor system pressures		
Fn	1	4	4	automated alarm callout for critical failures and reliability?	Yes and it is monitored by District Operations			
Fn INFORMATION	1	4 N/A	4 N/A	alarm log maintained and reviewed annually? type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	The alarm log is maintained but it is not reviewed a	nnually		
R	N/A 1	N/A 2	N/A 2	communication system is reliable (approximate no. of comm. failures in last year)?				
				uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power failure?		ught to the site in the event of a power outage		
R R	2	2	6	failure?	Parts are readily available through the manufacture	or or at the District offices		
PM	2	4	8		2 11 Years based on AWU Useful Life	. or or are significantees		
INICODANTICAL	b./*	N: / 0	h:/a	Electrical Power				
INFORMATION R	N/A 1	N/A 5	N/A 5	standby generator size (kW)? adequate power available to run all equipment				
R	1	5	5	adequate standby power present and reliable?	Yes			
NFORMATION	N/A	N/A	N/A	fuel storage capacity (gals)?				
R R	1 N/A	5	5 N/A	fuel supply adequate for standby power service? time needed to mobilize portable generator?				
Fn	1	3	3	known electrical hazards that could be mitigated?				
R	2	3	6	spare parts/service support readily available?				
PM	1	4	4	estimated service life remaining?	16 years based on AWU Useful Life			
				Additional Data				
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):	1200gpm @ 400ft, 150hp			
·				Legend				
					Physical Mortality Functionality			
				R	Reliability			
		1	1		Financial Efficiency	· · · · · · · · · · · · · · · · · · ·		
					Capacity			

South Tahoe PUD	Location Description:	Hwy 89 at corner with Valhalla Access Road	K/J Project Number: 1270004*	00
Water System Optimization Plan	Wells Facility ID #:	VHWL	Date:	3/13/2012
			Condition Assessment	
	Wells Facility Name:	Valhalla Well	Inspectors:	Peter Lavallee and Jeremy Rutherdale
	Pressure Zones Served:	Gardner Mountain or Stateline Zone depending on valving	Adjacent Pressure Zones:	Stateline depending on valving
Photo Evidence for PM, Fn, R, FE]			
		PHOTOS		
2011/01/22 DOS 10 PM	2017	55/276 03:09 PM	EXPLORED DESCRIPTION OF THE STATE OF THE STA	2011/05/25 03:0
2011/05/25 03/	975 PM	2011/05/25 03 09 PM		

		South Tahoe PUD	Location Description	On Airport Pr	roperty	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID	#: APRTW	'L	Date:	3/8/20:)12
			Wells Facility Nam	ne: Airport V	Vell	Condition Assessment Inspectors:		nd Mark Grav
		WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL - WELL NOT :	Pressure Zones Serve	Stateline 2	one	Adjacent Pressure Zones:	Country Club and Tw	vin Peaks Zones
		Notes:	RAILD	Fail	lure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Leve	l of Service reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 40 yrs	1: best available technology	
			2: minor defects only 3: moderate deterioration	greater than 95% of design requirements greater than 90% of design requirements	exceeds some requirements meets all requirements	2: failure every 21 to 40 yrs 3: failure every 11 to 20 yrs	financial efficiency is high financial efficiency is average	
			4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	-
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standard	1					
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)) N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	1009/	Weighted Final Score (1-25)		N/A N/A	N/A 70%	N/A 30%	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		N/A N/A	70% N/A	30% N/A	N/A N/A	0.00
		Criticality Score	e				10%	0.00
		Well Site						
		Is Failure Mode Score Calculated or Assigned?		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	. Otal Factorea Stor
CHECK	100%	Criticality Weighting Factor (0 - 100%	N/A	N/A	70%	30%	N/A	
		Factored Final Score		N/A	N/A	N/A	N/A	0.00
		Criticality Score Building Structure					5%	0.00
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)) N/A	N/A	N/A	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25		N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		N/A N/A	60% N/A	30% N/A	N/A N/A	0.00
		Criticality Score		N/A	N/A	1970	5%	0.00
		Well Pump	•					
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%		20%	30%	20%	15%	
		Factored Final Score	e N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score Piping & Valves					15%	0.00
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5		N/A	N/A	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25		N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		60% N/A	30% N/A	N/A N/A	N/A N/A	0.00
		Criticality Score			.4		10%	0.00
		Supply Well - Sanitary Seal, Casing and Screen						
		Is Failure Mode Score Calculated or Assigned?		N/A N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	. C.ui i uctoreu stor
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	50%	20%	20%	
		Factored Final Score		N/A	N/A	N/A	N/A	0.00
		Criticality Score Wellhead Treatment					15%	0.00
		Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Scor
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A N/A	N/A 60%	N/A 40%	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	N/A	40% N/A	N/A N/A	0.00
		Criticality Score	e				15%	0.00
		SCADA System						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 0.00	Calculated 0.00	N/A N/A	Total Factored Scor
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	0.00	0.00	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	30%	N/A	
		Factored Final Score		N/A	0.00	0.00	N/A	0.00
		Criticality Score	e				5%	0.00
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?	? N/A	N/A	Calculated	Calculated	N/A	Total Factored Scor
		Unweighted Failure Mode Score (1-5)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	
	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A N/A	N/A 60%	N/A 20%	N/A N/A	
CHECK	100%							
CHECK	100%	Factored Final Score		N/A	N/A	N/A	N/A	0.00

				South Tahoe PUD	Location Description:	On Airport Property	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Wells Facility ID #:	APRTWL	Date: Condition Assessment	3/8/2012
					Wells Facility Name:	Airport Well	Inspectors:	Peter Lavallee and Mark Gray
					,			-
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Country Club and Twin Peaks Zones
				WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL - WELL NOT R	ATED			
		Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score (1 - 5)	Weighting (1-5)	Final Score					
				Calif. Waterworks Standards				
R R		4	0	compliant with Calif. DWR Bulletin 74-81? compliant with AWWA Standards A100-06 (wells)?				
Fn		3	0	adequate equipment clearances to facilitate routine O&M?	Yes			
Fn		4 5	0	equipment accessible for removal?				
R Fn		3	0	site drainage adequate to prevent flooding of well, buildings, and critical equipment? wellhead minimum 18" above finished grade or floor?				
R		2	0	well electrical controls not in vault?	Within building but not in vault			
Fn		3	0	well equipped with ability to add chlorination facilities? sample taps available to obtain water quality prior to disinfection (between wellhead and check	No chlorine injection because the well has been take	n offline		
Fn		4	0	sample taps available to obtain water quality prior to disinfection (between wellhead and check valve) and after disinfection?	NA			
Fn		5	0	sample tap non-threaded downed-turned?	Yes			
Fn		5	0	bacti sample tap not screened or aerated?		manhala		
Fn Fn		3	0	well able to be pumped to waste with waste discharge line protected from backflow? well meter provided?		mannole		
Fn		4	0	chemical additives NSF 60 compliant?				
Fn		2	0	Well Site adequate vehicle access for year-round maintenance?				
R		3	0		No. This site is indicated as other areas Zone X on the	e FEMA flood map.		
R		4	0		Site is adjacent to a meadow and there is a potential	for wildfires		
R R		2	0	is site close to known active seismic faults? any unstable site conditions (if yes, describe)?	None			
K		2		site lighting, fencing, and security monitoring adequate to discourage unauthorized	The site is within the security of the airport			
Fn		2	0	access/ variualism:				
Fn		2	0	other known problems?	None			
				Building Structure				
Fn		3	0	adequate security measures and monitoring to prevent unauthorized access?		s with unauthorized access into the facility		
PM PM	N/A	N/A	N/A 0	date building was constructed? condition of exterior coatings adequate to protect structure?				
Fn		4	0	adequate openings for ingress/egress?				
Fn		3	0	interior lighting adequate for routine O&M?				
Fn Fn		2	0	building designed to withstand snow load and not create safety issue? building meets code compliance requirements?	Yes for the time when it was constructed Building met requirements of the code for when it w	as constructed		
R		3	0	known fire or haz-mat conditions that could be mitigated?	Proximity to the meadow but no mitigation has occu			
Fn PM		5	0	other known problems? estimated service life remaining?				
FIVI		J	U	esumateu service me remaining:	- 255 Contractic by 5 years			
				Well Pump				
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	pump type?	Submersible Ingersol-Dresser Model 8488			
INFORMATION	N/A	3	0		800gpm @ 80psi			
PM		4	0	pump rebuilt (list year) and describe work done?	Pump has been off since the well exceeded the Arser	ic MCL and is in standby for high peak days. Has not been rebuilt rec	ently	
Fe R		4	0	pump curves available? known history of pump/motor failures? If so, explain the nature of the failure(s).				
R		2	0	number of service calls/repairs in the last year?				
INFORMATION		3	0	what is firm capacity of well pump based on flow test?				
C Pm		4	0	Does zone serviced by pump have adaquate capacity to be served? coatings adequate to provide corrosion protection?		ot pulled		
Fe		5	0	pumps operate efficiently (>70% bowl efficiency)		•		
R		4	0	pumps operate free from excessive vibration?				
Fn Fe		2	0	adequate NPSH available to prevent cavitation? motor high efficiency and no excessive noise?				
R		2	0	spare parts readily available?	Parts are available from the manufacturer and the p	ump would need to be sent in to be rebuilt		
R PM		5	0	other known problems? estimated service life remaining?				
PIM		4	υ	estimated service life remaining?	rast Avvo Oseiui Liie by 5 Years			

		_						
				South Tahoe PUD	Location Description:	On Airport Property	K/J Project Number: 1270004*	00
				Water System Optimization Plan	Wells Facility ID #:	APRTWL	Date:	3/8/2012
					Wells Facility Name:	Airport Well	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
								·
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Country Club and Twin Peaks Zones
				WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL - WELL NOT I				
		4	0	Piping & Valves pipe supports adequate to prevent movement or vibration?				
Fn PM		5	0		Some coating missing and rust can be seen on the piping			
С		3	0	pipes adequately sized to prevent excessive noise or headloss?	Yes			
Fn PM		2	0	valves are suitable for efficient and reliable service?	Yes and no problems have been documented 27 years based on AWU Useful Life			
PIVI		4	U	estinated service me remaining:	27 years based on AWO Oseron Line			
				Supply Well - Sanitary Seal, Casing and Screen				
PM PM		3	0	well casing is in good condition? well screen is in good condition?				
Fe		3	0	well-driller's log is available?				
R		4	0	50 ft. sanitary seal?	No it is 46 ft.			
D		_	0	approximate distance from closest known groundwater contamination hazards (septic tank, leachfield, MTBE/TCE plume, etc.)?				
R INFORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted?				
PM	,	2	0	last year well was redeveloped?				
Fn		3	0	sounding tube or other means to measure depth to water surface?				
Fn PM		5	0	gravel-fill pipe provided at well head to monitor condition of filter pack? estimated service life remaining:				
1 101		3	Ü	Communication of the remaining of the re				
				Wellhead Treatment				
Fn		2	0	chemical storage tanks have secondary containment?	None Tubing is in good condition with no visible defects			
Fn Fn		2	0	if multiple chemicals used, adequate separation of different chemicals?				
Fn		4	0	adequate equipment for meter-pump calibration?	Yes			
Fn		5	0	frequency of dose calibration?				
R INFORMATION	N/A	1 N/A	0 N/A	spare parts and service support readily available? treatment system type and capacity (tank storage)?	Sodium Hypochlorite with direct injection. 30 gal drums on s	ite		
				SCADA system				
Fn		4	0	pump flow meter is adequate to monitor pump performance:				
Fn		1	0	flow totals recorded at regular intervals? How frequent?	the flow totals are recorded daily by hand			
Fn		2	0	pressure instrumentation is adequate to monitor pump performance?	There are pressure gauges throughout the well that monitor	system pressures		
Fn Fn		4	0	automated alarm callout for critical failures and reliability?	The alarm log is maintained but it is not reviewed annually			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	Radio			
R		2	0	communication system is reliable (approximate no. of comm. failures in last year)?				
R		2	0	uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power failure?	A portable back up generator would need to be brought to t	he site in the event of a power outage but there are no ho	okups	
R		3	0	spare parts/service support readily available?	Parts are readily available through the manufacturer or at the			
PM		4	0	estimated service life remaining?	Estimate 10 years based on AWU Useful Life			
				Electrical Power				
R		1	0	standby generator size (kW)?				
R		5	0	adequate power available to run all equipment	Yes			
R	NI/A	5	0	adequate standby power present and reliable?	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
R R	N/A	N/A 5	N/A 0	fuel storage capacity (gals): fuel supply adequate for standby power service?				
R		1	0	time needed to mobilize portable generator?	1-2 hours but there are no hookups			
Fn		2	0	known electrical hazards that could be mitigated?				
R PM		3 4	0	spare parts/service support readily available? estimated service life remaining?				
1 141			0	esumateu servite ille remaining:				
				Additional Data				
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower).	800gpm @ 80psi Well in the off position because of Arsenic levels.			
				Legend				
				PN	Physical Mortality			
		-			Functionality Reliability			
					Financial Efficiency			
-					Capacity			

South Tahoe PUD	Location Description:	On Airport Property	K/J Project Number: 1270004*0	0
Water System Optimization Plan	Wells Facility ID #:	APRTWL	Date:	3/8/2012
	Wells Facility Name:	Airport Well	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
	Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Country Club and Twin Peaks Zones
WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL - WE Photo Evidence for PM,	LL NOT RATED	1		
Prioto evidence for PW,	rii, n, rc	PHOTOS		
2611A35/20 03:07 PM	2011/05/20 0	03:08 PM	2011/05/20 03 0	39 PM
2011/05/720 03307 PM		2011/05/20 03 07 PM	2011/05/20 @8	GIO PM

			<u> </u>					
		South Tahoe PUD	Location Description	Corner of Sacramento	o and Tallac Ave.	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID #	: ATWL:	2	Date:	3/7/	2012
			Wells Facility Name	: Al Tahoe W	/ell #2	Condition Assessment Inspectors:	Peter Lavallee	and Phill Torney
								,
			Pressure Zones Served	Stateline 2	Zone	Adjacent Pressure Zones:	Twin Pe	aks Zone
		Notes:		Fai	lure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level functionality	of Service reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements		best available technology financial efficiency is high	
			3: moderate deterioration 4: significant deterioration	3: greater than 90% of design requirements	3: meets all requirements 4: fails some requirements	3: failure every 11 to 20 yrs	3: financial efficiency is average 4: financial efficiency is low	
			5: virtually unserviceable	4: greater than 85% of design requirements 5: less than 85% of design requirements	5: Fails all requirements		5: asset should be replaced	
		California Waterworks Standard	i					
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-5		N/A N/A	Calculated 1.40	Calculated 1.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-25) N/A	N/A	5.60	3.75	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score	e N/A	N/A N/A	70% 3.92	30% 1.125	N/A N/A	5.05
		Criticality Score Well Site					10%	0.50
		Is Failure Mode Score Calculated or Assigned	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5 Weighted Final Score (1-25) N/A	N/A N/A	2.33 4.67	1.75 6.25	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		N/A N/A	70% 3.27	30% 1.875	N/A N/A	5.14
		Criticality Score Building Structure	e				5%	0.26
		Is Failure Mode Score Calculated or Assigned	? Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5 Weighted Final Score (1-25		N/A N/A	1.00 3.33	1.00 3.00	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Scor	10%	N/A N/A	60%	30% 0.9	N/A N/A	3.55
		Criticality Score	2				5%	0.18
		Well Pump Is Failure Mode Score Calculated or Assigned		Calculated	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5 Weighted Final Score (1-25		1.00 3.00	5.00 10.00	1.60 4.20	4.00 13.33	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%	15%	20%	30% 3.00	20%	15% 2.00	
		Factored Final Score Criticality Score		0.60	3.00	0.84	15%	7.04 1.06
		Piping & Valve: Is Failure Mode Score Calculated or Assigned		Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5	2.00	1.00	1.00	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%	10%	60%	30%	N/A N/A	N/A N/A	
		Factored Final Score Criticality Score		1.80	0.90	N/A	N/A 10%	3.65 0.37
		Supply Well - Sanitary Seal, Casing and Screer Is Failure Mode Score Calculated or Assigned		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5	4.25	N/A	5.00	1.50	5.00	Total Factored Score
CHECK	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%	10%	N/A N/A	17.50 50%	7.00 20%	15.00 20%	
		Factored Final Score Criticality Score		N/A	8.75	1.40	3.00 15%	14.40 2.16
		Wellhead Treatmen	t	N/A	Colonidated	Calculated	N/A	
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-5) N/A	N/A N/A	Calculated 1.60	1.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%) N/A	N/A N/A	4.20 60%	1.00 40%	N/A N/A	
		Factored Final Scor Criticality Scor		N/A	2.52	0.40	N/A 15%	2.92 0.44
		SCADA System	1					
		Is Failure Mode Score Calculated or Assigned Unweighted Failure Mode Score (1-5	2.00	N/A N/A	Calculated 1.00	Calculated 2.67	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25 Criticality Weighting Factor (0 - 100%		N/A N/A	3.33 60%	6.00 30%	N/A N/A	
		Factored Final Score	0.80	N/A	2.00	1.80	N/A 5%	4.60
		Criticality Score					<u> </u>	0.23
		Electrical Powe Is Failure Mode Score Calculated or Assigned	? Calculated	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5 Weighted Final Score (1-25	2.00	N/A N/A	1.00 3.00	1.00 4.20	N/A N/A	i otal ractored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%	20%	N/A N/A	60% 1.80	20%	N/A N/A	4.24
		Factored Final Score Criticality Score		N/A	1.80	0.84	20%	4.24 0.85
						O	verall Total Factored Score (Out of 25) =	6.04

				South Tahoe PUD	Location Description:	Corner of Sacramento and Tallac Ave.	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Wells Facility ID #:	ATWL2	Date:	3/7/2012
							Condition Assessment	
					Wells Facility Name:	Al Tahoe Well #2	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
		Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score (1 - 5)	Weighting (1-5)	Final Score					
		_		Calif. Waterworks Standards				
R R	1 1	4	4	compliant with Calif. DWR Bulletin 74-81? compliant with AWWA Standards A100-06 (wells)?				
Fn	1	3	3	adequate equipment clearances to facilitate routine O&M?	Yes			
Fn R	1	4 5	4 5	equipment accessible for removal? site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn	1	3	3	wellhead minimum 18" above finished grade or floor?	Yes			
R	1	2	2		Controls are in the building and not in the vault			
Fn	1	3	3	well equipped with ability to add chlorination facilities? sample taps available to obtain water quality prior to disinfection (Detween wellhead and check	even has chiorination			
Fn	1	4	4	valve) and after distinction:		on		
Fn Fn	5	5	5 25	sample tap non-threaded downed-turned? bacti sample tap not screened or aerated?				
Fn	1	2	25	well able to be pumped to waste with waste discharge line protected from backflow?		vithout entering the distribution system		
Fn	1	3	3	well meter provided?				
Fn	1	4	4	chemical additives NSF 60 compliant?	Yes			
				Well Site				
Fn	1	2	2	adequate vehicle access for year-round maintenance?				
R R	1	3 4	3 4	is site within 100-yr flood plain? is site vulnerable to wildfires?	No. This site is indicated as other areas Zone X on t	he FEMA flood map.		
R	4	4	16	is site close to known active seismic faults?				
R	1	2	2	any unstable site conditions (if yes, describe)?	None			
Fn	5	2	10	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	Minimal site security available back lot is fenced but	adjacent land owners have entered the site before		
Fn	1	2	2	other known problems?	None			
				Building Structure				
Fn	1	3	3	adequate security measures and monitoring to prevent unauthorized access?	Doors are locked and keyed for District personnel. N	No known unauthorized access has occurred		
INFORMATION	N/A	N/A	N/A	date building was constructed?	1994			
PM Fn	1	3 4	3 4	condition of exterior coatings adequate to protect structure? adequate openings for ingress/egress?	Block building is in good condition with no issues se There are multiple points of entry into the well	en		
Fn	1	3	3	interior lighting adequate for routine O&M?	Yes			
Fn Fn	1	2	2	building designed to withstand snow load and not create safety issue? building meets code compliance requirements?				
R	1	3	3	known fire or haz-mat conditions that could be mitigated?				
Fn	1	4	4	other known problems?	None 12 years according to AWU Useful Life			
PM	2	5	10	estimated service life remaining?	12 years according to AWO OSEIN LITE			
				Well Pump				
INFORMATION	N/A	N/A	N/A	pump type? pump manufacturer?	Vertical Turbine			
INFORMATION INFORMATION	N/A	N/A 3	N/A 0		2500gpm @90psi			
PM		4	0	pump rebuilt (list year) and describe work done?	Pump has been pulled and rebuilt a few times the la	ist time being 1993		
Fe R	5 1	2	20	pump curves available? known history of pump/motor failures? If so, explain the nature of the failure(s).	Pump curves are available None			
R	1	2	2	number of service calls/repairs in the last year?	None			
INFORMATION C	1	3	0	what is firm capacity of well pump based on flow test? Does zone serviced by pump have adaquate capacity to be served?				
Pm	1	4	4	coatings adequate to provide corrosion protection?	There are no visible defect in the coating			<u> </u>
Fe	2	5	10	pumps operate efficiently (>70% bowl efficiency)	insufficient data to determine pump efficiency, but	specific energy is low (1200 kW-hr/Mgal) relative to other District well pu	ımps.	
R Fn	5	2	4 10	pumps operate free from excessive vibration? adequate NPSH available to prevent cavitation?				
Fe	5	2	10	motor high efficiency and no excessive noise?	insufficient data			
R R	1	2 5	- 8 - 5	spare parts readily available? other known problems?	none readily available contact supplier			
PM	2	4	8		12 years according to AWU Useful Life			

			South Tahoe PUD	Location Description:	Corner of Sacramento and Tallac Ave.	K/J Project Number: 127000	1*00
					corner of Sacramento and Tallac Ave.	, , , , , , , , , , , , , , , , , , , ,	¥ 00
			Water System Optimization Plan	Wells Facility ID #:	ATWL2	Date:	3/7/2012
				Wells Facility Name:	Al Tahoe Well #2	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
				Treat reality reality	A TOROC WELLINE	opectors.	reter Edvance and Time Forney
				Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
1	4	4					
3	5	15	coatings adequate to protect piping and valves?	Some coatings have worn off and some rust is visible on s	me of the components		
1	4	4					
			Sunnly Wall - Sanitary Soal Casing and Screen				
5	3	15					
5	3	15					
1	3 4	15 4	50 ft sanitary seal?	Yes it is 105ft			
			approximate distance from closest known groundwater contamination hazards (septic tank,	Sentinel Wells around the outskirs of the Al Tahoe Neighb	orhood have indicated MTBE but these do not affect this well		
2 N/Δ	5 N/Δ						
5	2	10					
5	3	15					
2	4 5						
	-		-				
-	2	10					
1	2	2					
N/A	N/A	N/A	if multiple chemicals used, adequate separation of different chemicals?	NA NA			
1							
1	1	1	spare parts and service support readily available?	Yes			
N/A	N/A	N/A	treatment system type and capacity (tank storage)?	Sodium Hypochlorite with direct injection multiple 30 gal	anks onsite		
			SCADA system				
1	4	4					
1			flow totals recorded at regular intervals? How frequent? pressure instrumentation is adequate to monitor pump performance?	the flow totals are recorded daily by hand There are pressure gauges throughout the well that monit	or system pressures		
1	4	4	automated alarm callout for critical failures and reliability?	Yes and it is monitored by District Operations			
1	4	4					
1 1	N/A 2	N/A 2	communication system is reliable (approximate no. of comm. failures in last year)?	No communication issues in the last year			
			uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power	A portable back up generator would need to be brought to	the site in the event of a power outage		
5	2						
2	4	8					
			Electrical Payer				
N/A	N/A	N/A					
1	5	5	adequate power available to run all equipment	Yes		P 1	
1 N/A	5 N/Δ				to the pump so the generator runs the pump directly by wither	alesel or propane.	
1	5	5					
N/A	1	N/A					
2	3						
2	4	8					
			مقدن المسمئة الدائم				
N/A	N/A	N/A					
	,			Well is generally in the off position but is run and tested o	Wednesdays to keep the well fresh		
			Fn	Functionality			
				Reliability			
				Financial Efficiency Capacity			
	5 5 5 5 1 2 2 N/A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 5 1 3 1 2 1 4 5 3 5 3 5 3 5 3 5 3 5 3 1 4 2 5 N/A N/A 5 2 5 3 5 4 2 5	3 5 15 1 3 3 3 1 1 2 2 2 1 4 4 4 5 3 15 5 3 15 5 3 15 5 3 15 5 3 15 5 3 15 1 4 4 4 4 2 5 10 N/A N/A N/A N/A 5 2 10 5 3 15 5 4 20 2 5 10 5 3 15 5 4 20 2 5 10 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 4 4 9 pipe supports adequate to prevent movement or vibration. 3 5 5 15 Contains a dequate to prevent excessive noise or headross. 1 2 2 2 2 valves are suitable for efficient affects of the state of	Second Process of the Control of t	1	

	South Tahoe PUD	Location Description:	Corner of Sacramento and Tallac Ave.	K/J Project Number: 1270004*0	0
	Water System Optimization Plan	Wells Facility ID #:	ATWL2	Date:	3/7/2012
		Wells Facility Name:	ALT L. W. H.	Condition Assessment	
			Al Tahoe Well #2	Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
	Photo Evidence for PM,	, Fn, R, FE			
			PHOTOS		
A DUTTE WIND IN					

		South Tahoe PUD	Location Description:	Corner of Black Rock Rd	and North Rd	K/J Project Numb	er: 1270004*00		
		Water System Optimization Plan	Wells Facility ID #:	BRWL2		Da	te: 3/13/2	2012	
			·	Blackrock Well #2		Condition Assessment		and Jeremy Rutherdale	
			Wells Facility Name:					Jeremy Rutherdale	
			Pressure Zones Served:	Stateline Zo	ne	Adjacent Pressure Zon	es: Twin Pea	ıks Zone	
		WELL OFFLINE DUE TO MTBE LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RAT	ED.	Failu	re Mode Scoring (1 - 5)				
		Notes: 1. Capacity score will be based on hydraulic model	Physical Mortality	Capacity	= 1 1 1	of Service	Financial Efficiency		
				1: meets or exceeds design requirements	functionality 1: exceeds all requirements	reliability 1: failure every > 40 yrs	1: best available technology		
				greater than 95% of design requirements greater than 90% of design requirements	2: exceeds some requirements 3: meets all requirements	2: failure every 21 to 40 yrs 3: failure every 11 to 20 yrs	financial efficiency is high financial efficiency is average		
				4: greater than 85% of design requirements	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low		
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced		
		California Waterworks Standard							
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A		
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score	
enze	1000/	Weighted Final Score (1-25)		N/A	N/A	N/A	N/A		
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	70% N/A	30% N/A	N/A N/A	0.00	
		Criticality Score			.47.	1971	10%	0.00	
		Well Site							
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Pactoreu SCOPE	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	70%	30%	N/A		
		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00	
		Criticality Score					5%	0.00	
		Building Structure Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A		
		Unweighted Failure Mode Score (1-5)		N/A N/A	N/A	N/A	N/A N/A	Total Factored Score	
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A		
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	30%	N/A	2.22	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 5%	0.00	
		Well Pump						0.00	
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A		
		Unweighted Failure Mode Score (1-5)		N/A N/A	N/A	N/A	N/A N/A	Total Factored Score	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A 20%	N/A 30%	N/A 20%	15%		
CHECK	100/0	Factored Final Score		N/A	N/A	N/A	N/A	0.00	
		Criticality Score					15%	0.00	
		Piping & Valves							
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score	
		Weighted Final Score (1-25)		N/A	N/A	N/A	N/A		
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	60%	30%	N/A	N/A		
		Factored Final Score		N/A	N/A	N/A	N/A	0.00	
		Criticality Score Supply Well - Sanitary Seal, Casing and Screen					10%	0.00	
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A		
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score	
OUEC::	1000/	Weighted Final Score (1-25)		N/A	N/A	N/A	N/A		
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	50% N/A	20% N/A	20% N/A	0.00	
		Criticality Score		O/A	19/75	IN/A	15%	0.00	
		Wellhead Treatment							
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	40%	N/A N/A		
		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00	
		Criticality Score					15%	0.00	
		SCADA System Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A		
		Unweighted Failure Mode Score Calculated or Assigned?		N/A N/A	0.00	0.00	N/A N/A	Total Factored Score	
		Weighted Final Score (1-25)	0.00	N/A	0.00	0.00	N/A		
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	30%	N/A		
		Factored Final Score Criticality Score		N/A	0.00	0.00	N/A 5%	0.00	
		Electrical Power					570	0.00	
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A		
		Unweighted Failure Mode Score (1-5)		N/A	N/A	N/A	N/A	Total Factored Score	
CHECK	100%	Weighted Final Score (1-25)	N/A	N/A	N/A	N/A 20%	N/A		
СНЕСК	100%		N/A 20%			N/A 20% N/A	N/A N/A N/A	0.00	

			South Tahoe PUD	Location Description:	Corner of Black Rock Rd and North Rd	K/J Project Number: 1270004*00	
				·			
			Water System Optimization Plan	Wells Facility ID #:	BRWL2	Date:	3/13/2012
						Condition Assessment	
				Wells Facility Name:	Blackrock Well #2	Inspectors:	Peter Lavallee and Jeremy Rutherdale
				Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
			WELL OFFLINE DUE TO MTBE LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RATE	ED.			
	Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type		inal Score			CONDITION ASSESSIMENT CHECKEST		
			Calif. Waterworks Standards				
R		0	compliant with Calif. DWR Bulletin 74-81?				
R Fn		0	compliant with AWWA Standards A100-06 (wells)? adequate equipment clearances to facilitate routine O&M?		Il head is next to the door		
Fn		0	equipment accessible for removal?	Equipment removed through roof hatches			
R Fn		0	site drainage adequate to prevent flooding of well, buildings, and critical equipment? wellhead minimum 18" above finished grade or floor?		the west side of the building		
R		0		Electrical boxes are within the building			
Fn		0	well equipped with ability to add chlorination facilities?	Chlorination facilities are in place			
Fn		0	sample taps available to obtain water quality prior to disinfection (between wellhead and check valve) and after disinfection?	Yes			
Fn		0	sample tap non-threaded downed-turned?				
Fn Fn		0	bacti sample tap not screened or aerated? well able to be pumped to waste with waste discharge line protected from backflow?		with an air gan		
Fn		0	well meter provided?		7.1.1 d.1 d.1 g.p		
Fn		0	chemical additives NSF 60 compliant?	Yes			
			Well Site				
Fn		0	adequate vehicle access for year-round maintenance?	Yes			
R R		0	is site within 100-yr flood plain? is site vulnerable to wildfires?	No. This site is indicated as other areas Zone X	Con the FEMA flood map.		
R R		0	is site vuinerable to whome seismic faults?				
R		0	any unstable site conditions (if yes, describe)?	None			
Fn		0	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	The facility needs to be painted multiple times	s per year due to graffiti		
Fn		0	other known problems?	None			
			Duilding Chrushup				
Fn		0	Building Structure adequate security measures and monitoring to prevent unauthorized access?	The building is locked and there has been no hi	istory of unauthorized access		
PM		0	date building was constructed?	1959			
PM Fn		0	condition of exterior coatings adequate to protect structure?	Yes it has been repainted numerous times due Yes but one door is blocked by the well head	to graffiti		
Fn		0	interior lighting adequate for routine O&M?	Yes			
Fn Fn		0	building designed to withstand snow load and not create safety issue? building meets code compliance requirements?				
R		0	known fire or haz-mat conditions that could be mitigated?				
Fn		0	other known problems?	None			
PM		0	estimated service life remaining?	EVICEOR WAND OPEIN! FILE			
			Well Pump				
INFORMATION INFORMATION	N/A N/A N/A N/A	N/A N/A	pump type? pump manufacturer?				
INFORMATION	N/A N/A	0	pump manufacturer? pump capacity?				
PM		0	pump rebuilt (list year) and describe work done?	None			
Fe R		0	pump curves available? known history of pump/motor failures? If so, explain the nature of the failure(s).				
R		0	number of service calls/repairs in the last year?	None			
INFORMATION C	3	0	what is firm capacity of well pump based on flow test? Does zone serviced by pump have adaquate capacity to be served?				
Pm	,	0	coatings adequate to provide corrosion protection?		d not evaluate the coatings		
Fe R		0	pumps operate efficiently (>70% bowl efficiency)				
Fn		0	pumps operate free from excessive vibration? adequate NPSH available to prevent cavitation?				
Fe		0	motor high efficiency and no excessive noise?	The sure would need to the terminal	and the investment and a free the second sec		
R R		0	spare parts readily available? other known problems?	The pump would need to be pulled to determing None	ne the issue and parts order from the supplier		
PM		0	estimated service life remaining?				
PM		U	estimated service life remaining?				

				South Tahoe PUD	Location Description:	Corner of Black Rock Rd and North Rd	K/J Project Number: 1270004	00
				Water System Optimization Plan	Wells Facility ID #:	BRWL2	Date:	3/13/2012
					Malla Facilità Norre		Condition Assessment	
					Wells Facility Name:	Blackrock Well #2	Inspectors:	Peter Lavallee and Jeremy Rutherdale
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
				WELL OFFLINE DUE TO MTBE LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RAT	TED.			
				Piping & Valves	•			
Fn			0	pipe supports adequate to prevent movement or vibration?		uctod		
PM C			0	pipes adequately sized to prevent excessive noise or headloss?	Not all pipes have coatings and some of the flanges are r	usted		
Fn			0		No issues with nay of the valving and they are adequate			
PM			0	estimated service life remaining?	7 years based on AWU Useful Life			
				Supply Well - Sanitary Seal, Casing and Screen				
PM			0	well casing is in good condition?				
PM			0	well screen is in good condition?				
Fe R			0	well-driller's log is available? 50 ft. sanitary seal?	Unknown			
N			U	approximate distance from closest known groundwater contamination hazards (septic tack)	This well has had a stitle by C. Agree 11. 11. 11.	aluma aluma af MTDF		
R			0	icacinicia, ini bej ree planie, etc.).	1	IOWN PIUME OT MTBE		
NFORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted?				
PM Fn			0	last year well was redeveloped? sounding tube or other means to measure depth to water surface?				
Fn			0	gravel-fill pipe provided at well head to monitor condition of filter pack?				
PM			0	estimated service life remaining?		-		,
Fn			0	Wellhead Treatment chemical storage tanks have secondary containment?				
Fn			0	chemical storage tanks have secondary containments chemical piping/tubing is in good condition?				
Fn			0	if multiple chemicals used, adequate separation of different chemicals?	NA NA			
Fn			0	adequate equipment for meter-pump calibration?				
Fn R			0	frequency of dose calibration? spare parts and service support readily available?	would be daily but it is not in use			
NFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)?				
					Nothing in this well is connected to SCADA			
Fn Fn			0	pump flow meter is adequate to monitor pump performance? flow totals recorded at regular intervals? How frequent?	P NA			
Fn			0	pressure instrumentation is adequate to monitor pump performance?	NA			
Fn			0	automated alarm callout for critical failures and reliability?	NA NA			
Fn			0	alarm log maintained and reviewed annually?				
NFORMATION R	N/A	N/A	N/A 0	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? communication system is reliable (approximate no. of comm. failures in last year)?				
K			0	communication system is reliable (approximate no. of comm. failures in last year)? uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power failure?	· · · ·			
R			0	failure?	NA NA			
R PM			0	spare parts/service support readily available? estimated service life remaining?				
PIVI			0	estimated service life remaining?	, INA			
				Electrical Power				
R			0	standby generator size (kW)?				
R			0	adequate power available to run all equipment				
R NFORMATION	N/A	N/A	0 N/A	adequate standby power present and reliable? fuel storage capacity (gals)?				
R	14/15	14/75	0	fuel supply adequate for standby power service?	NA NA			
R			0	time needed to mobilize portable generator?	There are no hookups for a portable generator so 1-2 ho	urs plus time to retrofit connections		
Fn R			0	known electrical hazards that could be mitigated?				
R PM			0	spare parts/service support readily available? estimated service life remaining?				
					This well has been off due to MTBE			
NFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower): Legend				
					Physical Mortality			
				Fn	Functionality			
					Reliability			
					Financial Efficiency Capacity			

South Tahoe PUD	Location Description:	Corner of Black Rock Rd and North Rd	K/J Project Number: 1270004*0	10
Water System Optimization Plan	Wells Facility ID #:	BRWL2	Date:	3/13/2012
	Wells Facility Name:	Blackrock Well #2	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
	Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
WELL OFFLINE DUE TO MTBE LEVELS THAT HAVE BEEN DETECTED WITHIN THE WE	LL. WELL NOT RATED.			
Photo Evidenc	e for PM, Fn, R, FE	PHOTOS		
2011/05/25 01 21 18	2011/06	5/25 01:21 PM	2011/05/26 01 21 PM	
2011/05/25 01:20 FM	2031/00	7 215 @1 226 FM		

		South Tahoe PUD	Location Description:	Chris Ave.		K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID #	CHRISWL		Date	3/8/20	012
			Wells Facility Name	Chris Well	ı	Condition Assessment Inspectors:	Peter Lavallee a	nd Mark Gray
			Pressure Zones Served:	Stateline Zo	ne	Adjacent Pressure Zones:	Twin Peal	ks Zone
			Tressure zones serveu.	Statemie 20	iie	Adjucent Fessure Zones.	IWIII Fear	KS ZUITE
		Notes:	Dhysical Mantelity		re Mode Scoring (1 - 5)	of Service	Financial Ffficience	
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	reliability	Financial Efficiency	
			1: new or excellent condition 2: minor defects only 3: moderate deterioration	meets or exceeds design requirements greater than 95% of design requirements greater than 90% of design requirements	exceeds all requirements exceeds some requirements meets all requirements	1: failure every > 40 yrs 2: failure every 21 to 40 yrs 3: failure every 11 to 20 yrs	best available technology financial efficiency is high financial efficiency is average	
			4: significant deterioration 5: virtually unserviceable	4: greater than 85% of design requirements 5: less than 85% of design requirements	4: fails some requirements 5: Fails all requirements	4: failure every 5 to 10 yrs 5: failure < 5 yrs	4: financial efficiency is low 5: asset should be replaced	
		California Waterworks Standard		3. less than 63% of design requirements	3. Talis all requirements	3. Tallule < 3 yls	3. asset siloula be replaced	
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Foots and Cook
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	1.80 7.30	1.00 3.75	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	70% 5.11	30% 1.125	N/A N/A	6.24
		Criticality Score Well Site					10%	0.62
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	1.67 3.33	1.75 6.25	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	70% 2.33333333	30% 1.875	N/A N/A	4.21
		Criticality Score Building Structure					5%	0.21
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	4.00	N/A N/A	1.33 4.33	3.00 9.00	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	60% 2.6	30% 2.7	N/A N/A	5.70
		Criticality Score		·			5%	0.29
		Well Pump Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		1.00 3.00	5.00 10.00	1.40 3.80	4.33 15.67	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		20% 0.60	30% 3.00	20% 0.76	15% 2.35	9.31
		Criticality Score Piping & Valves					15%	1.40
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	T-1-1 51 d 5
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		2.00	3.00 11.00	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		60% 3.60	30% 3.30	N/A N/A	N/A N/A	9.15
		Criticality Score Supply Well - Sanitary Seal, Casing and Screen					10%	0.92
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Francisco
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	16.25	N/A N/A	5.00 17.50	3.00 14.50	5.00 15.00	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	50% 8.75	20% 2.90	20% 3.00	16.28
		Criticality Score Wellhead Treatment					15%	2.44
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	N/A	N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	N/A	N/A N/A	60% N/A	40% N/A	N/A N/A	0.00
		Criticality Score SCADA System					15%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	0.00	N/A N/A	5.00 16.67	5.00 11.67	N/A N/A	. J.u. i uctoreu store
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	60% 10.00	30% 3.50	N/A N/A	13.50
		Criticality Score Electrical Power					5%	0.68
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	N/A N/A	3.00 9.40	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	60% N/A	20% 1.88	N/A N/A	1.88
		Criticality Score					20% Overall Total Factored Score (Out of 25) =	0.38 6.92

				South Tahoe PUD	Location Description:	Chris Ave.	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Wells Facility ID #:	CHRISWL	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Chris Well	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
		Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score (1 - 5)	Weighting (1-5)	Final Score	Calif. Waterworks Standards				
R	1	4	4	compliant with Calif. DWR Bulletin 74-81?				
R	1	4	4	compliant with AWWA Standards A100-06 (wells)?				
Fn Fn	1	3	3	adequate equipment clearances to facilitate routine O&M?	Yes Yes through a roof hatch in the building.			
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn	1	3	3	wellhead minimum 18" above finished grade or floor?		a Alexandra de Caracteria de C		
R Fn	1	3	3	usul aguinga duith a blitu ta add ablacinatan facilities?	Electrical controls are in the building but not in Chlorination is available to be connected	i the vauit		
				sample taps available to obtain water quality prior to disinfection (between wellhead and check	Yes			
Fn Fn	4	4 5	4 20	valve) and after disinfection? sample tap non-threaded downed-turned?				
Fn	5	5	25	bacti sample tap not screened or aerated?				
Fn	2	2	4	well able to be pumped to waste with waste discharge line protected from backflow?				
Fn Fn	1 1	3 4	3 4	well meter provided? chemical additives NSF 60 compliant?				
	<u> </u>	-		chemical additives har to compliant.				
				Well Site				
Fn R	1	2	3	adequate vehicle access for year-round maintenance?	Yes No. This site is indicated as other areas Zone >	K on the FFMA flood man		
R	1	4	4	is site vulnerable to wildfires?	No	ton the remainable		
R	4	4	16	is site close to known active seismic faults?				
R	1	2	2	any unstable site conditions (if yes, describe)? site lighting, fencing, and security monitoring adequate to discourage unauthorized	None			
Fn	3	2	6	access/varidatism:				
Fn	1	2	2	other known problems?	None			
				Building Structure				
Fn	3	3	9	adequate security measures and monitoring to prevent unauthorized access?				
INFORMATION PM	N/A 1	N/A 3	N/A 3	date building was constructed? condition of exterior coatings adequate to protect structure?				
Fn	1	4	4	adequate openings for ingress/egress?	Yes			
Fn	1	3	3	interior lighting adequate for routine O&M? building designed to withstand snow load and not create safety issue?				
Fn Fn	1	2	2	building designed to withstand show load and not create safety issuer building meets code compliance requirements?				
R	3	3	9	known fire or haz-mat conditions that could be mitigated?	Located in wooded area and has compisition r	oof and wood sided building		
Fn PM	1	4 5	5	other known problems? estimated service life remaining?	None 18 years according to AWU Useful Life			
	-		-					
INCODE ANTIQUE	**/*	21/2	**/*	•		t could be turned back on pending the review of the MTBE policy. Wel	I was turned off in October 2011.	
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	pump type? pump manufacturer?	Submersible Pump Goulds			
INFORMATION	3	3	9	pump capacity?	unknown			
PM Fe	3	4	12 12	pump rebuilt (list year) and describe work done? pump curves available?				
R	1	2	2	known history of pump/motor failures? If so, explain the nature of the failure(s).	None			
R		2	0	number of service calls/repairs in the last year?	Turned off			
INFORMATION C	1	3	3	what is firm capacity of well pump based on flow test? Does zone serviced by pump have adaquate capacity to be served?				
Pm	5	4	20	coatings adequate to provide corrosion protection?	Pump coatings are unavailable since the pump	was not pulled		<u>'</u>
Fe R	5 1	5	25 4	pumps operate efficiently (>70% bowl efficiency) pumps operate free from excessive vibration?				
Fn	5	2	10	adequate NPSH available to prevent cavitation?	Insufficient data			
Fe	5	2	10	motor high efficiency and no excessive noise?	Insufficient data			
R R	1	5	- 8 - 5	spare parts readily available? other known problems?	Parts would need to be ordered from the man None	uidetuiei		
PM	5	4	20			vell pump has exceeded it AWU Useful life by 10 to 20 years		
								<u> </u>

				South Tahoe PUD	Location Description:	Chris Ave.	K/J Project Number: 127000	±*nn
				South range 1 SD	Eccation Description.	CIIIIS AVE.	1,75110,000	. 00
				Water System Optimization Plan	Wells Facility ID #:	CHRISWL	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Chris Well	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
Fn	5	4	20	Piping & Valves pipe supports adequate to prevent movement or vibration?				
PM	5	5	20 25	coatings adequate to protect piping and valves?	No coatings and the pipe has corrosion on it			
C	2	3	6	pipes adequately sized to prevent excessive noise or headloss?		flow from well		
Fn PM	5	4	20	valves are suitable for efficient and reliable service? estimated service life remaining?	2 0-10 years based on AWU Useful Life			
PM	5	3	15	Supply Well - Sanitary Seal, Casing and Screen well casing is in good condition?				
PM	5	3	15	well screen is in good condition?	Insufficient data			
Fe R	5	3 4	15 4	well-driller's log is available? 50 ft. sanitary seal?	Yes it is 50 ft			
				approximate distance from closest known groundwater contamination hazards (septic tank,	This well had 5 consecutive hits of MTRE			
R INFORMATION	5 N/A	5 N/A	25 N/A	leachfield, MTBE/TCE plume, etc.)? last year of down-hole inspection and what defects were noted?				
PM	5	2	10	last year well was redeveloped?	Insufficient data			
Fn Fn	5	3 4	15 20	sounding tube or other means to measure depth to water surface? gravel-fill pipe provided at well head to monitor condition of filter pack?				
PM	5	5	25		Well was installed in 1960. Estimate that the well pump has e	exceeded it AWU Useful life by 2 years		
				Mallhard Tarakarak	Chloring treatment has been removed from the site but the	connections are still available		
Fn	N/A	2	N/A	chemical storage tanks have secondary containment?	Chlorine treatment has been removed from the site but the o	connections are still available.		
Fn	N/A	2	N/A	chemical piping/tubing is in good condition?	NA NA			
Fn Fn	N/A N/A	N/A 4	N/A N/A	if multiple chemicals used, adequate separation of different chemicals? adequate equipment for meter-pump calibration?				
Fn	N/A	5	N/A	frequency of dose calibration?				
R INFORMATION	N/A N/A	1 N/A	N/A N/A	spare parts and service support readily available? treatment system type and capacity (tank storage)?				
INICINIATION	N/A	N/A	N/A					
		ļ			Station has never been connected to SCADA			
Fn Fn	3 5	1	12 5	pump flow meter is adequate to monitor pump performance? flow totals recorded at regular intervals? How frequent?				
Fn	5	2	10	pressure instrumentation is adequate to monitor pump performance?	NA NA			
Fn Fn	5	4	20	automated alarm callout for critical failures and reliability? alarm log maintained and reviewed annually?				
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	NA NA			
R	5	2	10	communication system is reliable (approximate no. of comm. failures in last year)? uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power	P NA			
R	5	2	10	failure?	?			
R PM	5 N/A	3 4	15 N/A	spare parts/service support readily available? estimated service life remaining?				
	.,,		.,,					
INFORMATION	N/A	21/2	N/A	Electrical Power				
INFORMATION R	N/A 1	N/A 5	N/A 5	standby generator size (kW)? adequate power available to run all equipment				
R	5	5	25	adequate standby power present and reliable?	No			
INFORMATION R	N/A N/A	N/A 5	N/A N/A	fuel storage capacity (gals)? fuel supply adequate for standby power service?				
R	5	1	5	time needed to mobilize portable generator?	No hookups so the site would need to be retrofitted			
Fn R	N/A 4	3	N/A 12	known electrical hazards that could be mitigated?	None They would need to be ordered from the manufacturer			
PM	N/A	4	N/A	estimated service life remaining?				
				Additional Data				
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):				
					This well has been turned off due to MTBE hits. The policy is	under review and the well may be put back into service.		
		1		Legend PM	I Physical Mortality			
				Fn	Functionality			
		+			Reliability Financial Efficiency			
					Capacity			

South Tahoe PUD	Location Description:	Chris Ave.	K/J Project Number: 1270004*0	0
Water System Optimization Plan	Wells Facility ID #:	CHRISWL	Date:	3/8/2012
	Wells Facility Name:	Chris Well	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
	Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
Photo Evidence for PM, Fn, R, FE		1		
Photo Evidence for PM, Fn, K, FE		PHOTOS		
2011//03/20 1/2; 1/3 (N.)		2011/05/20 12:16:3/\		2011/05/20 12:15 PM
2011/03/20 12:15:14		2011/05/20 12-15 PM		

		South Tahoe PUD	Location Description:	On Clement Ave near intersect	tion with Gardner St.	K/J Project Numbe	1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	CLMTWL		Dat		2012
			Wells Facility Name:	Clement Wo	ell	Condition Assessme Inspector		and Mark Gray
			Pressure Zones Served:	Gardner Mountain or Stateline zo	one depending on valving	Adjacent Pressure Zone	Twin peaks zone or Stateline	zone depending on valving
		WELL OFFLINE DUE TO CONTAMINATE LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WEL	L NOT RATED.					
		Notes:		Failu	re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level (of Service reliability	Financial Efficiency	
		3. For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements	1: failure every > 40 yrs 2: failure every 21 to 40 yrs	best available technology financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements 4: greater than 85% of design requirements	3: meets all requirements 4: fails some requirements	3: failure every 11 to 20 yrs 4: failure every 5 to 10 yrs	3: financial efficiency is average 4: financial efficiency is low	
				5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standard						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	N/A	N/A N/A	70% N/A	30% N/A	N/A N/A	0.00
		Criticality Score Well Site					10%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	rotal ractored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	70% N/A	30% N/A	N/A N/A	0.00
		Criticality Score		-911	.911		5%	0.00
		Building Structure Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	30%	N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 5%	0.00
		Well Pump Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A 20%	N/A 30%	N/A 20%	N/A 15%	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 15%	0.00
		Piping & Valves					216	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	N/A	N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A 60%	N/A 30%	N/A N/A	N/A N/A	
-		Factored Final Score Criticality Score	N/A	N/A	N/A	N/A	N/A 10%	0.00
		Supply Well - Sanitary Seal, Casing and Screen						0.00
·		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
CUECY	1000/	Weighted Final Score (1-25)	N/A	N/A N/A	N/A 50%	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	N/A	N/A N/A	50% N/A	20% N/A	20% N/A	0.00
		Criticality Score Wellhead Treatment					15%	0.00
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	N/A	N/A N/A	60% N/A	40% N/A	N/A N/A	0.00
		Criticality Score SCADA System					15%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Parker 10
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	0.00	0.00	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	10%	N/A N/A	60% 0.00	30% 0.00	N/A N/A	0.00
		Criticality Score		NA	0.00	0.00	5%	0.00
		Electrical Power Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	20%	<mark>N/A</mark> N/A	N/A 60%	N/A 20%	N/A N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 20%	0.00
	1 1	Criticality Score					Overall Total Factored Score (Out of 25) =	0.00

			South Tahoe PUD	Location Description:	On Clement Ave near intersection with Gardner St.	K/J Project Number: 12700	004*00
				·			
		,	Water System Optimization Plan	Wells Facility ID #:	CLMTWL	Date:	3/8/2012
			, .			Condition Assessment	· ·
				Wells Facility Name:	Clement Well	Inspectors:	Peter Lavallee and Mark Gray
				,			
				Pressure Zones Served:	Gardner Mountain or Stateline zone depending on valving	Adjacent Pressure Zones:	Twin peaks zone or Stateline zone depending on valving
					duranter infoantain of statesing zone acpending on varying		TWIT peaks zone of statesine zone depending on valving
			WELL OFFLINE DUE TO CONTAMINATE LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL	NOT RATED.			
		l					
	Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score (1 - 5) Weighting (1-5) Fin	inal Score					
R		0	Calif. Waterworks Standards compliant with Calif. DWR Bulletin 74-81?	Vor			
R R		0	compliant with AWWA Standards A100-06 (wells)?				
Fn		0	adequate equipment clearances to facilitate routine O&M?				
Fn		0	equipment accessible for removal?				
R		0	site drainage adequate to prevent flooding of well, buildings, and critical equipment? wellhead minimum 18" above finished grade or floor?				
Fn R		0		Yes They are within the building and not in the vault			
Fn		0	well aguinned with ability to add chlorination facilities?	Yes but is not currently needed			
			sample taps available to obtain water quality prior to disinfection (between wellhead and check	Sample taps are available at multiple points throu	ugh the treatment chain		
Fn Fn		0	valve) and after disinfection? sample tap non-threaded downed-turned?		-		
Fn Fn		0	sample tap non-threaded downed-turned? bacti sample tap not screened or aerated?				
Fn		0	well able to be pumped to waste with waste discharge line protected from backflow?				
Fn		0	well meter provided?				
Fn		0	chemical additives NSF 60 compliant?	Yes when installed			
			Well Site				
Fn		0	adequate vehicle access for year-round maintenance?	Yes			
R		0		No. This site is indicated as other areas Zone X or	n the FEMA flood map.		
R		0	is site vulnerable to wildfires?				
R		0	is site close to known active seismic faults? any unstable site conditions (if yes, describe)?				
R		U	site lighting, fencing, and security monitoring adequate to discourage unauthorized	Thome The Control of the Control of			
Fn		0	access/vandalism?	The property is fully fenced			
Fn		0	other known problems?	None			
			Duilding Churchurg				
Fn		0	Building Structure adequate security measures and monitoring to prevent unauthorized access?	Ves			
PM		0		Unknown. The building was inherited from an exis	sting water company. Estimate pre 1960s.		
PM		0	condition of exterior coatings adequate to protect structure?		and show no visible defects		
Fn		0	adequate openings for ingress/egress?				
Fn Fn		0	interior lighting adequate for routine O&M? building designed to withstand snow load and not create safety issue?				
Fn		0	building meets code compliance requirements?				
R		0	known fire or haz-mat conditions that could be mitigated?	None			
Fn		0	other known problems?	None Estimate the building has exceeded its useful life			
PM		0	estimated service life remaining?	Estimate the bulluling has exceeded its useful life			
			Well Pump				
INFORMATION	N/A N/A	N/A	pump type?	Submersible			
INFORMATION	N/A N/A	N/A	pump manufacturer?	Goulds			
INFORMATION PM		0	pump capacity?				
PM Fe		0	pump rebuilt (list year) and describe work done? pump curves available?				
		-					
R		0	known history of pump/motor failures? If so, explain the nature of the failure(s).	None since it has been off for over 12 years			
R		0	number of service calls/repairs in the last year?				
INFORMATION		0	what is firm capacity of well pump based on flow test?			_	
C Pm	3	0	Does zone serviced by pump have adaquate capacity to be served? coatings adequate to provide corrosion protection?		tlv		
Fe		0	pumps operate efficiently (>70% bowl efficiency)		···		
R		0	pumps operate free from excessive vibration?	Unknown			
Fn		0	adequate NPSH available to prevent cavitation?				
Fe P		0	motor high efficiency and no excessive noise? spare parts readily available?				
R R		0			t for PCE and has also had MTBE hits so the pump has not been run consistently	for more than a decade. Problems may arise if th	e well is put back into service
PM		0		9 years according to AWU Useful Life			·

		1						
				South Tahoe PUD	Location Description:	On Clement Ave near intersection with Gardner St.	K/J Project Number: 127000	4*00
				Water System Optimization Plan	Wells Facility ID #:	CLMTWL	Date:	3/8/2012
					Wells Facility Name:	ClassackWall	Condition Assessment	Datas I a sellas and Mark Cons
					wens racinty Name.	Clement Well	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Gardner Mountain or Stateline zone depending on valving	Adjacent Pressure Zones:	Twin peaks zone or Stateline zone depending on valving
				WELL OFFLINE DUE TO CONTAMINATE LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WEL	L NOT RATED.			
				Piping & Valves				
Fn PM			0	pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?				
C			0	pipes adequately sized to prevent excessive noise or headloss?				
Fn			0	valves are suitable for efficient and reliable service?	Yes			
PM			0	estimated service life remaining?	39 years left according to AWU Useful Life			
214				Supply Well - Sanitary Seal, Casing and Screen				
PM PM			0	well casing is in good condition? well screen is in good condition?				
Fe			0	well-driller's log is available?				
R			0	50 ft sanitary soal?	Unknown			
_				approximate distance from closest known groundwater contamination hazards (septic tank,	PCE and MTBE			
R NFORMATION	N/A	N/A	0 N/A	leachfield, MTBE/TCE plume, etc.)? last year of down-hole inspection and what defects were noted?	'			
PM	IN/A	IN/A	0 0	last year or down-note inspection and what defects were noted?				
Fn			0	sounding tube or other means to measure depth to water surface?	Unknown			
Fn			0	gravel-fill pipe provided at well head to monitor condition of filter pack?				
PM			0	estimated service life remaining?	Well drilled in 1991 but no way to determine useful	ife based on tables provided		
				Wellhead Treatment				
Fn			0	chemical storage tanks have secondary containment?				
Fn Fn			0	chemical piping/tubing is in good condition? if multiple chemicals used, adequate separation of different chemicals?				
Fn			0	adequate equipment for meter-pump calibration?				
Fn			0	frequency of dose calibration?				
R NFORMATION	N/A	N/A	0 N/A	spare parts and service support readily available? treatment system type and capacity (tank storage)?				
				CCADA sustan	well is out of service			
Fn			0	pump flow meter is adequate to monitor pump performance?				
Fn			0	flow totals recorded at regular intervals? How frequent?				
Fn			0	pressure instrumentation is adequate to monitor pump performance?	NA NA			
Fn			0	automated alarm callout for critical failures and reliability?				
Fn NFORMATION	N/A	N/A	0 N/A	alarm log maintained and reviewed annually? type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?				
R	N/A	N/A	0	communication system is reliable (approximate no. of comm. failures in last year)?				
				uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power	NΔ			
R R			0	failure? spare parts/service support readily available?				
PM			0	estimated service life remaining?				
				Electrical Power				
R R			0	standby generator size (kW)? adequate power available to run all equipment				
R			0	adequate power available to run an equipment adequate standby power present and reliable?				
NFORMATION	N/A	N/A	N/A	fuel storage capacity (gals)?				
R			0	fuel supply adequate for standby power service?				
R Fn		+	0	time needed to mobilize portable generator? known electrical hazards that could be mitigated?				
Fn R		+	0	spare parts/service support readily available?				
PM			0	estimated service life remaining?				
				.,,,,,				
NFORMATION	N/A	N/A	N/A	Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower):				
	.415		.41.		This well has not been in operation in over 12 years	but has been on a regular flushing cycle to test the water from the well. Mos	data for this well is absent due to its inoperation.	he well is mostly used for storage of excess parts and equipn
		 		Legend				
		+			Physical Mortality Functionality			
		1			Reliability			
					Financial Efficiency			
					Capacity			

	South Tahoe PUD	Location Description:	On Clement Ave near intersection with Gardner St.	K/J Project Number: 12700	004*00
	Water System Optimization Plan	Wells Facility ID #:	CLMTWL	Date:	3/8/2012
	, i			Condition Assessment	
		Wells Facility Name:	Clement Well	Inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served:	Gardner Mountain or Stateline zone depending on valving	Adjacent Pressure Zones:	Twin peaks zone or Stateline zone depending on valving
	WELL OFFLINE DUE TO CONTAMINATE LEVELS THAT HAVE BEEN DETECTED WITHIN	N THE WELL. WELL NOT RATED.	<u>, </u>		
	Photo Evidenc	e for PM, Fn, R, FE	PHOTOS		
The second section of the second section of the second section of the second se	2011 AGE/20 11:57 AM	2511/07/2013	58 AM 2011	1 N P P P P P P P P P P P P P P P P P P	2011/05/20 11:55 AM
2011/08/20 11:89 AM	2011/05/20 11:86 AM			2011/05/20 11:58 AM	2011/05/201/1158

		South Tahoe PUD	Location Description:	City Playfields behind District's	main treatment plant	K/J Project Numbe	er: 1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	CLGWL		Dat		/2012
			Wells Facility Name:	College We	ell	Condition Assessme Inspecto		Jeremy Rutherdale
			Pressure Zones Served:	Stateline Zo	ne	Adjacent Pressure Zone	ES: Twin Pe	aks Zone
		WELL OFFLINE DUE TO URANIUM LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT	T RATED.			_		
		Notes:		Failu	re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level	of Service reliability	Financial Efficiency	
		3. For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements	1: failure every > 40 yrs 2: failure every 21 to 40 yrs	best available technology financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 20 yrs	3: financial efficiency is average	
				4: greater than 85% of design requirements 5: less than 85% of design requirements	4: fails some requirements 5: Fails all requirements	4: failure every 5 to 10 yrs 5: failure < 5 yrs	4: financial efficiency is low 5: asset should be replaced	
			3. Virtually unserviceable	J. less than 63% of design requirements	3. Talis all requirements	J. Tallule C J yls	3. asset siloulu be replaceu	
		California Waterworks Standard						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A N/A	N/A	N/A N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 10%	0.00
		Well Site	•					
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	T-1-15 . 10
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A N/A	70%	30%	N/A N/A	
		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score Building Structure					5%	0.00
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	N/A 60%	N/A 30%	N/A N/A	
CITEUR	100/6	Factored Final Score		N/A N/A	N/A	N/A	N/A N/A	0.00
		Criticality Score					5%	0.00
		Well Pump					1	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		20% N/A	30% N/A	20% N/A	15% N/A	0.00
		Criticality Score		N/A	IN/A	N/A	15%	0.00
		Piping & Valves			_	_		
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated	Calculated N/A	N/A N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A	N/A N/A	Total ructored score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	60%	30%	N/A	N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 10%	0.00
		Supply Well - Sanitary Seal, Casing and Screen					1076	0.00
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	N/A 50%	N/A 20%	N/A 20%	
-		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score Wellhead Treatment					15%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	N/A 60%	N/A 40%	N/A N/A	
		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score					15%	0.00
		SCADA System Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	0.00	N/A	0.00	0.00	N/A	Total Factored Score
		Weighted Final Score (1-25)	0.00	N/A	0.00	0.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	60% 0.00	30% 0.00	N/A N/A	0.00
		Criticality Score		1 190	0.00		5%	0.00
		Electrical Power	1			,		
		Is Failure Mode Score Calculated or Assigned?		N/A N/A	Calculated	Calculated N/A	N/A N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	. Star ractorea score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	60%	20%	N/A	
		Factored Final Score		N/A	N/A	N/A	N/A 20%	0.00
		Criticality Score					Overall Total Factored Score (Out of 25) =	0.00

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Fn 0 dadequate security measures and monitoring to prevent unauthorized access? PM 0 0 date building was constructed? PM 0 0 0 condition of exterior coatings adequate to protect structure? Fn 0 0 designed per princip lighting adequate for protein pringers/gegress? Fn 0 0 building designed to withstand snow load and not create safety issue? Fn 0 0 building meets code compliance requirements? R 0 0 building meets code compliance requirements? R 0 0 known fire or haz-mat conditions that could be militared? Fn 0 0 sestimated service life remaining? Fn 0 0 sestimated service life remaining? Fn 0 0 meets and there is no history unauthorized access? Here are multiple areas of ingress/gegress The building the section condition of the facility is in good condition There are multiple areas of ingress/gegress The building the section condition There are multiple areas of ingress/gegress The building the
Fn 0 dadequate security measures and monitoring to prevent unauthorized access? PM 0 0 date building was constructed? PM 0 0 0 condition of exterior coatings adequate to protect structure? Fn 0 0 designed per princip lighting adequate for protein pringers/gegress? Fn 0 0 building designed to withstand snow load and not create safety issue? Fn 0 0 building meets code compliance requirements? R 0 0 building meets code compliance requirements? R 0 0 known fire or haz-mat conditions that could be militared? Fn 0 0 sestimated service life remaining? Fn 0 0 sestimated service life remaining? Fn 0 0 meets and there is no history unauthorized access? Here are multiple areas of ingress/gegress The building the section condition of the facility is in good condition There are multiple areas of ingress/gegress The building the section condition There are multiple areas of ingress/gegress The building the
PM 0 0 condition of exterior coatings adequate to protect structure 9 Fin 0 0 condition of exterior coatings adequate to protect structure 9 Fin 0 0 interior lighting adequate for routine O&MP Yes Fin 0 0 building designed to withstand snow load and not create safety issue? Fin 0 0 building designed to withstand snow load and not create safety issue? Fin 0 0 building mets code compliance requirements? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mitigated? Fin 0 0 Monwr fire or haz-mat conditions that could be mi
Fn 0 0 interior lighting adequate openings for ingress/egress? There are multiple areas of ingress/egress Fn 0 0 interior lighting adequate for routine O&M? Yes Fn 0 0 building designed to withstand sonw load and not create safety issue? The building meets the loads required at the time of construction Fn 0 0 building meets code compliance requirements? R 0 0 known fire or haz-mat conditions that could be mitigated? None Fn 0 0 Month of the rhown problems? None PM 0 0 estimated service life remaining? Fin 0 0 Mel Pump Fin 0 Mel Pump Fin 0 Mel Pu
Fn 0 bilding dequate for routine 0&M? Yes Fn 0 bilding meets code compliance requirements? Met the codes at the time of construction R 0 known fire or haz-mat conditions that could be mitigated? None Fn 0 0 known fire or haz-mat conditions that could be mitigated? None Fn 0 0 known fire or haz-mat conditions that could be mitigated? None Fn 0 0 setimated service life remaining? Exceeds AWU Useful Life PM 0 0 estimated service life remaining? Exceeds AWU Useful Life INFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A N/
Fn 0 building designed to withstand snow load and not create safety issue? Fn 0 building meets code compliance requirements? Met the codes at the time of construction Met he codes at the time of construction None None None None None None None No
R 0 Known fire or haz-mat conditions that could be mitigated? Fn 0 0 Setimated service life remaining? PM 0 0 Setimated service life remaining? Well Pump INFORMATION N/A N/A N/A N/A N/A N/A N/A D/A D/A D/A D/A D/A D/A D/A D/A D/A D
Fn 0 other known problems? None PM 0 0 estimated service life remaining? Exceeds AWU Useful Life Well Pump Right angle drive motor powered by propane INFORMATION N/A N/A N/A N/A N/A Dymp pump type? Vertical Turbine INFORMATION N/A N/A N/A N/A Dymp manufacturer? Peabody Flowy Flowy Flowy Flowy Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Pump repairly (unknown flow) Flow Flow Flow Flow Flow Flow Flow Flow
PM 0 estimated service life remaining? Exceeds AWU Useful Life Well Pump Right angle drive motor powered by propane INFORMATION N/A N/A N/A N/A N/A N/A N/A Pump Typer Peabody Floway INFORMATION N N/A N/A N/A N/A N/A N/A N/A N/A N/A
INFORMATION N/A N/A N/A N/A pump type? Vertical Turbine INFORMATION N/A N/A N/A N/A N/A pump manufacture? Peabody Floway INFORMATION D D D D D D D D D D D D D D D D D D D
INFORMATION N/A N/A N/A N/A pump type? Vertical Turbine INFORMATION N/A N/A N/A N/A N/A pump manufacture? Peabody Floway INFORMATION D D D D D D D D D D D D D D D D D D D
INFORMATION N/A N/A N/A pump manufacturer? Peabody Floway INFORMATION 0 pump capacity? PM 0 pump rebuilt (list year) and describe work done? Well is offline due to Uranium
PM 0 pump rebuilt (list year) and describe work done? Well is offline due to Uranium
Fe 0 pump curves available? No
R 0 known history of pump/motor failures? If so, explain the nature of the failure(s). None
R 0 number of service calls/repairs in the last year? None INFORMATION 0 what is firm capacity of well pump based on flow test? unknown
C 3 0 Does zone serviced by pump have adaquate capacity to be served? Evaluation in block diagram
Pm 0 coatings adequate to provide corrosion protection? The coatings are adequate and there are no visual defects
Fe 0 pumps operate efficiently (>70% bowl efficiency) unknown R 0 pumps operate free from excessive vibration? Yes
Fn 0 adequate NPSH available to prevent cavitation? unknown
Fe 0 motor high efficiency and no excessive noise? unknown R 0 spare parts readily available? No
R 0 spare parts readily available? No R 0 other known problems? None

			s	South Tahoe PUD	Location Description:	City Playfields behind District's main treatment plant	K/J Project Number: 1270004*	00
			V	Water System Optimization Plan	Wells Facility ID #:	CLGWL	Date:	3/13/2012
					Wells Facility Name:	College Well	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
			v			Stateme zone	, injustini i resoure zeriesi	TWITT CORS ZOTIC
Fn			0	Piping & Valves pipe supports adequate to prevent movement or vibration?	There are steel pipe supports which are bolted to the	floor		
PM			0	coatings adequate to protect piping and valves? T	The coatings have worn off in places and there is a sig	nificant amount of rust		
С			0	pipes adequately sized to prevent excessive noise or headloss?				
Fn PM			0	valves are suitable for efficient and reliable service?	None 29 years according to AWU Useful Life			
PIM			0	estimated service life remaining?	29 years according to AWO Oserui Life			
-				Supply Well - Sanitary Seal, Casing and Screen				
PM			0	well casing is in good condition?				
PM Fe			0	well screen is in good condition? well-driller's log is available?	No			
R			0	50 ft. sanitary seal? U				
R			0	approximate distance from closest known groundwater contamination hazards (centic tank	High Uranium has been detected in this well. There h	ive not been any other contaminants identified		
NFORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted?				
PM Fn			0	last year well was redeveloped? sounding tube or other means to measure depth to water surface?				
Fn Fn			0	gravel-fill pipe provided at well head to monitor condition of filter pack?				
PM			0	estimated service life remaining?				
F			0	chemical storage tanks have secondary containment?	All treatment has been removed from the well			
Fn Fn			0	chemical piping/tubing is in good condition?				
Fn			0	if multiple chemicals used, adequate separation of different chemicals?				
Fn			0	adequate equipment for meter-pump calibration?				
Fn R			0	frequency of dose calibration? No spare parts and service support readily available?				
NFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)?				
Fn			0	pump flow meter is adequate to monitor pump performance?	The SCADA system has been disconnected			
Fn			0	flow totals recorded at regular intervals? How frequent?				
Fn			0	pressure instrumentation is adequate to monitor pump performance?	NA			
Fn			0	automated alarm callout for critical failures and reliability? Nature and reviewed annually?				
Fn INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? I				
R	,	,	0	communication system is reliable (approximate no. of comm. failures in last year)?	NA .			
R			0	uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power failure?	NA			
R			0	spare parts/service support readily available?	NA			
PM			0	estimated service life remaining?	NA			
				Fleatrical Dames				
R			0	Electrical Power standby generator size (kW)?	NA .			
R			0	adequate power available to run all equipment	/es			
R			0			adequate to run the well but not to power the system		
NFORMATION R	N/A	N/A	N/A 0	fuel storage capacity (gals)? 2 fuel supply adequate for standby power service? Y				
R			0		res There are no hookups for a portable generator so it w	ould take a significant amount of time to connect in		
Fn			0	known electrical hazards that could be mitigated?	None			
R PM			0	spare parts/service support readily available? Y estimated service life remaining? E				
rivi			U	esurraced service life remaining? [Execusivity of Oscial Elic			
						District is restricted as to when and how long the well can be run.		
	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):	200hp			
NFORMATION	,,,			Legend				
INFORMATION	1471		+		Physical Mortality			
NFORMATION	- Ayr.			PM F	Physical Mortality Functionality			
IFORMATION	.,,,			PM F Fn F R F				

South Tahoe PUD	Location Description:	City Playfields behind District's main treatment plant	K/J Project Number: 1	270004*00
Water System Optimization Plan	Wells Facility ID #:	CLGWL	Date:	3/13/2012
	Wells Facility Name:	College Well	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
	Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
WELL OFFLINE DUE TO URANIUM LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT	RATED.			
Photo Evidence for PM, Fn, R, FE		PHOTOS		
2011/05/25	22/43/44/	ZON LAGRANTI GEZ-ER PEN	2011/05/25 02 30 PM	2011/06/20 02/201
2011/05/25 02/35 5%	2 34 PM	2011/06/25 0X 95 PM	2011/05/25 02/36 PM	ZONA REPUZE CIZZES PA

		South Tahoe PUD	Location Description	: Corner of Rancho Way ar	nd Glenwood Way.	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID #	GLWLHE	05	Date:	3/7	//2012
			Wells Facility Name	: Glenwood W	/ell #5	Condition Assessment Inspectors:	Peter Lavallee	and Phill Torney
			Pressure Zones Served	: Stateline Z	one	Adjacent Pressure Zones:	Twin P	eaks Zone
		Notes:			ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality 1: new or excellent condition	Capacity	functionality	of Service reliability	Financial Efficiency	
		, , , , , , , , , , , , , , , , , , , ,	2: minor defects only 3: moderate deterioration	meets or exceeds design requirements greater than 95% of design requirements greater than 90% of design requirements	exceeds all requirements exceeds some requirements meets all requirements	2: failure every 21 to 40 yrs	best available technology financial efficiency is high financial efficiency is average	
			4: significant deterioration 5: virtually unserviceable	4: greater than 85% of design requirements 5: less than 85% of design requirements	4: fails some requirements 5: Fails all requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low 5: asset should be replaced	
		California Waterworks Standard		<u> </u>	1			
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	N/A N/A	N/A N/A	Calculated 1.40	Calculated 1.00	N/A N/A	Total Factored Sco
IECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	N/A N/A	N/A N/A	5.60 70%	3.75 30%	N/A N/A	
		Factored Final Score Criticality Score	N/A	N/A	3.92	1.125	N/A 10%	5.05 0.50
		Well Site Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Failure Mode Score (1-25)	N/A N/A	N/A N/A	1.00 2.00	2.00 7.25	N/A N/A N/A	Total Factored Sco
ECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	N/A	N/A N/A	70% 1.4	30% 2.175	N/A N/A	3.58
		Criticality Score Building Structure	1971	, apr		2.273	5%	0.18
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 1.50	N/A N/A	Calculated 1.00	Calculated 1.00	N/A N/A	Total Factored Sco
IECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	6.50 10%	N/A N/A	3.33	3.00	N/A N/A	
IECK	10076	Factored Final Score Criticality Score Criticality Score	0.65	N/A	2	0.9	N/A 5%	3.55 0.18
		Well Pump	Calculated	Calculated	Calculated	Calculated	Calculated	0.10
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		1.00 3.00	5.00 10.00	1.40 3.80	4.33 15.00	Total Factored Sco
IECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	15.33 15% 2.00	20%	30% 3.00	20%	15% 2.25	8.61
		Criticality Score Piping & Valves	2.00	0.00	3.00	0.70	15%	1.29
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 1.50	Calculated 1.00	Calculated 1.00	N/A N/A	N/A N/A	Total Factored Sco
IECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	7.00 10%	3.00 60%	3.00	N/A N/A	N/A N/A	
ILCK	100%	Factored Final Score Criticality Score	0.70	1.80	0.90	N/A	N/A 10%	3.40 0.34
		Supply Well - Sanitary Seal, Casing and Screen Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5) Weighted Failure Mode Score (1-25)		N/A N/A	5.00 17.50	1.00 4.50	5.00 15.00	Total Factored Sco
IECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	10%	N/A N/A	50% 8.75	20%	20% 3.00	13.78
		Criticality Score Wellhead Treatment					15%	2.07
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	N/A N/A	N/A N/A	Calculated 2.00	Calculated 1.00	N/A N/A	Total Factored Sco
HECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	N/A N/A	N/A N/A	5.25 60%	1.00 40%	N/A N/A	
		Factored Final Score Criticality Score		N/A	3.15	0.40	N/A 15%	3.55 0.53
		SCADA System Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	2.00 8.00	N/A N/A	1.00 3.00	1.33 3.33	N/A N/A	Total Factored Sco
IECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	10% 0.80	N/A N/A	60% 1.80	30% 1.00	N/A N/A	3.60
		Criticality Score Electrical Power					5%	0.18
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 1.00	N/A N/A	Calculated 1.00	Calculated 1.25	N/A N/A	Total Factored Sco
HECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	4.00 20%	N/A N/A	3.00 60%	5.25	N/A N/A	
-		Factored Final Score		N/A	1.80	1.05	N/A	3.65

				South Tahoe PUD	Location Description:	Corner of Rancho Way and Glenwood Way.	K/J Project Number: 1270004*00	
							_	
				Water System Optimization Plan	Wells Facility ID #:	GLWLHD5	Date:	3/7/2012
					Wells Facility Name:	Glenwood Well #5	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
					wens racinty Name.	Gleriwood Well #5	inspectors.	Peter Lavailee and Phili Torney
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
						CONDITION ASSESSMENT SUFERVIET		
Failure Mode Type	Score (1 - 5)	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards				
R R	1	4	4	compliant with Calif. DWR Bulletin 74-81? compliant with AWWA Standards A100-06 (wells)?				
Fn	1	3	3	adequate equipment clearances to facilitate routine O&M?	Yes			
Fn R	1	5	5	equipment accessible for removal? site drainage adequate to prevent flooding of well, buildings, and critical equipment?	Yes, the well is a pitless adapter so all remova	l occurs outside		
Fn	1	3	3	wellhead minimum 18" above finished grade or floor?	Yes			
R	1	2	2	well electrical controls not in vault?				
Fn	1	3	3	well equipped with ability to add chlorination facilities? sample taps available to obtain water quality prior to disinfection (between wellhead and check				
Fn	1	4	4	valve) and after disinfection?	Yes before and after the disinfection			
Fn	1	5	5	sample tap non-threaded downed-turned?	They are non-threaded and down turned The sample taps are not screened or aerated			
Fn Fn	5 1	5	25 2	well able to be pumped to waste with waste discharge line protected from backflow?				
Fn	1	3	3	well meter provided?	Yes			
Fn	1	4	4	chemical additives NSF 60 compliant?	Yes			
				Well Site				
Fn	1	2	2	adequate vehicle access for year-round maintenance?				
R	1	3	3		No. This site is indicated as other areas Zone			
R R	4	4	8 16		Site is adjacent to a meadow and there is a po 1.778 to nearest fault to the east, 2.460 ft, to			
R	1	2	2	any unstable site conditions (if yes, describe)?	None	The describing to the West		
Fn	1	2	2	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?		as not had major problems. Some graffiti and tagging has occurred		
Fn	1	2	2	other known problems?				
				Building Structure				
Fn	1	3	3	adequate security measures and monitoring to prevent unauthorized access?	The facility is locked and the District has had a	no issues with unauthorized access into the facility		
INFORMATION	N/A	N/A	N/A	date building was constructed?	2002	·		
PM	1	3	3	condition of exterior coatings adequate to protect structure?		dition. The roof is also in good condition.		
Fn Fn	1	3	3	adequate openings for ingress/egress? interior lighting adequate for routine O&M?				
Fn	1	4	4	building designed to withstand snow load and not create safety issue?				
Fn	1	2	2	building meets code compliance requirements?				
R Fn	1	3	3 4	known fire or haz-mat conditions that could be mitigated? other known problems?		as occurred		
PM	2	5	10		20 years according to AWU Useful Life			
				\				
INFORMATION	N/A	N/A	N/A	Well Pump pump type?	Submersible			
INFORMATION	N/A	N/A	N/A		Ingersoll Dresser Pumps-Pleuger			
INFORMATION		3	0		1200 gpm @ 260 ft.			
PM Fe	<u>3</u>	4	12 20	pump rebuilt (list year) and describe work done?	No rebuilds on this pump Pump Curves are available			
R	1	2	2	known history of pump/motor failures? If so, explain the nature of the failure(s).	•			
R	1	2	2	number of service calls/repairs in the last year?				
INFORMATION	1	3	3	what is firm capacity of well pump based on flow test? Does zone serviced by pump have adaquate capacity to be served?				
Pm	5	4	20	coatings adequate to provide corrosion protection?		p was not pulled		
Fe	3	5	15	pumps operate efficiently (>70% bowl efficiency)		ris relatively low (1700 kW-hr/Mgal)		
R Fn	5	2	4 10	pumps operate free from excessive vibration? adequate NPSH available to prevent cavitation?				
Fe	5	2	10	motor high efficiency and no excessive noise?	insufficient data			
R	3	2	6			d the pump would need to be sent in to be rebuilt		
R PM	2	5	5 8	other known problems?	None 20 years based on AWU Useful Life			
ΓIVI	۷	4	٥	estimated service life remaining?				

				South Tahoe PUD	Location Description:	Corner of Rancho Way and Glenwood Way.	K/J Project Number: 127000	1*00
				Water System Optimization Plan	Wells Facility ID #:	GLWLHD5	Date:	3/7/2012
					, , , , , , , , , , , , , , , , , , , ,		Condition Assessment	2,1,1====
					Wells Facility Name:	Glenwood Well #5	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
							,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
				Piping & Valves				
Fn	1	4	4	pipe supports adequate to prevent movement or vibration				
PM	2	5	10		Minor dings in the piping coatings but no other visual defects			
C Fn	1	3 2	3	pipes adequately sized to prevent excessive noise or headloss' valves are suitable for efficient and reliable service'				
PM	1	4	4		2 50 years based on AWU Useful Life			
		·		Supply Well - Sanitary Seal, Casing and Screer				
PM	5	3	15	well casing is in good condition				
PM	5	3	15	well screen is in good condition	insufficient data			
Fe	5	3	15	well-driller's log is available				
R	1	4	4	50 ft. sanitary seal	r yes 140 rt.			
R	1		5	approximate distance from closest known groundwater contamination hazards (septic tank leachfield, MTBE/TCE plume, etc.)	None			
NFORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted				
PM	5	2	10	last year well was redeveloped				
Fn	5	3	15	sounding tube or other means to measure depth to water surface				
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack				
PM	1	5	5	estimated service life remaining	Typ useful life 50 yrs. 40 yrs remaining useful life			
				Wellhead Treatment				
Fn	5	2	10	chemical storage tanks have secondary containment				
Fn	1	2	2		Tubing is in good condition with no visible defects			
NFORMATION	N/A	N/A	N/A	if multiple chemicals used, adequate separation of different chemicals	NA NA			
Fn	1	4	4	adequate equipment for meter-pump calibration				
Fn R	1	5	5	frequency of dose calibration' spare parts and service support readily available'				
NFORMATION	N/A	N/A	1 N/A		Sodium Hypochlorite with direct injection. 30 gal drums on site	!		
		,	,	, , , , , , , , , , , , , , , , , , , ,				
				SCADA system				
Fn	1	4	4	pump flow meter is adequate to monitor pump performance				
Fn	1	1	1	flow totals recorded at regular intervals? How frequent				
Fn Fn	1 1	4	2 4	pressure instrumentation is adequate to monitor pump performance automated alarm callout for critical failures and reliability	Yes and it is monitored by District Operations	stem pressures		
	1	4	4		The alarm log is maintained but it is not reviewed annually			
Fn NFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)	Radio			
	N/A 1	N/A 2	N/A 2	communication system is reliable (approximate no. of comm. failures in last year)	No communication issues in the last year			
NFORMATION R		· ·	2	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe	No communication issues in the last year There is a backup generator on site			
NFORMATION R R	1	· ·	2	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure	No communication issues in the last year There is a backup generator on site	District offices		
NFORMATION R		2	2	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available	No communication issues in the last year There is a backup generator on site	District offices		
R R R	1 1 2	2 2 3	2 2 6	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I	District offices		
R R R PM	1 1 2 2	2 2 3 4	2 2 6 8	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I G years based on AWU Useful Life	District offices		
R R R PM	1 1 2	2 2 3 4	2 2 6 8	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW)	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW	District offices		
NFORMATION R R R R PM NFORMATION R	1 1 2 2 2 N/A 1	2 2 3 4 N/A 5	2 2 6 8 N/A 5	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the to gears based on AWU Useful Life 220kW Yes	District offices		
R R R PM	1 1 2 2 2 N/A 1 1	2 2 3 4 N/A 5	2 2 6 8 N/A 5	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes	District offices		
R R R PM	1 1 2 2 2 N/A 1	2 2 3 4 N/A 5	2 2 6 8 N/A 5	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes 250gal	District offices		
FORMATION R R R R PM FORMATION R R R FORMATION R FORMATION R FORMATION	1 2 2 2 N/A 1 1 N/A	2 2 3 4 N/A 5 5 5 N/A 5	2 6 8 8 N/A 5 5 N/A 5 N/A	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the to gears based on AWU Useful Life 220kW Yes Yes 250gal Yes NA	District offices		
FORMATION R R R R PM IFORMATION R R IFORMATION R R IFORMATION R F IFORMATION F F IFORMATION F R	1 2 2 2 N/A 1 1 N/A 1 N/A 1 N/A	2 2 3 4 N/A 5 N/A 5 N/A 3	2 6 8 N/A 5 5 N/A 5 N/A 3	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes Yes 250gal Yes NA None	District offices		
R R R R PM NFORMATION R R R NFORMATION R R NFORMATION R NFORMATION R R NFORMATION R R NFORMATION R R R NFORMATION R R R R R R R R R R R R R R R R R R R	1 2 2 2 N/A 1 1 N/A 1 N/A 1 2	2 3 4 N/A 5 5 N/A 5 N/A 3 3	2 6 8 N/A 5 5 N/A 5 N/A 5	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes 220kW Yes 250gal Yes NA None Yes at District Plant	District offices		
R R R R PM NFORMATION R R R NFORMATION R R NFORMATION R NFORMATION R NFORMATION R R NFORMATION R R NFORMATION	1 2 2 2 N/A 1 1 N/A 1 N/A 1 N/A	2 2 3 4 N/A 5 N/A 5 N/A 3	2 6 8 N/A 5 5 N/A 5 N/A 3	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes Yes 250gal Yes NA None	District offices		
NFORMATION R R R R PM NFORMATION R R NFORMATION R NFORMATION R NFORMATION R NFORMATION R NFORMATION R NFORMATION R NFORMATION R R	1 2 2 2 N/A 1 1 N/A 1 N/A 1 2	2 3 4 N/A 5 5 N/A 5 N/A 3 3	2 6 8 N/A 5 5 N/A 5 N/A 5	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes Yes 250gal Yes NA None Yes at District Plant 15 years according to AWU Useful Life	District offices		
NFORMATION R R R R PM NFORMATION R R NFORMATION R NFORMATION R NFORMATION R PM PM PM	1 2 2 2 N/A 1 1 N/A 1 N/A 1 2	2 3 4 N/A 5 5 N/A 5 N/A 3 3	2 6 8 N/A 5 5 N/A 5 N/A 5	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure: spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available estimated service life remaining:	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes 250gal Yes NA None Yes at District Plant 15 years according to AWU Useful Life			
NFORMATION R R R R PM NFORMATION R R NFORMATION R NFORMATION R NFORMATION R NFORMATION R NFORMATION R R NFORMATION R R NFORMATION R	1 2 2 2 N/A 1 1 N/A 1 N/A 1 2	2 2 3 4 N/A 5 5 N/A 5 N/A 4	2 6 8 N/A 5 5 N/A 5 N/A 4	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available estimated service life remaining: Additional Data	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes 250gal Yes NA None Yes at District Plant 15 years according to AWU Useful Life		water have been logged.	
NFORMATION R R R R PM NFORMATION R R NFORMATION R R NFORMATION R R NFORMATION R P NFORMATION R P NFORMATION R P PM	1 2 2 2 N/A 1 1 N/A 1 N/A 1 2	2 2 3 4 N/A 5 5 N/A 5 N/A 4	2 6 8 N/A 5 5 N/A 5 N/A 4	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available estimated service life remaining: Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower) Legent	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes 250gal Yes NA None Yes at District Plant 15 years according to AWU Useful Life 1200 gpm, 260 ft., 125 hp Well off in winter time to allow for aquifer recharge. Operated		water have been logged.	
NFORMATION R R R R PM NFORMATION R R NFORMATION R NFORMATION R NFORMATION R PM PM PM PM	1 2 2 2 N/A 1 1 N/A 1 N/A 1 2	2 2 3 4 N/A 5 5 N/A 5 N/A 4	2 6 8 N/A 5 5 N/A 5 N/A 4	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available estimated service life remaining: Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower) Legence	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I is years based on AWU Useful Life 220kW Yes 220kW Yes 250gal Yes NA None Yes at District Plant 15 years according to AWU Useful Life 1200 gpm, 260 ft., 125 hp Well off in winter time to allow for aquifer recharge. Operated Physical Mortality		water have been logged.	
R R R R PM NFORMATION R R R NFORMATION R R NFORMATION R R NFORMATION R R PM PM PM	1 2 2 2 N/A 1 1 N/A 1 N/A 1 2	2 2 3 4 N/A 5 5 N/A 5 N/A 4	2 6 8 N/A 5 5 N/A 5 N/A 4	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available estimated service life remaining: Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower) Legen Ph. Fri	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I 6 years based on AWU Useful Life 220kW Yes 220kW Yes Yes A Sogal Yes A District Plant 15 years according to AWU Useful Life 1200 gpm, 260 ft., 125 hp Well off in winter time to allow for aquifer recharge. Operated Physical Mortality Functionality		water have been logged.	
IFORMATION R R R R PM IFORMATION R R IFORMATION R IFORMATION R IFORMATION R R IFORMATION R P PM	1 2 2 2 N/A 1 1 N/A 1 N/A 1 2	2 2 3 4 N/A 5 5 N/A 5 N/A 4	2 6 8 N/A 5 5 N/A 5 N/A 4	communication system is reliable (approximate no. of comm. failures in last year) uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure spare parts/service support readily available estimated service life remaining Electrical Power standby generator size (kW) adequate power available to run all equipmen adequate standby power present and reliable fuel storage capacity (gals) fuel supply adequate for standby power service time needed to mobilize portable generator known electrical hazards that could be mitigated spare parts/service support readily available estimated service life remaining: Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower) Legent Ph. Fit	No communication issues in the last year There is a backup generator on site Parts are readily available through the manufacturer or at the I is years based on AWU Useful Life 220kW Yes 220kW Yes 250gal Yes NA None Yes at District Plant 15 years according to AWU Useful Life 1200 gpm, 260 ft., 125 hp Well off in winter time to allow for aquifer recharge. Operated Physical Mortality		water have been logged.	

So	uth Tahoe PUD	Location Description:	Corner of Rancho Way and Glenwood Way.	K/J Project Number:	1270004*00
	ater System Optimization Plan	Wells Facility ID #:	GLWLHD5	Date:	3/7/2012
	,			Condition Assessment	
		Wells Facility Name:	Glenwood Well #5	Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
	Photo Evidence for PM, Fn, R, FE				
			PHOTOS		

		South Tahoe PUD	Location Description:	End of Helen Ave. near	the Meadow	K/J Project Numb	er: 1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	HWLHD2		Da		2012
		, .	Wells Facility Name:	Helen Ave. We	ell #2	Condition Assessme		and Mark Grav
			Pressure Zones Served:	Stateline Zo		Adjacent Pressure Zone		,
			Tressure zones serveu.	Stateme 20	TIC .	,,	TWIIT CO	and zone
		Notes: 1. Capacity score will be based on hydraulic model	Dhysical Mantality		re Mode Scoring (1 - 5)	of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality 1: new or excellent condition	Capacity 1: meets or exceeds design requirements	functionality 1: exceeds all requirements	reliability 1: failure every > 40 yrs	Financial Efficiency 1: best available technology	
			3: moderate deterioration	greater than 95% of design requirements greater than 90% of design requirements	exceeds some requirements meets all requirements	2: failure every 21 to 40 yrs 3: failure every 11 to 20 yrs	financial efficiency is high financial efficiency is average	
				4: greater than 85% of design requirements 5: less than 85% of design requirements	4: fails some requirements 5: Fails all requirements	4: failure every 5 to 10 yrs 5: failure < 5 yrs	4: financial efficiency is low 5: asset should be replaced	
		California Waterworks Standard		1 1/4				
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	N/A	N/A N/A	Calculated 1.40	Calculated 1.00	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	N/A	N/A N/A	5.60 70%	3.75 30%	N/A N/A	5.05
		Factored Final Score Criticality Score		N/A	3.92	1.125	N/A 10%	5.05 0.50
		Well Site Is Failure Mode Score Calculated Vasigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
CUEO:	400%	Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	2.33 4.67	2.75 9.50	N/A N/A	Total Pactoreu Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score Criticality Score Criticality Score	N/A	N/A N/A	70% 3.27	30% 2.85	N/A N/A 5%	6.12 0.31
		Building Structure		N/A	Calculated	Calculated	N/A	U.31
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	2.00	N/A N/A N/A	1.00 3.33	1.00 3.00	N/A N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Final Score	10%	N/A N/A N/A	60%	30% 0.9	N/A N/A N/A	3.80
		Criticality Score		N/A		0.9	5%	0.19
		Well Pump Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	Calculated	Total Factored Score
CHECK	100%	Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	17.33	1.00 3.00 20%	5.00 10.00 30%	1.40 3.80 20%	3.00 9.67 15%	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score Criticality Score Criticality Score	2.60	0.60	3.00	0.76	1.45 1.5%	8.41 1.26
		Piping & Valves		Calculated	Calculated	Calculated	N/A	1.20
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	1.00	1.00 3.00	1.00 3.00	N/A N/A	N/A N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Scot	10%	60%	30% 0.90	N/A N/A	N/A N/A	3.15
		Factored mina Score Criticality Score Supply Well - Sanitary Seal, Casing and Screen		1.00	0.50	MA	10%	0.32
		Supply Weil - Saintary Sear, casing and Street Is Failure Mode Score (alculated or Assigned) Unweighted Failure Mode Score (1-5)	Calculated	N/A N/A	Calculated 5.00	Calculated 1.00	Calculated 5.00	Total Factored Score
CHECK	100%	Weighted Failure Wides Score (1-2) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	11.25	N/A N/A N/A	17.50 50%	4.50 20%	15.00 20%	
0.1201	2000	Factored Final Score Criticality Score	1.13	N/A	8.75	0.90	3.00 15%	13.78 2.07
		Wellhead Treatment Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	2.00 5.25	1.00 1.00	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	N/A	N/A N/A	60% 3.15	40% 0.40	N/A N/A	3.55
		Criticality Score SCADA System					15%	0.53
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated	N/A N/A	Calculated 1.00	Calculated 2.67	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	8.00 10%	N/A N/A	3.00 60%	6.00 30%	N/A N/A	
		Factored Final Score Criticality Score	0.80	N/A	1.80	1.80	N/A 5%	4.40 0.22
		Electrical Power Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A N/A	N/A N/A	1.00 3.00	3.25 10.25	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	20% N/A	N/A N/A	60% 1.80	20% 2.05	N/A N/A	3.85
		Criticality Score					20% Overall Total Factored Score (Out of 25) =	0.77 6.17

k				South Tahoe PUD	Location Description:	End of Helen Ave. near the Meadow	K/J Project Number: 1270004*00	
					·			
				Water System Optimization Plan	Wells Facility ID #:	HWLHD2	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Helen Ave. Well #2	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
•		,						
Failure Mode Type	Score (1 - 5)	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
ranure wode Type	30016 (1 - 3)	weighting (1-3)	Fillal Score	Calif. Waterworks Standards				
R	1	4	4	compliant with Calif. DWR Bulletin 74-81?	Yes			
R	1	4	4	compliant with AWWA Standards A100-06 (wells)?				
Fn Fn	1	3	3 4	adequate equipment clearances to facilitate routine O&M? equipment accessible for removal?				
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment?	No issues with drainage			
Fn	1	3	3	wellhead minimum 18" above finished grade or floor?				
R Fn	1 1	3	3	Socialization for a state of the state of th	Electrical controls are in building but not in vault Yes	t		
		3	,	sample taps available to obtain water quality prior to disinfection (between which and check	Voc			
Fn	1	4	4	valve) and after disinfection?				
Fn Fn	1 5	5	5 25	sample tap non-threaded downed-turned? bacti sample tap not screened or aerated?				
Fn	1	2	2	well able to be pumped to waste with waste discharge line protected from backflow?				
Fn	1	3	3	well meter provided?	Yes a Siemens mag meter			
Fn	1	4	4	chemical additives NSF 60 compliant?	Yes			
				Well Site				
Fn	1	2	2	adequate vehicle access for year-round maintenance?	Yes			
R	4	3	12	is site within 100-yr flood plain?	Yes this site is Designated as Zone AE which base	e flood elevations have been determined for the 100 year flood.		
R R	2	4	8	is site vulnerable to wildfires? is site close to known active seismic faults?	Yes it is adjacent to the meadow			
R R	1	2	16 2	any unstable site conditions (if yes, describe)?	None			
				site lighting, fencing, and security monitoring adequate to discourage unauthorized	The site does not have any security around the r	perimeter		
Fn Fn	5	2	10	access/vandalism? other known problems?				
FII	1	2	2	other known problems:	None			
				Building Structure				
Fn	1	3	3	adequate security measures and monitoring to prevent unauthorized access?		xey system		
INFORMATION PM	N/A 1	N/A 3	N/A 3	date building was constructed? condition of exterior coatings adequate to protect structure?		in good condition as is the roof		
Fn	1	4	4		Yes multiple points of egress and ingress	in good condition as is the root		
Fn	1	3	3	interior lighting adequate for routine O&M?	Yes			
Fn Fn	1	4	2	building designed to withstand snow load and not create safety issue? building meets code compliance requirements?				
R	1	3	3	known fire or haz-mat conditions that could be mitigated?		. or construction		
Fn	1	4	4	other known problems?	None			
PM	3	5	15	estimated service life remaining?	Exceed AWU Useful Service life (rh) building nee	eas paint & probably new root within next 5 yrs		
				Well Pump				
INFORMATION	N/A	N/A	N/A	pump type?	Submersible Pump with 3" discharge			
INFORMATION	N/A	N/A	N/A	pump manufacturer?				
INFORMATION PM	5	3	20	pump capacity?				
Fe	1	4	4	p = p	Pump Curves are available			
R	1	2	2	known history of pump/motor failures? If so, explain the nature of the failure(s).	None	:		
R INFORMATION	1	2	0	number of service calls/repairs in the last year? what is firm capacity of well pump based on flow test?		installed		
C	1	3	3	Does zone serviced by pump have adaquate capacity to be served?	Evaluation in block diagram			
Pm	5	4	20	coatings adequate to provide corrosion protection?			·	
Fe R	3 1	5 4	15 4	pumps operate efficiently (>70% bowl efficiency) pumps operate free from excessive vibration?		relatively low (1700 kW-hr/Mgal)		
Fn	5	2	10	adequate NPSH available to prevent cavitation?	insufficient data			
Fe	5	2	10	motor high efficiency and no excessive noise?	insufficient data			
R R	3	2	5	spare parts readily available? other known problems?	Pump would need to be pulled and parts would None	need to be ordered		
PM	3	4	12		Exceeds AWU Useful Service Life (rh) pump shou	uld be pulled within next 5 yrs and inspected		
	•							

				South Tahoe PUD	Location Description:	End of Helen Ave. near the Meadow	K/J Project Number: 1270004*00	
							_	
				Water System Optimization Plan	Wells Facility ID #:	HWLHD2	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Helen Ave. Well #2	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
					Tressure zones serveu.	Statemie Zone	Adjucent ressure zones.	TWIII FEBRS ZOTIE
					٦			
				Piping & Valves	Piping and valves were rehabbed or replaced in February	2012		
Fn	1	4	4	pipe supports adequate to prevent movement or vibration		upports		
PM C	1	5	5 3	coatings adequate to protect piping and valves' pipes adequately sized to prevent excessive noise or headloss'				
Fn	1	2	2	valves are suitable for efficient and reliable service				
PM	1	4	4	estimated service life remaining	? 60 years the piping was replaced in February 2012			
				Supply Well - Sanitary Seal, Casing and Screer	1			
PM	5	3	15	well casing is in good condition				
PM	5	3	15	well screen is in good condition				
Fe	5	3	15	well-driller's log is available				
R	1	4	4	50 ft. sanitary seal approximate distance from closest known groundwater contamination hazards (septic tank leachfield. MTR-TCF plume, etc.)	()			
R	1	5	5		- 1	proximity to this well		
INFORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted				
PM Fn	5 5	3	10 15	last year well was redeveloped' sounding tube or other means to measure depth to water surface'				
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack				
PM	1	5	5		? Typ useful life 50 yrs. Zero yrs remaining useful life since	well 2 yrs beyond useful life		
				Malliand Tanakana				
Fn	5	2	10	Wellhead Treatment chemical storage tanks have secondary containment				
Fn	1	2	2	chemical piping/tubing is in good condition				
INFORMATION	N/A	N/A	N/A	if multiple chemicals used, adequate separation of different chemicals				
Fn	1	4	4	adequate equipment for meter-pump calibration				
Fn R	1	5	5 1	frequency of dose calibration spare parts and service support readily available				
INFORMATION	N/A	N/A	N/A		? Sodium Hypochlorite direct injection and 30 gal drums			
Fn	1	4	4	SCADA system pump flow meter is adequate to monitor pump performance				
Fn	1	1	1	flow totals recorded at regular intervals? How frequent				
Fn	1	2	2	pressure instrumentation is adequate to monitor pump performance	? There are pressure gauges throughout the well that mon	tor system pressures		
Fn F-	1	4	4	automated alarm callout for critical failures and reliability	 Yes and it is monitored by District Operations The alarm log is maintained but it is not reviewed annual 	W		
Fn INFORMATION	N/A	4 N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)		у		
R	1	2	2	communication system is reliable (approximate no. of comm. failures in last year)	No communication issues in the last year			
_				uninterrupted power system (UPS) available to run all telemetry and instrumentation on main powe failure	A portable back up generator would need to be brought	to the site in the event of a power outage		
R R	5 2	3	10 6		? Parts are readily available through the manufacturer or a			
PM	2	4	8		? 12 years based on AWU Useful Life			
				p1 : 1 1=				
INFORMATION	N/A	N/A	N/A	Electrical Power standby generator size (kW)				
R	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	N/A 5	5 N/A	adequate power available to run all equipmen				
R	5	5	25	adequate standby power present and reliable	? No			
INFORMATION	N/A	N/A	N/A	fuel supply adequate for standby power sorting				
INFORMATION R	N/A 5	N/A 1	N/A 5	fuel supply adequate for standby power service time needed to mobilize portable generator	? NA Po hookups at the site so long time to retrofit if necessar	V		
Fn	1	3	3	known electrical hazards that could be mitigated	? None	-		
R	2	3	6	spare parts/service support readily available				
PM	N/A	4	N/A	estimated service life remaining	/ INA			
				Additional Data	a			
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower)	: 260gpm, 25 hp			
				Legend				
					Λ Physical Mortality n Functionality			
					R Reliability			
				FI FI				

South Tahoe PUD	Location Description:	End of Helen Ave. near the Meadow	K/J Project Number: 127000	04*00
Water System Optimization Plan	Wells Facility ID #:	HWLHD2	Date:	3/8/2012
	Wells Facility Name:	Helen Ave. Well #2	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
	Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
		Stateline 20ne	/ Lajavent : 1000a10 2011001	TWITT CORS ZOTIC
Photo Evi	dence for PM, Fn, R, FE	PHOTOS		
2012A9820 11:40 AM	2011/05/20 11:39:AM	2011/05/	20 11:38 AM	2011/05/20 11:39 AM
2011/05/20 11:38 AM	2011/05/20 11-38 AM	2011/05/2	O 11 38 AM	2011AGBARA 11:88 AAA
NE POSITI	_			

		South Tahoe PUD	Location Description	Corner of Paloma	and Nevada	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Wells Facility ID #	t: PLWLH	ID	Date:	3/7	/2012
			Wells Facility Name	Paloma \	Well	Condition Assessment Inspectors:		and Phill Torney
			Pressure Zones Served		Zono	Adjacent Pressure Zones:		eaks Zone
			Fressure Zones Serveu	Stateline .	zone	Aujacent Fressure Zones.	TWIN P	eaks zone
		Notes:			lure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level functionality	of Service reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements	2: failure every 21 to 40 yrs	1: best available technology 2: financial efficiency is high	
			moderate deterioration significant deterioration	greater than 90% of design requirements greater than 85% of design requirements	meets all requirements fails some requirements		financial efficiency is average financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standa				,		
		Is Failure Mode Score Calculated or Assign Unweighted Failure Mode Score (3		N/A N/A	Calculated 1.50	Calculated 1.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-	25) N/A	N/A	6.10	3.75	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 10:	ore N/A	N/A N/A	70% 4.27	30% 1.125	N/A N/A	5.40
		Criticality Sc Well S					10%	0.54
		Is Failure Mode Score Calculated or Assign	ed? N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1- Weighted Final Score (1-		N/A N/A	1.33 2.67	1.75 6.25	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 10	0%) N/A	N/A	70%	30%	N/A	
		Factored Final Sc Criticality Sc		N/A	1.87	1.875	N/A 5%	3.74 0.19
		Building Structo						
		Is Failure Mode Score Calculated or Assign Unweighted Failure Mode Score (3		N/A N/A	Calculated 1.00	Calculated 1.00	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1 Criticality Weighting Factor (0 - 10		N/A N/A	3.33 60%	3.00 30%	N/A N/A	
CHECK	100%	Factored Final Sc	ore 0.65	N/A	2	0.9	N/A	3.55
		Criticality Sc Well Pu					5%	0.18
		Is Failure Mode Score Calculated or Assign		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1- Weighted Final Score (1-		1.00 3.00	5.00 10.00	0.80 2.60	3.00 9.67	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 10)	0%) 15%	20%	30%	20%	15%	
		Factored Final Sc Criticality Sc		0.60	3.00	0.52	1.45 15%	7.97 1.20
		Piping & Val						
		Is Failure Mode Score Calculated or Assign Unweighted Failure Mode Score (3		N/A 1.00	Calculated 1.00	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1- Criticality Weighting Factor (0 - 10		3.00 60%	3.00 30%	N/A N/A	N/A N/A	
CHECK	100%	Factored Final Sc	ore 0.45	1.80	0.90	N/A	N/A	3.15
		Criticality Sc Supply Well - Sanitary Seal, Casing and Scre					10%	0.32
		Is Failure Mode Score Calculated or Assign	ed? Calculated	N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1- Weighted Final Score (1-		N/A N/A	5.00 17.50	2.00 9.50	5.00 15.00	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 10) Factored Final Sc	0%) 10% ore 1.25	N/A N/A	50% 8.75	20% 1.90	20% 3.00	14.90
		Criticality Sc	ore	N/A	δ./5	1.90	3.00 15%	2.24
		Wellhead Treatme Is Failure Mode Score Calculated or Assign		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (:	1-5) N/A	N/A	2.00	1.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1- Criticality Weighting Factor (0 - 10	0%) N/A	N/A N/A	5.25 60%	1.00 40%	N/A N/A	
		Factored Final Sc Criticality Sc	ore N/A	N/A	3.15	0.40	N/A 15%	3.55 0.53
		SCADA Syst	em					0.33
		Is Failure Mode Score Calculated or Assign Unweighted Failure Mode Score (3		N/A N/A	Calculated 1.00	Calculated 1.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-	25) 8.00	N/A	3.00	2.33	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 10: Factored Final Sc	0%) 10% ore 0.80	N/A N/A	60% 1.80	30% 0.70	N/A N/A	3.30
		Criticality Sc	ore	NA NA	1.00	3.70	5%	0.17
		Electrical Pov		N/A	Calculated	Calculated	N/A	
		Is Failure Mode Score Calculated or Assign				Curcurated		
		Is Failure Mode Score Calculated or Assign Unweighted Failure Mode Score (:	1-5) 2.00	N/A	1.00	3.25	N/A	Total Factored Score
CHECK	100%		2.00 25) 8.00			3.25 10.25 20%	N/A N/A N/A	Total Factored Score

				South Tahoe PUD	Location Description:	Corner of Paloma and Nevada	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Wells Facility ID #:	PLWLHD	Date:	3/7/2012
							Condition Assessment	
					Wells Facility Name:	Paloma Well	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
		Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score (1 - 5)	Weighting (1-5)	Final Score					
R	1	4	4	Calif. Waterworks Standards compliant with Calif. DWR Bulletin 74-81?	Vos			
R	1	4	4	compliant with AWWA Standards A100-06 (wells)?				
Fn	1	3	3	adequate equipment clearances to facilitate routine O&M?	Yes			
Fn	1	4	4	equipment accessible for removal?				
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn R	1	2	3	wellhead minimum 18" above finished grade or floor?	Yes Well Electrical is in building not in vault			
Fn	1	3	3	well equipped with ability to add chlorination facilities?				
111	1	,	,		<u> </u>			
Fn	1	4	4	valve) and after disinfection?	Sample taps are provided			
Fn	2	5	10	sample tap non-threaded downed-turned?	Sample taps are down turned but have thread	S		
Fn	5	5	25	bacti sample tap not screened or aerated?				
Fn Fn	1	2	3	well able to be pumped to waste with waste discharge line protected from backflow? well meter provided?		onnect lay flat nose to go to sewer		
Fn	1	4	4	chemical additives NSF 60 compliant?				
	_							
				Well Site				
Fn	1	2	2	adequate vehicle access for year-round maintenance?				
R	1	3	3		No. This site is indicated as other areas Zone	K on the FEMA flood map.		
R R	4	4	4	is site vulnerable to wildfires? is site close to known active seismic faults?				
R	1	2	16 2					
	_	_		any unstable site conditions (if yes, describe)? site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	No fee a grant of court but a grant delicer income	and the facility in the later than a beauty		
Fn	2	2	4			as the facility looks like a nome		
Fn	1	2	2	other known problems?	None			
				Building Structure				
Fn	1	3	3	adequate security measures and monitoring to prevent unauthorized access?	The facility is adequately lesked			
INFORMATION	N/A	N/A	N/A	date building was constructed?				
PM	1	3	3	condition of exterior coatings adequate to protect structure?		ng and the roof is also in good condition		
Fn	1	4	4	adequate openings for ingress/egress?				
Fn	1	3	3	interior lighting adequate for routine O&M?	Interior Lighting is very good	· · · · · · · · · · · · · · · · · · ·		
Fn Fn	1	2	2	building designed to withstand snow load and not create safety issue? building meets code compliance requirements?		uction		
R R	1	3	3	known fire or haz-mat conditions that could be mitigated?		ucaon.		
Fn	1	4	4	other known problems?	None			
PM	2	5	10	estimated service life remaining?	13 years according to AWU Useful Life			
				W-8 8				
INICODAZATION	N1/4	N1/0	N1/2	Well Pump	Submersible pump			
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	pump typer pump manufacturer?				
INFORMATION	.47	3	0		2500gpm @ 322ft			
PM	4	4	16	pump rebuilt (list year) and describe work done?	this pump has not been rebuilt (rh) pump sho	uld be pulled and inspected		
Fe	1	4	4		Pump curves are available			
R R	1	2	2	known history of pump/motor failures? If so, explain the nature of the failure(s). number of service calls/repairs in the last year?				
INFORMATION	1	3	0	what is firm capacity of well pump based on flow test?				
С	1	3	3	Does zone serviced by pump have adaquate capacity to be served?	Evaluation in block diagram			
Pm	5	4	20	coatings adequate to provide corrosion protection?	Pump coatings are unavailable since the pump			
Fe	3	5	15	pumps operate efficiently (>70% bowl efficiency)		is relatively low (1700 kW-hr/Mgal)		
R Fn	5	2	4 10	pumps operate free from excessive vibration? adequate NPSH available to prevent cavitation?				
Fe	5	2	10	motor high efficiency and no excessive noise?				
R		2	0	spare parts readily available?	Pump would need to be pulled and parts wou	ld need to be ordered		
R	1	5	5	other known problems?				
PM	3	4	12	estimated service life remaining?	13 years according to AWU Useful Life			

				South Tahoe PUD	Location Description:	Corner of Paloma and Nevada	K/J Project Number: 1270004*0	0
				Water System Optimization Plan	Wells Facility ID #:	PLWLHD	Date:	3/7/2012
							Condition Assessment	
					Wells Facility Name:	Paloma Well	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
						State-in-C 2011C	,	TWITT COILS ZONC
				Piping & Valves				
Fn	1	4	4	pipe supports adequate to prevent movement or vibration?	Steel supports that are bolted to the floor			
PM	1	5	5		Coatings are in excellent condition with no visible signs of	defects		
C Fn	1	3	2	pipes adequately sized to prevent excessive noise or headloss? valves are suitable for efficient and reliable service?				
PM	1	4	4		43 years according to AWU Useful Life			
				Supply Well - Sanitary Seal, Casing and Screen				
PM	5	3	15	well casing is in good condition?				
PM Fe	5	3	15 15	well screen is in good condition? well-driller's log is available?				
R	1	4	4	C 10				
				50 ft. sanitary seal? approximate distance from closest known groundwater contamination hazards (septic tank, leachfield, MTBE/TCE plume, etc.)?	MTBE has been identified in sentinel wells near this well he	ead but non has been found within the well itself		
R NFORMATION	3 N/A	5 N/A	15 N/A	leachfield, MTBE/TCE plume, etc.)? last year of down-hole inspection and what defects were noted?	incufficient data			
PM	N/A 5	N/A 2	N/A 10	last year of down-note inspection and what defects were noted?				
Fn	5	3	15	sounding tube or other means to measure depth to water surface?				
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack?				
PM	2	5	10	estimated service life remaining?	Typ useful life 50 yrs. 33 yrs remaining useful life			
				Wellhead Treatment				
Fn	5	2	10	chemical storage tanks have secondary containment?	No			
Fn	1	2	2	chemical piping/tubing is in good condition?	Tubing appears new with no visual defects			
NFORMATION	N/A	N/A	N/A	if multiple chemicals used, adequate separation of different chemicals?				
Fn Fn	1	5	4 5	adequate equipment for meter-pump calibration? frequency of dose calibration?				
R	1	1	1	spare parts and service support readily available?				
NFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)?	Sodium Hypochlorite direct injection 30 gal drums			
				CCADAt				
F-		4	4	SCADA system pump flow meter is adequate to monitor pump performance?				
Fn Fn	1	1	1	flow totals recorded at regular intervals? How frequent?				
Fn	1	2	2	pressure instrumentation is adequate to monitor pump performance?	There are pressure gauges throughout the well that monit	or system pressures		
Fn	1	4	4	automated alarm callout for critical failures and reliability?				
Fn NFORMATION	1 N/A	4 N/A	4 N/A	alarm log maintained and reviewed annually? type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	The alarm log is maintained but it is not reviewed annually			
R	1	2	2	communication system is reliable (approximate no. of comm. failures in last year)?				
					A portable back up generator would need to be brought to	the cite in the event of a newer outage		
R	1	2	2					
R PM	2	3 4	3 8	spare parts/service support readily available? estimated service life remaining?	Parts are readily available through the manufacturer or at Typ useful life 50 yrs. 33 yrs remaining useful life	the district offices		
			1					
				Electrical Power				
NFORMATION	N/A	N/A	N/A	standby generator size (kW)?				
R R	5	5	5 25	adequate power available to run all equipment adequate standby power present and reliable?				
NFORMATION	N/A	N/A	N/A	fuel storage capacity (gals)?	NA			
NFORMATION	N/A	N/A	N/A	fuel supply adequate for standby power service?				
R	5	1	5		1-2 hours depending on outside factors such as weather			
Fn R	2	3	3 6	known electrical hazards that could be mitigated? spare parts/service support readily available?				
PM	2	4	8		11 years based on AWU Useful Life			
				Additional Data				
	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):		ity. The Well is only run on Wednesdays to keep the well fresh a	is Rawiew is adequate for supply to the zone	
NFORMATION						icy. The vven is only run on vveullesuays to keep the well fresh a	so bayvicav is adequate for supply to the zone.	
NFORMATION				Legenti				
INFORMATION					Physical Mortality			
NFORMATION				PM Fn	Physical Mortality Functionality			
NFORMATION				PM Fn R	Physical Mortality			

South Tahoe PUD	Location Description:	Corner of Paloma and Nevada	K/J Project Number: 1270004*	700
Water System Optimization Plan	Wells Facility ID #:	PLWLHD	Date:	3/7/2012
	Wells Facility Name:	Paloma Well	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
	Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
Photo Evidence for PM, Fn, R,	, FE			
25		PHOTOS		
				RIGHA

		South Tahoe PUD	Location Description	919 Sunse	t Dr.	K/J Project Number	1270004*00	
		Water System Optimization Plan	Wells Facility ID #	SSWL		Date	3/8/	/2012
		7,				Condition Assessment		
			Wells Facility Name	Sunset V	/ell	Inspectors	Peter Lavallee	and Mark Gray
			Pressure Zones Served	Stateline 2	one .	Adjacent Pressure Zones	Twin Pe	eaks Zone
		Notes: 1. Capacity score will be based on hydraulic model	Physical Mortality	Capacity	lure Mode Scoring (1 - 5)	of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records	1: new or excellent condition	1: meets or exceeds design requirements	functionality 1: exceeds all requirements	reliability 1: failure every > 40 yrs	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 21 to 40 yrs	2: financial efficiency is high	
			moderate deterioration significant deterioration	greater than 90% of design requirements greater than 85% of design requirements	meets all requirements fails some requirements	3: failure every 11 to 20 yrs 4: failure every 5 to 10 yrs	financial efficiency is average financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standard						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	1.40	1.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	N/A N/A	N/A N/A	5.60 70%	3.75 30%	N/A N/A	
CHECK	100%	Factored Final Score	N/A	N/A	3.92	1.125	N/A	5.05
		Criticality Score					10%	0.50
		Well Site Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	2.33	2.00	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	N/A N/A	N/A N/A	4.67 70%	7.25 30%	N/A N/A	
CHECK	100%	Factored Final Score		N/A N/A	3.27	2.175	N/A N/A	5.44
		Criticality Score					5%	0.27
		Building Structure Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	1.00	1.00	N/A	Total Factored Score
		Weighted Final Score (1-25)	9.00	N/A	3.33	3.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	10% 0.9	N/A N/A	60%	30% 0.9	N/A N/A	3.80
		Criticality Score		NA	2	0.5	5%	0.19
		Well Pump						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 3.67	N/A 1.00	Calculated 5.00	Calculated 1.40	Calculated 4.33	Total Factored Score
		Weighted Final Score (1-25)	14.67	3.00	10.00	3.80	15.00	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	15% 2.20	20% 0.60	30% 3.00	20% 0.76	15% 2.25	8.81
		Criticality Score		0.80	3.00	0.76	15%	1.32
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 1.00	N/A 1.00	Calculated 1.00	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-5)	4.50	3.00	3.00	N/A	N/A	101411141010104
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	60%	30%	N/A	N/A	
		Factored Final Score Criticality Score	0.45	1.80	0.90	N/A	N/A 10%	3.15 0.32
		Supply Well - Sanitary Seal, Casing and Screen					10,0	3.52
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	4.50 13.75	N/A N/A	5.00 17.50	2.00 9.50	5.00 15.00	i otal Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	50%	20%	20%	
-		Factored Final Score Criticality Score		N/A	8.75	1.90	3.00 15%	15.03 2.25
		Wellhead Treatment					15%	2.23
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A N/A	N/A N/A	1.60 4.20	1.00	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	
<u></u>		Factored Final Score Criticality Score		N/A	2.52	0.40	N/A 15%	2.92 0.44
		SCADA System					15%	0.44
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
· ·		Unweighted Failure Mode Score (1-5)	2.00 8.00	N/A N/A	1.00 3.00	2.67 6.00	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	8.00 10%	N/A N/A	3.00 60%	6.00 30%	N/A N/A	
-		Factored Final Score	0.80	N/A	1.80	1.80	N/A	4.40
		Criticality Score					5%	0.22
		Electrical Power Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	5.00	N/A	1.00	3.25	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	20.00 20%	N/A N/A	3.00 60%	10.25 20%	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	1.80	2.05	N/A N/A	7.85
		Criticality Score						

				South Tahoe PUD	Location Description:	919 Sunset Dr.	K/J Project Number: 1270004*00	
					·			
				Water System Optimization Plan	Wells Facility ID #:	SSWL	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Sunset Well	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
		Importance				CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score (1 - 5)	Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKEST		
_		_		Calif. Waterworks Standards				
R R	1	4	4	compliant with Calif. DWR Bulletin 74-81? compliant with AWWA Standards A100-06 (wells)?				
Fn	1	3	3	adequate equipment clearances to facilitate routine O&M?				
Fn	1	4	4	equipment accessible for removal?				
R	1	5	5	site drainage adequate to prevent flooding of well, buildings, and critical equipment? wellhead minimum 18" above finished grade or floor?				
Fn R	1	2	2	wellnead minimum 18 above finished grade or floor? well electrical controls not in vault?				
Fn	1	3	3	well equipped with ability to add chlorination facilities?	Yes			
				sample taps available to obtain water quality prior to disinfection (between wellhead and check valve) and after disinfection?	Yes			
Fn Fn	1	4 5	4 5	sample tap non-threaded downed-turned?	Voc			
Fn	5	5	25	bacti sample tap not screened or aerated?				
Fn	1	2	2	well able to be pumped to waste with waste discharge line protected from backflow?	Hookup a lay flat hose to go to a sewer with a	n air gap		
Fn	1	3	3	well meter provided?				
Fn	1	4	4	chemical additives NSF 60 compliant?	Yes			
				Well Site				
Fn	1	2	2	adequate vehicle access for year-round maintenance?				
R	1	3	3		No. This site is indicated as other areas Zone			
R R	2 4	4	8 16	is site vulnerable to wildfires? is site close to known active seismic faults?	Yes it is very close in proximity to both foreste	ed lots and the meadow		
R	1	2	2	any unstable site conditions (if yes, describe)?	None			
				site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	No site security for the narcel			
Fn	5	2	10	access/vandalism? other known problems?				
Fn	1	2	2	other known problems:	None			
				Building Structure				
Fn	1	3	3	adequate security measures and monitoring to prevent unauthorized access?	The building is locked			
INFORMATION	N/A	N/A	N/A	date building was constructed?				
PM Fn	1	3 4	3 4	condition of exterior coatings adequate to protect structure? adequate openings for ingress/egress?				
Fn	1	3	3	interior lighting adequate for routine O&M?	Yes			
Fn	1	4	4	building designed to withstand snow load and not create safety issue?		f the date of construction		
Fn R	1	2	3	building meets code compliance requirements? known fire or haz-mat conditions that could be mitigated?				
Fn	1	4	4	other known problems?				
PM	3	5	15		8 years according to AWU Useful Life			
				W-8 5				
INFORMATION	N/A	N/A	N/A	Well Pump	8 stage Submersible Type			
INFORMATION	N/A N/A	N/A	N/A N/A	pump manufacturer?				
INFORMATION		3	0		740 gpm @ 145psi			
PM Fo	3	4	12 20	pump rebuilt (list year) and describe work done?	None Pump Curves are available			
Fe R	5 1	2	20	known history of pump/motor failures? If so, explain the nature of the failure(s).	·			
R	1	2	2	number of service calls/repairs in the last year?	None			
INFORMATION		3	0	what is firm capacity of well pump based on flow test?	600 gpm based on flow test			
C Pm	5	3 4	3 20	Does zone serviced by pump have adaquate capacity to be served? coatings adequate to provide corrosion protection?	Evaluation in block diagram Pump coatings are unavailable since the pump	o was not pulled		
Fe	3	5	15	pumps operate efficiently (>70% bowl efficiency)	unknown pump efficiency, but specific energy			
R	1	4	4	pumps operate free from excessive vibration?				
Fn Fe	5 5	2	10 10	adequate NPSH available to prevent cavitation? motor high efficiency and no excessive noise?				
re R	3	2	6		Insufficient data Pump would need to be pulled and parts orde	ered		
R	1	5	5	other known problems?	None			
PM	3	4	12	estimated service life remaining?	8 years according to AWU Useful Life			

				South Tahoe PUD	Location Description:	919 Sunset Dr.	K/J Project Number: 12700	04*00
				Water System Optimization Plan	Wells Facility ID #:	SSWL	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Sunset Well	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
]			
				Piping & Valves				
Fn	1	4	4	pipe supports adequate to prevent movement or vibration?				
PM	1	5	5	coatings adequate to protect piping and valves?				
C Fn	1	2	3 2	pipes adequately sized to prevent excessive noise or headloss? valves are suitable for efficient and reliable service?				
PM	1	4	4		38 years based on AWU Useful Life			
				Supply Well - Sanitary Seal, Casing and Screen				
PM	5	3	15	well casing is in good condition? well screen is in good condition?				
PM Fe	5	3	15 15	well-driller's log is available?				
R	1	4	4					
				50 ft. sanitary seal? approximate distance from closest known groundwater contamination hazards (septic tark, leachfield, MTBE/TCE plume, etc.)?	No MTBE but Hydrogen Sulfide has been identified and has cau	ised odor complaints in the past		
R INFORMATION	3 N/A	5 N/A	15 N/A	leachfield, MTBE/TCE plume, etc.)? last year of down-hole inspection and what defects were noted?	insufficient data			
PM	5 N/A	2	10	last year of down-note inspection and what defects were noted:				
Fn	5	3	15	sounding tube or other means to measure depth to water surface?	insufficient data			
Fn	5	4	20	gravel-fill pipe provided at well head to monitor condition of filter pack?				
PM	3	5	15	estimated service life remaining?	Typ useful life 50 yrs. 28 yrs remaining useful life			
				Wellhead Treatment				
Fn	5	2	10	chemical storage tanks have secondary containment?				
Fn	1	2	2	chemical piping/tubing is in good condition?	Yes			
Fn	N/A	3	N/A	if multiple chemicals used, adequate separation of different chemicals?				
Fn Fn	1	4 5	4 5	adequate equipment for meter-pump calibration? frequency of dose calibration?	Yes Daily when in operation. The well currently is flushed on Wedne	esdays and Helen well is in lead to this well		
R	1	1	1	spare parts and service support readily available?		esdays and recent wents in read to this wen.		
INFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)?	Sodium Hypochlorite direct injection and 30 gal drum			
				CCADA sustant				
Fn	1	4	4	SCADA system pump flow meter is adequate to monitor pump performance?				
Fn	1	1	1	flow totals recorded at regular intervals? How frequent?	the flow totals are recorded daily by hand			
Fn	1	2	2	pressure instrumentation is adequate to monitor pump performance?	There are pressure gauges throughout the well that monitor sy	stem pressures		
Fn	1	4	4	automated alarm callout for critical failures and reliability?				
Fn INFORMATION	N/A	4 N/A	4 N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	The alarm log is maintained but it is not reviewed annually			
R	1	2	2	communication system is reliable (approximate no. of comm. failures in last year)?	No communication issues in the last year			
				uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power	A portable back up generator would need to be brought to the	site in the event of a power outage		
R	5	2	10 6	lanute:	Parts are readily available through the manufacturer or at the D			
PM	2	4	8		11 years based on AWU Useful Life	District offices		
	_		-		,			
				Electrical Power				
INFORMATION	N/A	N/A	N/A	standby generator size (kW)?				
R R	1 5	5	5 25	adequate power available to run all equipment adequate standby power present and reliable?				
INFORMATION	N/A	N/A	N/A	fuel storage capacity (gals)?				
INFORMATION	N/A	N/A	N/A	fuel supply adequate for standby power service?	NA			
R	5	1	5		No hookups at the site so long time to retrofit if necessary			
Fn R	2	3	6	known electrical hazards that could be mitigated? spare parts/service support readily available?				
PM	5	4	20		3 years based on AWU Useful Life			
					,			
				Additional Data				
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):		and mambare. The well is a restable to the selection of	so a significant amount more of water but a large	on san not be fit into the 10" c
				Legend	This well has a 10" casing due to some decisions of previous bo	ard members. The well is expected to be able to prodi	ice a significant amount more of water but a large enough pur	ip can not be rit into the 10" casing.
				Ecgenia .				
				PM	Physical Mortality			
				Fn	Functionality			
				Fn R				

	South Tahoe PUD	Location Description:	919 Sunset Dr.	K/J Project Number:	1270004*00
	Water System Optimization Plan	Wells Facility ID #:	SSWL	Date:	3/8/2012
	The special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the special spanning of the spanning of the special sp			Condition Assessment	
		Wells Facility Name:	Sunset Well	Inspectors:	Peter Lavallee and Mark Gray
		Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
	Photo Evidence for PM, Fn, R, FE	İ	I	1 1	
			PHOTOS		
	20 N SOM TO 1	TAR AM	2011/05/20 11:15 AM 2011/05/20 11:07 AM	2011/05/20 18:98 AM 2011/05/20 11:93 AM	2011/05/20 11:15 AM

		South Tahoe PUD	Location Description:	1128 Tata La	ane	K/J Project Numbe	2 : 1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	TLWL1		Dat		2012
			Wells Facility Name:	Tata Well #	#1	Condition Assessme Inspector		and Mark Gray
			Pressure Zones Served:	Stateline Zo	ne	Adjacent Pressure Zone	S: Twin Peaks Zone or Gardner Mou	ntain Zone depending on valving
		WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT	RATED.					
		Notes:		Failu	re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	of Service reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop		meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements	1: failure every > 40 yrs 2: failure every 21 to 40 yrs	best available technology financial efficiency is high	
				greater than 90% of design requirements greater than 85% of design requirements	meets all requirements fails some requirements	3: failure every 11 to 20 yrs 4: failure every 5 to 10 yrs	financial efficiency is average financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standard					1 21/2	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%	N/A	N/A N/A	N/A 70%	N/A 30%	N/A N/A	
CHECK	100/0	Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score Well Site					10%	0.00
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		N/A N/A	70% N/A	30% N/A	N/A N/A	0.00
		Criticality Score Building Structure					5%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%	10%	N/A N/A	60%	30%	N/A	0.00
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 5%	0.00 0.00
		Well Pump Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A 20%	N/A 30%	N/A 20%	N/A 15%	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 15%	0.00
		Piping & Valves			,			
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A 60%	N/A 30%	N/A N/A	N/A N/A	
CHECK	10070	Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score Supply Well - Sanitary Seal, Casing and Screen					10%	0.00
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	N/A	N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		N/A N/A	50% N/A	20% N/A	20% N/A	0.00
		Criticality Score Wellhead Treatment					15%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Table : 10
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		N/A N/A	60% N/A	40% N/A	N/A N/A	0.00
		Criticality Score		400		1970	15%	0.00
		SCADA System Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)) N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	30%	N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 5%	0.00
		Electrical Power	r_	21/2	6-1-1-1	6-1 1 1 1		
		Is Failure Mode Score Calculated or Assigned: Unweighted Failure Mode Score (1-5)) N/A	N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A N/A	N/A 60%	N/A 20%	N/A N/A	
22011		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score					20% Overall Total Factored Score (Out of 25) =	0.00

			South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 1270	0004*00
				,	2 2 2 2 2		
			Water System Optimization Plan	Wells Facility ID #:	TLWL1	Date:	3/8/2012
			, .			Condition Assessment	
				Wells Facility Name:	Tata Well #1	Inspectors:	Peter Lavallee and Mark Gray
						·	
				Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone or Gardner Mountain Zone depending on valving
			WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT R.	ATED.			
	Importance	-:			CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type Score (1 - 5)	Weighting (1-5)	Final Score	Calif. Waterworks Standards				
R		0	compliant with Calif. DWR Bulletin 74-81?				
R		0	compliant with AWWA Standards A100-06 (wells)?				
Fn Fn		0	adequate equipment clearances to facilitate routine O&M? equipment accessible for removal?				
R		0	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn		0	wellhead minimum 18" above finished grade or floor?	Yes			
R		0		Well controls are within the building and not in a va	ult		
Fn		0	well equipped with ability to add chlorination facilities?				
Fn		0	sample taps available to obtain water quality prior to disinfection (between wellhead and check valve) and after disinfection?	NA Well not in use			
Fn		0	sample tap non-threaded downed-turned?				
Fn		0	bacti sample tap not screened or aerated?				
Fn		0	well able to be pumped to waste with waste discharge line protected from backflow?				
Fn Fn		0	well meter provided? chemical additives NSF 60 compliant?				
			chemical additives have be compliant.				
			Well Site				
Fn		0	adequate vehicle access for year-round maintenance?				
R		0	is site within 100-yr flood plain? is site vulnerable to wildfires?		he FEMA flood map. Which means flood hazards are undetermined b	out possible.	
R R		0	is site vulnerable to wildfires? is site close to known active seismic faults?				
R		0	any unstable site conditions (if yes, describe)?				
			site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	This parcel has a fence around the perimeter but ur	authorized access has occurred in the past		
Fn Fn		0	access/vandalism? other known problems?		·		
FII		0	other known problems:	None			
			Building Structure				
Fn		0	adequate security measures and monitoring to prevent unauthorized access?		d		
PM		0	date building was constructed?				
PM Fn		0	condition of exterior coatings adequate to protect structure? adequate openings for ingress/egress?	There is a single door for ingress/egress			
Fn		0	interior lighting adequate for routine O&M?	Yes			
Fn		0	building designed to withstand snow load and not create safety issue?				
Fn R		0	building meets code compliance requirements? known fire or haz-mat conditions that could be mitigated?	Met the requirements for when it was constructed			
Fn		0	other known problems?				
PM		0	estimated service life remaining?				
INFORMATION N/A	NI / 2	NI/A	Well Pump pump type?				
INFORMATION N/A INFORMATION N/A	N/A N/A	N/A N/A	pump type? pump manufacturer?				
INFORMATION	14/7.	0	pump capacity?				
PM		0	pump rebuilt (list year) and describe work done?				
Fe		0	pump curves available?				
R R		0	known history of pump/motor failures? If so, explain the nature of the failure(s). number of service calls/repairs in the last year?				
INFORMATION		0	what is firm capacity of well pump based on flow test?	Unknown			
С	3	0	Does zone serviced by pump have adaquate capacity to be served?				
Pm Fe		0	coatings adequate to provide corrosion protection? pumps operate efficiently (>70% bowl efficiency)				
R R		0	pumps operate enriciently (>70% bowl enriciency) pumps operate free from excessive vibration?				
Fn		0	adequate NPSH available to prevent cavitation?	unknown			
Fe		0	motor high efficiency and no excessive noise?		dorad		
R R		0	spare parts readily available? other known problems?	No the pumps would need to be pulled and parts of None	uereu		
PM		0	estimated service life remaining?				
1.00	l.			L			

							pt. 5	
				South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 12	70004*00
				Water System Optimization Plan	Wells Facility ID #:	TLWL1	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Tata Well #1	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone or Gardner Mountain Zone depending on valv
				WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RA	TED.			
				Piping & Valves				
Fn			0	pipe supports adequate to prevent movement or vibration?				
PM			0	coatings adequate to protect piping and valves? N				
C Fn			0	pipes adequately sized to prevent excessive noise or headloss? N valves are suitable for efficient and reliable service? N				
PM			0	estimated service life remaining? N				
				Supply Well - Sanitary Seal, Casing and Screen				
PM PM			0	well casing is in good condition? u well screen is in good condition? u				
Fe			0	well-driller's log is available? u				
R			0	50 ft canitary spal2 II	ınknown			
R			0	approximate distance from closest known groundwater contamination hazards (septic tank, leachfield, MTBE/TCE plume, etc.)?	MTBE has been identified within this well and it has been shut	down.		
FORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted? u				
PM			0	last year well was redeveloped? u				
Fn			0	sounding tube or other means to measure depth to water surface? u				
Fn PM			0	gravel-fill pipe provided at well head to monitor condition of filter pack? u estimated service life remaining? u				
				estimated service in exemining.				
				Wellhead Treatment				
Fn			0		well is out of service and chlorine injection equipment has bee	n removed		
Fn Fn			0	chemical piping/tubing is in good condition? N if multiple chemicals used, adequate separation of different chemicals? N				
Fn			0	adequate equipment for meter-pump calibration? N				
Fn			0	frequency of dose calibration?				
R FORMATION	N/A	N/A	0 N/A	spare parts and service support readily available? N treatment system type and capacity (tank storage)? N				
FORMATION	N/A	IN/A	N/A	treatment system type and capacity (tank storage): In	vo.			
				SCADA system				
Fn			0	pump flow meter is adequate to monitor pump performance? T				
Fn Fn			0	flow totals recorded at regular intervals? How frequent? N pressure instrumentation is adequate to monitor pump performance? N				
Fn			0	automated alarm callout for critical failures and reliability? N				
Fn			0	alarm log maintained and reviewed annually?	NA			
FORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? N				
R			0	communication system is reliable (approximate no. of comm. failures in last year)? Nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power system (UPS) available to run all telemetry and instrumentation on main power nuninterrupted power nuninterrupted power nuninterrupted power nuninterrupted power nun all telemetry and instrumentation on main power nun all telemetry and instrumentation on main power nun all telemetry nu	VA			
R			0	failure?				
R			0	spare parts/service support readily available? N				
PM			0	estimated service life remaining? N	NA			
				Electrical Power				
R			0	standby generator size (kW)? N	NA			
R			0	adequate power available to run all equipment y	/es			
R FORMATION	N/A	N/A	0 N/A	adequate standby power present and reliable? N fuel storage capacity (gals)? N				
R	19/75	14/75	0	fuel supply adequate for standby power service? N				
			0	time needed to mobilize portable generator? T	Time needed to mobilize a portable generator is high because	there are no connections		
R			0	known electrical hazards that could be mitigated? N spare parts/service support readily available? A				
Fn			0	estimated service life remaining?				
			U					
Fn R			U					
Fn R PM			0	Additional Data V	Well not in use due to MTBE and discharge piping has been se	parated.		
Fn R	N/A	N/A	N/A	Additional Data V Nameplate duty conditions (rated flow and head, nominal motor horsepower): L		parated.		
Fn R PM	N/A	N/A		Additional Data V Nameplate duty conditions (rated flow and head, nominal motor horsepower): L Legend	Jnknown	parated.		
Fn R PM	N/A	N/A		Nameplate duty conditions (rated flow and head, nominal motor horsepower): L Legend PM P Fn F	Jnknown Physical Mortality Functionality	parated.		
Fn R PM	N/A	N/A		Additional Data V Nameplate duty conditions (rated flow and head, nominal motor horsepower): Legend PM P Fn R R	Jnknown Physical Mortality	parated.		

Wells Facility Name: Total that Facility Name: Total that Facility Name: Total that Facility Name: Total that Facility Name: Pressure Zones Servedi: Pressure Zones S		South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 1270	J004*00
Well Facility Name: To see the 22 Inspectors: Processing and who draw Pressure Zones Served: State in 22 Adjacent Pressure Zones Served: Two house 20 as of demonstrating and adjacent Pressure Zones Served: Processing and Processing		Water System Optimization Plan	Wells Facility ID #:	TLWL1		3/8/2012
PROTOS PROTOS			Wells Facility Name:	Tata Well #1	Condition Assessment Inspectors:	Peter Lavallee and Mark Gray
PROTOS PROTOS			Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone or Gardner Mountain Zone depending on
PHOTOS PHOTOS		WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL I	NOT RATED.			
POTABLE WATER SOLIMENT COMMITTEE		Photo Evidence for PM, Fn,	, R, FE	PHOTOS		
		2011/05/20 02:08 PM	2011/05/20 02:08 PM		Où 1,/OB/PO (PRO)	
		FIG. 17.003/810 (3%.CD) PM			PACITIVE PACE COLOR PACE	
	- 					

		South Tahoe PUD	Location Description:	1128 Tata La	ane	K/J Project Numbe	2r: 1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	TLWL2		Dat		2012
			Wells Facility Name:	Tata Well #	#2	Condition Assessment Inspector		and Mark Gray
			Pressure Zones Served:	Stateline Zo	one	Adjacent Pressure Zone	S: Twin Peaks Zone or Gardner Mou	ntain Zone depending on Valving
		WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT R	ATED.					
		Notes:		Failu	ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level of functionality	of Service reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	meets or exceeds design requirements greater than 95% of design requirements	1: exceeds all requirements	1: failure every > 40 yrs 2: failure every 21 to 40 yrs	best available technology financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements 4: fails some requirements	3: failure every 11 to 20 yrs	3: financial efficiency is average 4: financial efficiency is low	
				4: greater than 85% of design requirements 5: less than 85% of design requirements	5: Fails all requirements	4: failure every 5 to 10 yrs 5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standard						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Tabel Fastered Coose
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score	N/A	N/A N/A	70% N/A	30% N/A	N/A N/A	0.00
		Criticality Score		IN/M	19/6	IV/A	10%	0.00
		Well Site Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A N/A	N/A 70%	N/A 30%	N/A N/A	
		Factored Final Score Criticality Score	N/A	N/A	N/A	N/A	N/A 5%	0.00 0.00
		Building Structure					376	0.00
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		N/A N/A	60% N/A	30% N/A	N/A N/A	0.00
		Criticality Score			.,,		5%	0.00
		Well Pump Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A 20%	N/A 30%	N/A 20%	N/A 15%	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 15%	0.00
		Piping & Valves					1370	0.00
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score		60% N/A	30% N/A	N/A N/A	N/A N/A	0.00
		Criticality Score					10%	0.00
		Supply Well - Sanitary Seal, Casing and Screen Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%	10%	N/A	50%	20%	20%	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 15%	0.00
		Wellhead Treatment Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A N/A	N/A 60%	N/A 40%	N/A N/A	
O.I.COX	20070	Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score SCADA System					15%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100% Factored Final Score	10%	N/A N/A	60% N/A	30% N/A	N/A N/A	0.00
		Criticality Score		IN/A	19/75	19/25	5%	0.00
		Electrical Power Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%		N/A N/A	N/A 60%	N/A 20%	N/A N/A	
CHECK	20070	Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score					20% Overall Total Factored Score (Out of 25) =	0.00

				South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 12	70004*00
				Water System Optimization Plan	Wells Facility ID #:	TLWL2	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Tata Well #2	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone or Gardner Mountain Zone depending on Valving
				WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RA	ATED			
				WEEL OF LINE DOE TO ANDERIC ELVELS THAT HAVE BEEN DETECTED WITHIN THE WEEL WEEL NOT TO	ALL.			
, and the second second	•							
Failure Mode Type	Score (1 - 5)	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
ranare mode type	30010 (1-3)	weighting (1-3)	i iliai score	Calif. Waterworks Standards				
R			0	compliant with Calif. DWR Bulletin 74-81?				
R			0	compliant with AWWA Standards A100-06 (wells)?				
Fn			0	adequate equipment clearances to facilitate routine O&M?				
Fn			0	equipment accessible for removal?				
R Fn	+		0	site drainage adequate to prevent flooding of well, buildings, and critical equipment? wellhead minimum 18" above finished grade or floor?				
R			0		Well controls are within the building and not	in a vault		
Fn			0	well equipped with ability to add chlorination facilities?	Yes			
				sample taps available to obtain water quality prior to disinfection (between wellhead and check	Not Connected			
Fn			0	valve) and after disinfection?				
Fn			0	sample tap non-threaded downed-turned?				
Fn			0	bacti sample tap not screened or aerated? well able to be pumped to waste with waste discharge line protected from backflow?				
Fn Fn			0	well able to be pumped to waste with waste discharge line protected from backflowr well meter provided?				
Fn			0	chemical additives NSF 60 compliant?				
				·				
				Well Site				
Fn			0	adequate vehicle access for year-round maintenance?	Yes this is a large parcel shared with Tata Boo	ster and Tata Tank		
R			0			D on the FEMA flood map. Which means flood hazards are undetermined	but possible.	
R			0	is site vulnerable to wildfires?				
R R			0	is site close to known active seismic faults? any unstable site conditions (if yes, describe)?				
N .			0	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	Trees are close to the well heads and building			
Fn			0	access/vandalism?	This parcel has a fence around the perimeter	but unauthorized access has occurred in the past		
Fn			0	other known problems?	None			
				Building Structure				
Fn			0	adequate security measures and monitoring to prevent unauthorized access?				
PM PM			0	date building was constructed?		. The fascia and soffit of the building show water damage on the low side	of the single slaned roof. It also appears that animals ma	ust one time had nexts within the coffit of the building
Fn			0		There is a single door for ingress/egress	. The rascia and some of the building show water damage on the low side	or the single sloped root. It also appears that animals ma	y at one time had nests within the sornt of the building.
Fn			0	interior lighting adequate for routine O&M?				
Fn			0	building designed to withstand snow load and not create safety issue?	Met the requirements for when it was constru			
Fn			0	building meets code compliance requirements?		ucted		
R			0	known fire or haz-mat conditions that could be mitigated?				
Fn PM			0	other known problems? estimated service life remaining?				
FIVI	+		U	estillated service life remaining?				
				Well Pump				
INFORMATION	N/A	N/A	N/A	pump type?				
INFORMATION	N/A	N/A	N/A	pump manufacturer?	Goulds			
INFORMATION			0	pump capacity?				
PM			0	pump rebuilt (list year) and describe work done?				
Fe R	+		0	pump curves available? known history of pump/motor failures? If so, explain the nature of the failure(s).				
R	+	+	0	number of service calls/repairs in the last year?				
INFORMATION			0	what is firm capacity of well pump based on flow test?	Unknown			
С		3	0	Does zone serviced by pump have adaquate capacity to be served?				
Pm			0	coatings adequate to provide corrosion protection?				
Fe R	+		0	pumps operate efficiently (>70% bowl efficiency)				
Fn			0	pumps operate free from excessive vibration? adequate NPSH available to prevent cavitation?				
Fe	+		0	motor high efficiency and no excessive noise?				
R			0		No the pumps would need to be pulled and p	arts ordered		
R			0	other known problems?				
PM			0	estimated service life remaining?	Exceeds AWU Useful Life			

							, , , , , , , , , , , , , , , , , , ,	
				South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 12	70004*00
				Water System Optimization Plan	Wells Facility ID #:	TLWL2	Date:	3/8/2012
					·		Condition Assessment	
					Wells Facility Name:	Tata Well #2	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone or Gardner Mountain Zone depending on Valvi
				WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RAI	red.			
				Piping & Valves				
Fn			0	pipe supports adequate to prevent movement or vibration? N	NA			
PM			0	coatings adequate to protect piping and valves? N				
C Fn			0	pipes adequately sized to prevent excessive noise or headloss? N valves are suitable for efficient and reliable service?				
PM			0	estimated service life remaining? N				
				Supply Well - Sanitary Seal, Casing and Screen				
PM			0	well casing is in good condition? u well screen is in good condition? u				
PM Fe			0	well-driller's log is available?				
R			0	50 ft sanitary spal2	ınknown			
R			0	approximate distance from closest known groundwater contamination hazards (septic tank, leachfield, MTBE/TCE plume, etc.)?	NTBE has been identified within this well and it has been shut	down.		
FORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted? U				
PM			0	last year well was redeveloped? u				
Fn Fn			0	sounding tube or other means to measure depth to water surface? u gravel-fill pipe provided at well head to monitor condition of filter pack? u				
PM			0	estimated service life remaining?				
				Wellhead Treatment				
Fn Fn			0	chemical storage tanks have secondary containment? I chemical piping/tubing is in good condition? N	well is out of service and chlorine injection equipment has bee	n removed		
Fn			0	if multiple chemicals used, adequate separation of different chemicals?				
Fn			0	adequate equipment for meter-pump calibration?	NA .			
Fn			0	frequency of dose calibration?				
R IFORMATION	N/A	N/A	0 N/A	spare parts and service support readily available? N treatment system type and capacity (tank storage)? N				
	.,,,,,	14/71	.471	3-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1				
				SCADA system				
Fn Fn			0	pump flow meter is adequate to monitor pump performance? T				
Fn Fn			0	flow totals recorded at regular intervals? How frequent? N pressure instrumentation is adequate to monitor pump performance? N				
Fn			0	automated alarm callout for critical failures and reliability?				
Fn			0	alarm log maintained and reviewed annually?				
IFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? N communication system is reliable (approximate no. of comm. failures in last year)?				
R			0	uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power				
R			0	failure?				
R PM			0	spare parts/service support readily available?				
PM			0	estimated service life remaining?	VA			
				Electrical Power				
R			0	standby generator size (kW)?	NA			
R			0	adequate power available to run all equipment y				
R	N/A	N/A	0 N/A	adequate standby power present and reliable? N fuel storage capacity (gals)? N				
IEODMATION	N/A	N/A	0	fuel supply adequate for standby power service? N				
FORMATION R			0		Time needed to mobilize a portable generator is high because	there are no connections		
R R			0	known electrical hazards that could be mitigated?				
R R Fn				1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -				
R R			0	spare parts/service support readily available? A estimated service life remaining?				
R R Fn R			0	estimated service life remaining?	NA			
R Fn R PM			0	estimated service life remaining? Additional Data	NA Well not in use due to MTBE and discharge piping has been sep	parated.		
R R Fn R	N/A	N/A	0	estimated service life remaining? Additional Data V Nameplate duty conditions (rated flow and head, nominal motor horsepower): 1	NA Well not in use due to MTBE and discharge piping has been sep	parated.		
R R Fn R PM	N/A	N/A	0	estimated service life remaining? Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower): 1 Legend	NA Well not in use due to MTBE and discharge piping has been sep 15.5hp	parated.		
R R Fn R PM	N/A	N/A	0	estimated service life remaining? Additional Data Nameplate duty conditions (rated flow and head, nominal motor horsepower): Legend PM PM PM PM PM PM PM PM	NA Well not in use due to MTBE and discharge piping has been sep	parated.		
R R Fn R PM	N/A	N/A	0	estimated service life remaining? Additional Data V Nameplate duty conditions (rated flow and head, nominal motor horsepower): 1 Legend PM F Fn I R F	NAI Well not in use due to MTBE and discharge piping has been set Shp Physical Mortality	parated.		



		South Tahoe PUD	Location Description:	1128 Tata La	ane	K/J Project Numbe	2r: 1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	TLWL3		Dat	· ·	2012
			Wells Facility Name:	Tata Well #	13	Condition Assessment Inspector		and Mark Gray
			Pressure Zones Served:	Stateline Zo	ne	Adjacent Pressure Zone	S: Twin Peaks Zone or Gardner Mou	ntain Zone depending on valving
		WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT R.	ATED.					
		Notes:		Failu	re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level of functionality	of Service reliability	Financial Efficiency	
		3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 40 yrs	1: best available technology	
			3: moderate deterioration	greater than 95% of design requirements greater than 90% of design requirements	3: meets all requirements	2: failure every 21 to 40 yrs 3: failure every 11 to 20 yrs	financial efficiency is high financial efficiency is average	
				greater than 85% of design requirements less than 85% of design requirements	4: fails some requirements 5: Fails all requirements	4: failure every 5 to 10 yrs 5: failure < 5 yrs	4: financial efficiency is low 5: asset should be replaced	
				3. ress than 0370 or design requirements	5. Tails dirregaliements	5. Idilate 15 415	5. disset should be replaced	
		California Waterworks Standard Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	N/A 70%	N/A 30%	N/A N/A	
CHECK	20070	Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score Well Site					10%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 5%	0.00
		Building Structure					3/0	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factors d Com-
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	30%	N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 5%	0.00
		Well Pump						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		20% N/A	30% N/A	20% N/A	15% N/A	0.00
		Criticality Score		NO	1975	19/15	15%	0.00
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		60% N/A	30% N/A	N/A N/A	N/A N/A	0.00
		Criticality Score					10%	0.00
		Supply Well - Sanitary Seal, Casing and Screen Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	N/A 50%	N/A 20%	N/A 20%	
22011		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score Wellhead Treatment					15%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	60%	40%	N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 15%	0.00
		SCADA System						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	10%	N/A N/A	60% N/A	30% N/A	N/A N/A	0.00
		Criticality Score		IN/A	IV/A	IV/A	5%	0.00
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	20%	N/A	
CHECK		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00

			South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 1270	004*00
				·			
			Water System Optimization Plan	Wells Facility ID #:	TLWL3	Date:	3/8/2012
			,	,		Condition Assessment	
				Wells Facility Name:	Tata Well #3	Inspectors:	Peter Lavallee and Mark Gray
				Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone or Gardner Mountain Zone depending on valving
			WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RA	-			
			WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT KA	ATED.			
Failure Mode Type Score (1 - 5)	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type Score (1 - 5)	weighting (1-5)	rillal Score	Calif. Waterworks Standards				
R		0	compliant with Calif. DWR Bulletin 74-81?	Yes			
R		0	compliant with AWWA Standards A100-06 (wells)?				
Fn Fn		0	adequate equipment clearances to facilitate routine O&M? equipment accessible for removal?				
R		0	site drainage adequate to prevent flooding of well, buildings, and critical equipment?				
Fn		0	wellhead minimum 18" above finished grade or floor?	Yes			
R		0		Well controls are within the building and not in a v	ault		
Fn		0	well equipped with ability to add chlorination facilities?				
Fn		0	sample taps available to obtain water quality prior to disinfection (between wellhead and check valve) and after disinfection?	NA Well not in use			
Fn		0	sample tap non-threaded downed-turned?				
Fn		0	bacti sample tap not screened or aerated?				
Fn Fn		0	well able to be pumped to waste with waste discharge line protected from backflow? well meter provided?				
Fn Fn		0	chemical additives NSF 60 compliant?				
		-					
			Well Site				
Fn		0	adequate vehicle access for year-round maintenance?				
R R		0	is site within 100-yr flood plain? is site vulnerable to wildfires?		the FEMA flood map. Which means flood hazards are undetermined	but possible.	
R R		0	is site close to known active seismic faults?				
R		0	any unstable site conditions (if yes, describe)?	Trees are close to the well heads and building			
			site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	This parcel has a fence around the perimeter but u	nauthorized access has occurred in the past		
Fn Fn		0	access/vandalism? other known problems?				
			otter known prosens.				
			Building Structure				
Fn		0	adequate security measures and monitoring to prevent unauthorized access?				
PM PM		0	date building was constructed? condition of exterior coatings adequate to protect structure?		#2		
Fn Fn		0		There is a single door for ingress/egress	**		
Fn		0	interior lighting adequate for routine O&M?	Yes			
Fn		0	building designed to withstand snow load and not create safety issue?				
Fn R		0	building meets code compliance requirements? known fire or haz-mat conditions that could be mitigated?	Met the requirements for when it was constructed			
Fn	+	0	other known problems?				
PM		0	estimated service life remaining?	Exceeds AWU Useful Life			
INFORMATION N/A	N/A	N/A	Well Pump pump type?				
INFORMATION N/A	N/A	N/A	pump typer pump manufacturer?				
INFORMATION		0	pump capacity?				
PM		0	pump rebuilt (list year) and describe work done?				
Fe R		0	pump curves available? known history of pump/motor failures? If so, explain the nature of the failure(s).				
R R		0	number of service calls/repairs in the last year?				
INFORMATION		0	what is firm capacity of well pump based on flow test?	Unknown			
С	3	0	Does zone serviced by pump have adaquate capacity to be served?				
Pm Fe		0	coatings adequate to provide corrosion protection? pumps operate efficiently (>70% bowl efficiency)				
R		0	pumps operate from excessive vibration?				
Fn		0	adequate NPSH available to prevent cavitation?	unknown			
Fe		0	motor high efficiency and no excessive noise?	Unknown No the pumps would need to be pulled and parts of	urdored		
R R		0	spare parts readily available? other known problems?		nuel eu		
PM		0	estimated service life remaining?				
	Į.						

			S	South Tahoe PUD	Location Description:	1128 Tata Lane	K/J Project Number: 12	70004*00
			V	Water System Optimization Plan	Wells Facility ID #:	TLWL3	Date:	3/8/2012
							Condition Assessment	
					Wells Facility Name:	Tata Well #3	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone or Gardner Mountain Zone depending on valvi
			v	WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RA	ATED.			
				Piping & Valves				
Fn			0	pipe supports adequate to prevent movement or vibration?				
PM C			0	coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise or headloss?				
Fn			0	valves are suitable for efficient and reliable service?	NA			
PM			0	estimated service life remaining?	NA			
				Supply Well - Sanitary Seal, Casing and Screen				
PM			0	well casing is in good condition?	unknown			
PM			0	well screen is in good condition?				
Fe R			0	well-driller's log is available? 50 ft. sanitary seal?	unknown			
R			0	approximate distance from closest known groundwater contamination hazards (septic tank, leachfield, MTBE/TCE plume, etc.)?	MTRE has been identified within this well and it has been shut	down.		
FORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted?	unknown			
PM Fn			0	last year well was redeveloped? sounding tube or other means to measure depth to water surface?				
Fn			0	gravel-fill pipe provided at well head to monitor condition of filter pack?				
PM			0	estimated service life remaining?				
				Mallhood Troobreaut				
Fn			0	Wellhead Treatment	well is out of service and chlorine injection equipment has bee	n removed		
Fn			0	chemical piping/tubing is in good condition?	NA			
Fn			0	if multiple chemicals used, adequate separation of different chemicals?				
Fn Fn			0	adequate equipment for meter-pump calibration? frequency of dose calibration?				
R			0	spare parts and service support readily available?	NA			
IFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)?	NA			
				SCADA system				
Fn			0	pump flow meter is adequate to monitor pump performance?	The well is out of service so the flow meter is not connected			
Fn			0	flow totals recorded at regular intervals? How frequent?				
Fn Fn			0	pressure instrumentation is adequate to monitor pump performance? automated alarm callout for critical failures and reliability?				
Fn			0	alarm log maintained and reviewed annually?	NA			
IFORMATION R	N/A	N/A	N/A 0	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? communication system is reliable (approximate no. of comm. failures in last year)?				
N.			U I	uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power	NA NA			
R			0	failure?				
R PM			0	spare parts/service support readily available? estimated service life remaining?				
			Ü	estimated service me remaining.	***			
				Electrical Power				
R R			0	standby generator size (kW)? adequate power available to run all equipment				
R			0	adequate power available to full all equipment adequate standby power present and reliable?				
IFORMATION	N/A	N/A	N/A	fuel storage capacity (gals)?				
R R			0	fuel supply adequate for standby power service?	NA Time needed to mobilize a portable generator is high because	there are no connections		
Fn			0	known electrical hazards that could be mitigated?		dicte are no connections		
R			0	spare parts/service support readily available?				
PM			0	estimated service life remaining?	NA			
				Additional Data	Well not in use due to MTBE and discharge piping has been se	parated.		
NFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):				
		-	-	Legend DM	Physical Mortality			
			l l	Fn]	Functionality			
				R	Reliability Financial Efficiency			

Wells Facility Name: Wells Facility Name: Tata Well #3 Condition Assessment inspectors: Peter Lavellee and Mark Gray Pressure Zones Served: Stateline Zone Adjacent Pressure Zones: Twin Peaks Zone or Gardner Mountain Zone despending on Photos Photos PHOTOS PHOTOS	Wells Facility Name: Tata well #3 Pressure Zones Served: Stateline Zone Adjacent Pressure: WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL. WELL NOT RATED. Photo Evidence for PM, Fn, R, FE PHOTOS PHOTOS	sment ectors: Peter Lavallee and Mark Gray
Wells Facility Name: Tata Well #3 Condition Assessment Inspectors: Peter Lavalice and Mark Gray Pressure Zones Served: Stateline Zone Adjacent Pressure Zones: Twin Peaks Zone or Gardner Mountain Zone depending on Methods Evidence for PM, Fn, R, FE PHOTOS PHOTOS	Well of Fine Due to Arsenc Levels That have been detected within the well well not sared. Photo Evidence for PM, Fn, R, FE PHOTOS Condition Assessing Inspired Stateline Zone Adjacent Pressure Photo Evidence for PM, Fn, R, FE PHOTOS	sment ectors: Peter Lavallee and Mark Gray
Pressure Zones Served: Stateline Zone Adjacent Pressure Zones: Twin Peaks Zone or Gardner Mountain Zone depending on WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL WELL NOT RATED. Photo Evidence for PM, Fn, R, FE PHOTOS PHOTOS PHOTOS	Pressure Zones Served: WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL WELL NOT RATED. Photo Evidence for PM, Fn, R, FE PHOTOS Adjacent Pressure: PHOTOS	
WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL WELL NOT RATED. Photo Evidence for PM, Fn, R, FE PHOTOS PHOTOS	WELL OFFLINE DUE TO ARSENIC LEVELS THAT HAVE BEEN DETECTED WITHIN THE WELL WELL NOT RATED. Photo Evidence for PPM, Fn, R, FE PHOTOS PHOTOS	Zones: Twin Peaks Zone or Gardner Mountain Zone depending of
PHOTOS	PHOTOS A CONTROL OF THE PROPERTY OF THE PROPE	
PHOTOS	PHOTOS White the second of th	

		South Tahoe PUD	Location Description:	1329 Mountain Me	eadow Dr.	K/J Project Numbe	2r: 1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	MVWL		Dat		/2012
			Wells Facility Name:	Mountain View	v Well	Condition Assessme Inspecto		and Phill Torney
			Pressure Zones Served:	Twin Peaks Z	one (Adjacent Pressure Zone	Stateline and I	Flagpole Zones
		Notes:			ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality 1: new or excellent condition	Capacity	functionality	reliability	Financial Efficiency	
		For Criticality Weighting Factors to be determined at District Workshop		meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements	1: failure every > 40 yrs 2: failure every 21 to 40 yrs	best available technology financial efficiency is high	
				3: greater than 90% of design requirements		3: failure every 11 to 20 yrs	3: financial efficiency is average	
				4: greater than 85% of design requirements 5: less than 85% of design requirements		4: failure every 5 to 10 yrs	4: financial efficiency is low 5: asset should be replaced	
			5: Virtually unserviceable	5: less than 85% of design requirements	5: Falls all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standard						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.60	1.75	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	6.20 70%	7.50 30%	N/A N/A	
U. ILUN	10070	Factored Final Score		N/A	4.34	2.25	N/A	6.59
		Criticality Score					10%	0.66
		Well Site						
		Is Failure Mode Score Calculated or Assigned?		N/A N/A	Calculated 2.33	Calculated 3.00	N/A N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	2.33	9.50	N/A N/A	Total Pactoreu Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
		Factored Final Score	N/A	N/A	3.27	2.85	N/A	6.12
		Criticality Score					5%	0.31
		Building Structure		81/8	Coloniated	Coloniated	N/0	
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 1.00	Calculated 1.00	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.33	3.00	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	30%	N/A	
		Factored Final Score	-	N/A	2	0.9	N/A	4.50
		Criticality Score					5%	0.23
		Well Pump Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	
		Unweighted Failure Mode Score (1-5)		5.00	5.00	1.20	4.33	Total Factored Score
		Weighted Final Score (1-25)	17.33	15.00	10.00	3.40	15.00	
CHECK	100%	Criticality Weighting Factor (0 - 100%)		20%	30%	20%	15%	
		Factored Final Score Criticality Score		3.00	3.00	0.68	2.25	11.53 1.73
		Piping & Valves					1570	2170
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		1.00	5.00	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25)		3.00 60%	15.00 30%	N/A N/A	N/A N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		1.80	4.50	N/A	N/A N/A	8.55
		Criticality Score					10%	0.86
		Supply Well - Sanitary Seal, Casing and Screen						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	Calculated	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	5.00 17.50	3.00 12.50	5.00 15.00	i otal Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	50%	20%	20%	
		Factored Final Score	1.63	N/A	8.75	2.50	3.00	15.88
		Criticality Score					15%	2.38
		Wellhead Treatment Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.60	1.00	N/A N/A	Total Factored Scor
		Weighted Final Score (1-25)	N/A	N/A	4.20	1.00	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A	60%	40%	N/A	2.02
		Factored Final Score Criticality Score		N/A	2.52	0.40	N/A 15%	2.92 0.44
		SCADA System						J. 17
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	1.00	2.67	N/A	Total Factored Scor
1501	1000/	Weighted Final Score (1-25)		N/A	3.00	6.00	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	60% 1.80	30% 1.80	N/A N/A	4.40
		Criticality Score		N/A	1.00	1.00	5%	0.22
		Electrical Power						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	3.25	N/A	Total Factored Scor
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	3.00 60%	10.25 20%	N/A N/A	
LIEUN	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	1.80	2.05	N/A N/A	7.85
								,

				South Tahoe PUD	Location Description:	1329 Mountain Meadow Dr.	K/J Project Number: 1270004*0	0
				Water System Optimization Plan	Wells Facility ID #:	MVWL	Date:	3/12/2012
							Condition Assessment	
					Wells Facility Name:	Mountain View Well	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Stateline and Flagpole Zones
							<u> </u>	
								
'	'							
Failure Mode Type	Score (1 - 5)	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
Tanare Wode Type	30010 (1 - 3)	weighting (1-5)	Tillal Score	Calif. Waterworks Standards				
R	1	4	4	compliant with Calif. DWR Bulletin 74-81?				
R Fn	1 3	3	9	compliant with AWWA Standards A100-06 (wells)? adequate equipment clearances to facilitate routine O&M?				
Fn	1	4	4	equipment accessible for removal?	Yes through a roof hatch			
R	4	5	20	site drainage adequate to prevent flooding of well, buildings, and critical equipment?	No this site has terrible drainage and due to the	e artesian nature has ponding on the north east side of the build	ling	
Fn R	1	3	3	wellhead minimum 18" above finished grade or floor? well electrical controls not in vault?				
Fn	1	3	3	well equipped with ability to add chlorination facilities?				
Fn	1	4	4	sample taps available to obtain water quality prior to disinfection (between wellhead and check valve) and after disinfection?	Yes			
Fn	1	5	5	sample tap non-threaded downed-turned?	They are down turned and non-threaded			
Fn	5	5	25	bacti sample tap not screened or aerated?	Neither screened nor aerated			
Fn Fn	1	3	3	well able to be pumped to waste with waste discharge line protected from backflow? well meter provided?				
Fn	1	4	4	chemical additives NSF 60 compliant?				
Fn	1	2	2	Well Site adequate vehicle access for year-round maintenance?	Vas			
R	2	3	6	is site within 100-yr flood plain?	No. This site is indicated as other areas Zone D	on the FEMA flood map. Which means flood hazards are undet	ermined but possible.	
R	2	4	8		The site is adjacent to an open meadow and is	vulnerable to wildfires		
R R	4	2	16 8	is site close to known active seismic faults? any unstable site conditions (if yes, describe)?		ilding as seen below in the pictures		
					There is no security and there is evidence of at			
Fn Fn	5 1	2	10 2	access/vandalism? other known problems?				
	-		-					
				Building Structure				
Fn INFORMATION	1 N/A	3 N/A	3 N/A	adequate security measures and monitoring to prevent unauthorized access? date building was constructed?				
PM	4	3	12	condition of exterior coatings adequate to protect structure?		nissing from the roof and paint is starting to peel		
Fn	1	4	4	adequate openings for ingress/egress?				
Fn Fn	1	3 4	3	interior lighting adequate for routine O&M? building designed to withstand snow load and not create safety issue?				
Fn	1	2	2	building meets code compliance requirements?	Yes for the time when it was constructed			
R Fn	1	3 4	3 4	known fire or haz-mat conditions that could be mitigated? other known problems?				
PM	4	5	20		Exceeds AWU Useful Life (rh) needs rehab with	in nxt 5 yrs		
				W-II B				
INFORMATION	N/A	N/A	N/A	Well Pump pump type?	Submersible			
INFORMATION	N/A	N/A	N/A	pump manufacturer?	Goulds			
INFORMATION	4	3	0	pump capacity? pump rebuilt (list year) and describe work done?				
PM Fe	4 5	4	16 20		Replaced the pump and motor in 1996 Pump Curves are available			
R	1	2	2	known history of pump/motor failures? If so, explain the nature of the failure(s).	None since replacement			
R INFORMATION	1	3	0	number of service calls/repairs in the last year? what is firm capacity of well pump based on flow test?				
C	5	3	15	Does zone serviced by pump have adaquate capacity to be served?	Evaluation in block diagram			
Pm	5	4	20	coatings adequate to provide corrosion protection?	Pump is submerged and unable to be evaluated			
Fe R	3 1	5 4	15 4	pumps operate efficiently (>70% bowl efficiency) pumps operate free from excessive vibration?	Yes	is relatively IOW (1500 KW-IIF/IVIgal)		
Fn	5	2	10	adequate NPSH available to prevent cavitation?	insufficient data			
Fe R	5 2	2	10 4	motor high efficiency and no excessive noise?	insufficient data Yes at the District shops and through the manu	ifacturer		
R	1	5	5	other known problems?	None			
PM	4	4	16	estimated service life remaining?	Estimate that it exceeds the AWU Useful Life (r	h) pump should be pulled and inspected within nxt 5 yrs		

				South Tahoe PUD	Location Description:	1329 Mountain Meadow Dr.	K/J Project Number: 1270004	*00
				Webs Codes Outinisation Blos	Malla Facility ID #		D. L.	2 (22 (22)
				Water System Optimization Plan	Wells Facility ID #:	MVWL	Date:	3/12/2012
					Wells Facility Name:		Condition Assessment	0
					wells Facility Name:	Mountain View Well	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Toda Basin Zana	Adjacent Pressure Zones:	Chahalina and Elementa 7
					Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones.	Stateline and Flagpole Zones
					_			<u></u>
				Pining & Valves	5 Old piping through concrete floor is thin walled and had n	improve looks just outside the building		
Fn	5	4	20	pipe supports adequate to prevent movement or vibration?		amerous leaks just outside the building		
PM	5	5	25	coatings adequate to protect piping and valves?	Most coatings are in good condition but others are worn,	cracked, rusted, and need to be replaced		
C Fn	1 5	3	3 10	pipes adequately sized to prevent excessive noise or headloss?	 Yes Yes, butterfly valve on discharge is rusted and in bad cond 	ition		
PM	5	4	20		Estimate that the piping is near or has exceeded AWU Use			
	-							
				Supply Well - Sanitary Seal, Casing and Screen				
PM PM	5	3	15 15	well casing is in good condition? well screen is in good condition?				
Fe	5	3	15	well-driller's log is available	? No			
R	5	4	20	50 ft. sanitary seal				
R	1	5	5	approximate distance from closest known groundwater contamination hazards (septic tank leachfield, MTBE/TCE plume, etc.)	None measured nearby			
INFORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted:	? insufficient data			
PM	5	2	10	last year well was redeveloped				
Fn Fn	5 5	3	15 20	sounding tube or other means to measure depth to water surface: gravel-fill pipe provided at well head to monitor condition of filter pack;				
PM	5	5	25		P Typ useful life 50 yrs. 5 yrs remaining useful life			
				Wellhead Treatment				
Fn Fn	5	2	10	chemical storage tanks have secondary containment: chemical piping/tubing is in good condition?				
Fn	N/A	3	N/A	if multiple chemicals used, adequate separation of different chemicals	? NA			
Fn	1	4	4	adequate equipment for meter-pump calibration				
Fn R	1	5	5	frequency of dose calibration? spare parts and service support readily available?				
INFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)				
				CCADA				
Fn	1	4	4	SCADA system pump flow meter is adequate to monitor pump performance:				
Fn	1	1	1	flow totals recorded at regular intervals? How frequents	the flow totals are recorded daily by hand			
Fn	1	2	2	pressure instrumentation is adequate to monitor pump performance	? There are pressure gauges throughout the well that monit	or system pressures		
Fn Fn	1	4	4	automated alarm callout for critical failures and reliability	 Yes and it is monitored by District Operations The alarm log is maintained but it is not reviewed annually 			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	Radio			
R	1	2	2	communication system is reliable (approximate no. of comm. failures in last year)				
R	5	,	10	uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power	r A portable back up generator would need to be brought to	the site in the event of a power outage		
R	2	3	6	spare parts/service support readily available?	Parts are readily available through the manufacturer or at			
PM	2	4	8		? 11 Years based on AWU Useful Life			
		 		Electrical Power	r			
INFORMATION	N/A	N/A	N/A	standby generator size (kW)				
R	1	5	5	adequate power available to run all equipmen	t Yes			
R INFORMATION	5 N/A	5 N/A	25 N/A	adequate standby power present and reliable fuel storage capacity (gals)				
INFORMATION	N/A N/A	N/A N/A	N/A N/A	fuel supply adequate for standby power service				
R	5	1	5	time needed to mobilize portable generator	? 1-2 hours but there are no hookups so retrofit would take	longer		
Fn	1	3	3	known electrical hazards that could be mitigated: spare parts/service support readily available:			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
R PM	5	3 4	6 20		R Exceeds useful life of controls by 20 yrs			
						rflow discharges through 2 inch line to meadow, 50 feet east	of well building	
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower)				
		 		Legend	d Physical Mortality			
		1			Functionality			
					R Reliability			
					Financial Efficiency			
	1		ļ	1	Capacity			

	South Tahoe PUD	Location Description:	1329 Mountain Meadow Dr.	K/J Project Number: 1270004*0	0
	Water System Optimization Plan	Wells Facility ID #:	MVWL	Date:	3/12/2012
		Wells Facility Name:	Mountain View Well	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Stateline and Flagpole Zones
	Photo Evidence for P	M, Fn, R, FE	1		
			PHOTOS		·
	2011/09/24 08(05) PM	2011/05/24 0	IS THE PAUL	2011 005 24 ph 10 PM	2011/05/24 03:09 PM
2017/05/24.0	2017/05/24 03:09 PM	2011/06/24 03:1	TPM	SONTE PERIOD PR	2011/03/24 08/

		South Tahoe PUD	Location Description:	Barbara Ave and N	flartin Ave	K/J Project Numbe	er: 1270004*00	
		Water System Optimization Plan	Wells Facility ID #:	MRTNWL	-	Dat		/2012
			Wells Facility Name:	Martin We	ell	Condition Assessme Inspecto		Jeremy Rutherdale
			Pressure Zones Served:	Stateline Zo	ne	Adjacent Pressure Zone	es: Twin Pe	aks Zone
		Well has been abandoned but not destroyed. It was very high in iron and man	ganese and it does not have any of	the equipment the pump has been pu	lled as well. Well not rated.			
		Notes:		Failu	re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level (of Service reliability	Financial Efficiency	
		3. For Criticality Weighting Factors to be determined at District Workshop		1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 40 yrs	1: best available technology	
				greater than 95% of design requirements greater than 90% of design requirements	2: exceeds some requirements 3: meets all requirements	2: failure every 21 to 40 yrs 3: failure every 11 to 20 yrs	financial efficiency is high financial efficiency is average	
				4: greater than 85% of design requirements 5: less than 85% of design requirements	4: fails some requirements 5: Fails all requirements	4: failure every 5 to 10 yrs 5: failure < 5 yrs	4: financial efficiency is low 5: asset should be replaced	
				3. less than 65% of design requirements	5. Fails all requirements	5. Tallure < 5 yrs	js. asset siloulu be replaceu	
		California Waterworks Standard Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (2-5)		N/A	N/A	N/A	N/A N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	N/A 70%	N/A 30%	N/A N/A	
CHECK	100%	Factored Final Score	N/A	N/A N/A	70% N/A	N/A	N/A	0.00
		Criticality Score Well Site					10%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
-		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	N/A	N/A N/A	N/A N/A	0.75 N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
		Factored Final Score Criticality Score	N/A	N/A	N/A	N/A	N/A 5%	0.00 0.00
		Building Structure					376	0.00
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	30%	N/A	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 5%	0.00
		Well Pump	•			_		
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		20% N/A	30% N/A	20% N/A	15% N/A	0.00
		Criticality Score		77.	.,,		15%	0.00
		Piping & Valves Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A 60%	N/A 30%	N/A N/A	N/A N/A	
CITECK	100/0	Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score Supply Well - Sanitary Seal, Casing and Screen					10%	0.00
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
-		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		N/A N/A	N/A N/A	N/A N/A	N/A N/A	Total Factored Score
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	50%	20%	20%	
		Factored Final Score Criticality Score		N/A	N/A	N/A	N/A 15%	0.00
		Wellhead Treatment				_		0.00
		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated N/A	Calculated N/A	N/A N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	N/A	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score		N/A N/A	60% N/A	40% N/A	N/A N/A	0.00
		Criticality Score					15%	0.00
		SCADA System Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A	N/A	N/A	N/A N/A	Total Factored Score
CHECK	1000/	Weighted Final Score (1-25)	N/A	N/A N/A	N/A 60%	N/A 30%	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Final Score	N/A	N/A N/A	60% N/A	30% N/A	N/A	0.00
_		Criticality Score					5%	0.00
		Electrical Power Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	N/A	N/A	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)		N/A N/A	N/A 60%	N/A 20%	N/A N/A	
		Factored Final Score	N/A	N/A	N/A	N/A	N/A	0.00
		Criticality Score					20% Overall Total Factored Score (Out of 25) =	0.00 0.00

			South Tahoe PUD	Location Description:	Barbara Ave and Martin Ave	K/J Project Number: 1270004*00	
				, , ,			
			Water System Optimization Plan	Wells Facility ID #:	MRTNWL	Date:	3/13/2012
						Condition Assessment	
				Wells Facility Name:	Martin Well	Inspectors:	Peter Lavallee and Jeremy Rutherdale
				-			
				Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
			Well has been abandoned but not destroyed. It was very high in iron and mang	anese and it does not have any of the	ne aguinment the numn has been nulled as well. Well not	rated	
			The mass seen assurable a sacrific description to was very high in non-anal mang	anese and it does not have any or the	to equipment the pump has been puned as well. Well hot	. ruccu	
Failure Mode Type	Importance Score (1 - 5) Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
ranare mode type	Secretary Treatment (2.5)	r mar occirc	Calif. Waterworks Standards				
R		0	compliant with Calif. DWR Bulletin 74-81?				
R Fn		0	compliant with AWWA Standards A100-06 (wells)? adequate equipment clearances to facilitate routine O&M?				
Fn		0	equipment accessible for removal?				
R		0	site drainage adequate to prevent flooding of well, buildings, and critical equipment?	There are no drainage issues at this location			
Fn R		0	wellhead minimum 18" above finished grade or floor?	Yes The electrical controls are inside the building b	ut not in the vault		
Fn		0	well equipped with ability to add chlorination facilities?	Removed	at not make 1881.		
			sample taps available to obtain water quality prior to disinfection (between wellhead and check	Removed			
Fn Fn		0	valve) and after disinfection? sample tap non-threaded downed-turned?				
Fn		0	bacti sample tap not screened or aerated?				
Fn		0	well able to be pumped to waste with waste discharge line protected from backflow?	Removed			
Fn		0	well meter provided? chemical additives NSF 60 compliant?				
Fn		U	chemical additives Nor 60 compilant?	Kemoveu			
			Well Site				
Fn		0	adequate vehicle access for year-round maintenance?				
R R		0		No. This site is indicated as other areas Zone X The site is vulnerable and adjacent to a meado			
R	3	0	is site close to known active seismic faults?				
R		0	any unstable site conditions (if yes, describe)?	None			
Fn		0	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	No there is a swing gate and that is it			
Fn		0	other known problems?				
			0.111.6.				
Fn		0	Building Structure adequate security measures and monitoring to prevent unauthorized access?	The huilding is locked			
PM		0	date building was constructed?				
PM		0	condition of exterior coatings adequate to protect structure?				
Fn Fn		0	adequate openings for ingress/egress? interior lighting adequate for routine O&M?				
Fn		0	building designed to withstand snow load and not create safety issue?	Met loads at the time of construction			
Fn		0	building meets code compliance requirements?				
R Fn		0	known fire or haz-mat conditions that could be mitigated? other known problems?				
PM		0	estimated service life remaining?				
			W-II Power				
INFORMATION	N/A N/A	N/A	Well Pump pump type?	NΔ			
INFORMATION	N/A N/A	N/A	pump manufacturer?				
INFORMATION		0	pump capacity?				
PM Fe		0	pump rebuilt (list year) and describe work done? pump curves available?				
R		0	known history of pump/motor failures? If so, explain the nature of the failure(s).	NA			
R		0	number of service calls/repairs in the last year?				
INFORMATION C	3	0	what is firm capacity of well pump based on flow test? Does zone serviced by pump have adaquate capacity to be served?				
Pm	J J	0	coatings adequate to provide corrosion protection?	NA	1		'
Fe		0	pumps operate efficiently (>70% bowl efficiency)				
R Fn		0	pumps operate free from excessive vibration? adequate NPSH available to prevent cavitation?				
Fe		0	motor high efficiency and no excessive noise?	NA			
R R		0	spare parts readily available? other known problems?				
R PM		0	estimated service life remaining?				
*.							

			1						
				South Tahoe PUD	Location Description:	Barbara Ave and M	lartin Ave	K/J Project Number: 1270004*0	0
				Water System Optimization Plan	Wells Facility ID #:	MRTNWL		Date:	3/13/2012
				Water System Optimization Filan	wens ruency is in	WINTINWE		Condition Assessment	3/13/2012
					Wells Facility Name:	Martin Wel	II	Inspectors:	Peter Lavallee and Jeremy Rutherdale
					Pressure Zones Served:	Stateline Zor	ne	Adjacent Pressure Zones:	Twin Peaks Zone
				Well has been abandoned but not destroyed. It was very high in iron and mangar	nese and it does not have any of	the equipment the pump has been pul	lled as well. Well not rated.		
				Piping & Valves					
Fn			0	pipe supports adequate to prevent movement or vibration? NA					
PM C		-	0	coatings adequate to protect piping and valves? NA pipes adequately sized to prevent excessive noise or headloss? NA					
Fn			0	valves are suitable for efficient and reliable service? NA					
PM			0	estimated service life remaining? NA	1				
			-	Complete Well Contract Code Code and Conserved					
PM			0	Supply Well - Sanitary Seal, Casing and Screen well casing is in good condition? NA	1				
PM		<u> </u>	0	well screen is in good condition? NA well screen is in good condition? NA					
Fe			0	well-driller's log is available? NA	A.				
R		-	0	50 ft. sanitary seal? NA approximate distance from closest known groundwater contamination hazards (septic tank,	A				
R			0	approximate distance from closest known groundwater contamination nazards (septic tank, leachfield, MTBE/TCE plume, etc.)?	A				
INFORMATION	N/A	N/A	N/A	last year of down-hole inspection and what defects were noted? NA					
PM			0	last year well was redeveloped? NA					
Fn Fn		-	0	sounding tube or other means to measure depth to water surface? NA gravel-fill pipe provided at well head to monitor condition of filter pack? NA					
PM			0	estimated service life remaining? NA					l .
			1	Wellhead Treatment					
Fn Fn			0	chemical storage tanks have secondary containment? NA chemical piping/tubing is in good condition? NA					
Fn			0	if multiple chemicals used, adequate separation of different chemicals? NA					
Fn			0	adequate equipment for meter-pump calibration? NA	A .				
Fn R			0	frequency of dose calibration? NA spare parts and service support readily available? NA					
INFORMATION	N/A	N/A	N/A	treatment system type and capacity (tank storage)? NA					
				SCADA system					
Fn Fn		-	0	pump flow meter is adequate to monitor pump performance? NA flow totals recorded at regular intervals? How frequent? NA					
Fn			0	pressure instrumentation is adequate to monitor pump performance? NA					
Fn			0	automated alarm callout for critical failures and reliability? NA					
Fn INFORMATION	N/A	N/A	0 N/A	alarm log maintained and reviewed annually? NA type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? NA					
R	IVA	IV/A	0	communication system is reliable (approximate no. of comm. failures in last year)? NA	4				
				uninterrupted power system (UPS) available to run all telemetry and instrumentation on main power	A				
R R			0	failure? "" spare parts/service support readily available? NA					
PM			0	estimated service life remaining? NA					
				Electrical Power					
R R			0	standby generator size (kW)? NA adequate power available to run all equipment					
R			0	adequate power available to full all equipment in adequate standby power present and reliable? NA	1				
INFORMATION	N/A	N/A	N/A	fuel storage capacity (gals)? NA					
R R			0	fuel supply adequate for standby power service? NA time needed to mobilize portable generator? NA					
Fn			0	known electrical hazards that could be mitigated? NA					
R			0	spare parts/service support readily available? NA	A .				
PM			0	estimated service life remaining? NA	1				
		<u> </u>	+	Additional Data W	ell has been abandoned but not destroyed.	. It was very high in iron and manganese and it do	es not have any of the equipment the	pump has been pulled as well.	
INFORMATION	N/A	N/A	N/A	Nameplate duty conditions (rated flow and head, nominal motor horsepower):		., 0	,	, , , , , , , , , , , , , , , , , , ,	
				Legend					
	-	-	1		ysical Mortality inctionality				
					liability				
				FE Fir	nancial Efficiency				
			1	C Ca	pacity				
							1		

					T	
		South Tahoe PUD	Location Description:	Barbara Ave and Martin Ave	K/J Project Number:	1270004*00
		Water System Optimization Plan	Wells Facility ID #:	MRTNWL	Date:	3/13/2012
					Condition Assessment	
			Wells Facility Name:	Martin Well	Inspectors:	Peter Lavallee and Jeremy Rutherdale
			Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks Zone
			·			rwin Peaks zone
-	-	Well has been abandoned but not destroyed. It was very high in iron and man Photo Evidence for PM, Fn, R, FE	ganese and it does not have any of the equip	ment the pump has been pulled as well. Well not rated		
		Those Evidence for Fin, Fig. 12		PHOTOS		
			No phot	os taken since well has been all but filled in.		
			No pilot			
1						
+						
+						
+						

Appendix A2

Pressure Reducing Valves

South Tahoe PUD Water System Optimization Plan Summary of PRV Condition and Capacity Evaluation

Failure Mode Scoring Summary - Criticality Scores

				Overall Total
			PRV Piping, Valves	Factored Score
PRV Facility Name:	PRV Facility ID #:	PRV Site	& Instrumentation	(Out of 25) =
Keller #4	R22-009	2.48	6.36	8.84
Comanche PRV	L38-014	1.24	3.88	5.12
Ottawa	K-39-014	1.47	6.17	7.65
Country Club PRV	K36-002	2.27	5.40	7.66
Oflying PRV	L37-012	1.26	3.33	4.59
Saddle #1	R23-019	2.22	5.44	7.65
Keller #1	R22-006	1.53	4.66	6.19
Keller #2	R23-007	1.40	3.74	5.13
Keller #3	R23-008	2.26	4.75	7.01
Keller #5	Q22-010	1.82	4.54	6.35
Pioneer #1 (Pioneer-Marshall)	O29-014	1.96	4.62	6.58
Pioneer #2 (Pioneer-Kokanee)	O29-015	1.96	4.64	6.60
Price Rd. PRV	Q23-018	1.58	4.33	5.90
Rock Point PRV	Q21-018	1.80	4.71	6.51
Terrace PRV	Q22-023	1.77	5.48	7.25
Overlook PRV	Not Assigned	0.00	0.00	15 (see Note 5)
Saddle #3	Q23-021	2.69	5.06	7.75
Saddle #2	R23-021	1.47	3.55	5.02
Susquehana PRV	N32-022	1.47	4.47	5.95
Pine Valley PRV	M34-016	1.37	6.24	7.60

				South Tahoe PUD	Location Description:	Intersection of Keller	and Regina	K/J Project Numb	er: _{1270004*00}	
				Water System Optimization Plan	PRV Facility ID #:	R22-009		Da	te: 2/22/20	012
					PRV Facility Name:	Keller #4		Condition Assessme Inspecto		Glenn Roderick
					Pressure Zones Served:	Heavenly Valle	Zone	Adjacent Pressure Zon	es: Keller Z	one
								·		
				Notes:		Failu	re Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Level	of Service	Financial Efficiency	
				2. For Reliabilty to be determined based on CMMS maintenance records		(See note 1)	functionality	reliability (see note 2)		
				For Criticality Weighting Factor to be determined at District Workshop His Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
					4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 5 yrs	4: financial efficiency is low	
					5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	Total Francis 10
				Unweighted Failure Mode Score (1-5)		N/A	3.50	3.00	4.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	4.00	N/A	10.33	9.00	8.00	
eck	100%			Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	35% 3.62	25%	20%	0.27
				Criticality Score		IV/A	3.02	2.25	1.60	8.27 2.48
				PRV Piping, Valves & Instrumentation					30%	2.70
				Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)	4.50	1.00	3.40	3.00	3.00	Total Factored Score
				Weighted Final Score (1-25)				15.00	6.00	
					9.00	3.00	10.80	15.00		
eck	100%				9.00 15%	3.00	10.80	20%	15%	
eck	100%			Criticality Weighting Factor (0 - 100%) Factored Score	15%			_		9.09
eck	100%			Criticality Weighting Factor (0 - 100%)	15% 1.35	20%	30%	20%	15% 0.9 70%	6.36
eck	100%			Criticality Weighting Factor (0 - 100%) Factored Score	15% 1.35	20%	30%	20%	15% 0.9	
		Importance Weighting Factor	Final Score	Criticality Weighting Factor (0 - 100%) Factored Score	15% 1.35	20%	30% 3.24	20%	15% 0.9 70%	6.36
	100% Score	Importance	Final Score	Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	15% 1.35	20% 0.60	30% 3.24	20%	15% 0.9 70%	6.36
		Importance Weighting Factor		Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score PRV Site	15% 1.35	20% 0.60 CONDITION ASSESSMENT CHE	30% 3.24	20%	15% 0.9 70%	6.36
Failure Mode Type	Score	Importance Weighting Factor (1-5)	Final Score	Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	15% 1.35 The site is in a vault within the roadway and	20% 0.60 CONDITION ASSESSMENT CHE	30% 3.24	20%	15% 0.9 70%	6.36
Failure Mode Type	Score 4	Importance Weighting Factor (1-5)	4	Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	15% 1.35 The site is in a vault within the roadway and Yes The vault has not flooded in the past but the	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Als	30% 3.24 CKLIST	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn	Score 4 3 4 4	Importance Weighting Factor (1-5) 1 2 3 4	4 6 12 16	Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance; site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Alse amage but the lid ring has damaged by snow plows	30% 3.24 CKLIST o the vault does not have a concrete for	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn Fn Fn Fn	Score 4 3 4 4 3	Importance Weighting Factor (1-5) 1 2 3 4 5	4 6 12 16 15	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent looding of valve vault? PRV vault adequately designed to prevent whicle damage? any site stability issues (if yes, describe)	15% 1.35 The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da No external site stability issues but the vault	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Als	30% 3.24 CKLIST o the vault does not have a concrete for	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn	Score 4 3 4 4	Importance Weighting Factor (1-5) 1 2 3 4	4 6 12 16	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent looding of valve vault? PRV vault adequately designed to prevent vehicle damage; any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da No external site stability issues but the vault 6624 from Google Earth	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem	30% 3.24 CKLIST o the vault does not have a concrete flow in the future	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn Fn INFORMATION	\$core 4 3 4 4 3 N/A 1 1 1 1 1 1 1 1 1	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A	4 6 12 16 15 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent looding of valve vault? PRV vault adequately designed to prevent vehicle damage; any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da No external site stability issues but the vault 6624 from Google Earth	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Alse amage but the lid ring has damaged by snow plows	30% 3.24 CKLIST o the vault does not have a concrete flow in the future	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn Fn INFORMATION	\$core 4 3 4 4 3 N/A 1 1 1 1 1 1 1 1 1	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A	4 6 12 16 15 N/A	Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance of	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Als amage but the lid ring has damaged by snow plows tresting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ	30% 3.24 CKLIST o the vault does not have a concrete flow in the future	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	Score 4 3 4 4 3 N/A 3	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault dainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle de No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance de Pipe supports are not adequate. They are cu	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Als amage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ arrently wood blocks resting on compacted earth	30% 3.24 CKLIST o the vault does not have a concrete flow in the future	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	Score 4 3 4 4 3 N/A 3	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9	Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance of the Company of th	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Als amage but the lid ring has damaged by snow plows a resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ arrently wood blocks resting on compacted earth piping	30% 3.24 CKLIST o the vault does not have a concrete flows in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	Score 4 3 4 4 3 N/A 3	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance described by the value of the Venezia of the value of the Venezia	20% 0.60 CONDITION ASSESSMENT CHE the lid is not locked ere is no way to prevent the vault from flooding. Als amage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ arrently wood blocks resting on compacted earth	30% 3.24 CKLIST o the vault does not have a concrete flows in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn Fn PM	\$core 4 3 4 4 3 N/A 3 5 5	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault dainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle do No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance of the Company of th	the lid is not locked tree is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ rirrently wood blocks resting on compacted earth piping No reported problems with noise but headloss ma	30% 3.24 CKLIST o the vault does not have a concrete flost in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	Score 4 3 4 4 3 N/A 3 5 5	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9	Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle do No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance of the Company of th	the lid is not locked tree is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ rirrently wood blocks resting on compacted earth piping No reported problems with noise but headloss ma	30% 3.24 CKLIST o the vault does not have a concrete flost in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn PM C Fn Fn Fn Fn PM	Score 4 3 4 4 3 N/A 3 5 5 1	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9	PRV Site Site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? Site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle de No external site signed to prevent vehicle de Acceptable of the vault was designed to prevent vehicle de No external site signed to prevent vehicle de The vault was designed to prevent vehicle de Potential traffic issues during maintenance de Pipe supports are not adequate. They are cu Severe Rust issue at this PRV and associated 4" PRV tied to 6" main on downstream side. Upstream valve appears to have lost its coat No flowmeter on site	the lid is not locked tree is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ rirrently wood blocks resting on compacted earth piping No reported problems with noise but headloss ma	30% 3.24 CKLIST o the vault does not have a concrete flost in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
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Failure Mode Type Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	Score 4 3 4 4 3 N/A 3 5 5 1	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9	PRV Site Site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? Site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance description of the vault of vault of the vault of	the lid is not locked tree is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ rirrently wood blocks resting on compacted earth piping No reported problems with noise but headloss ma	30% 3.24 CKLIST o the vault does not have a concrete flost in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
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Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	\$core 4 3 4 4 3 N/A 3 5 5 1 5 1 7 1 N/A	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9 5 10 3 20 25 1 8 3	PRV Site Site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? Site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle do No external site signed to prevent vehicle do Roe vault foc24 from Google Earth Potential traffic issues during maintenance of the Pipe supports are not adequate. They are cut Severe Rust issue at this PRV and associated 4" PRV tied to 6" main on downstream side. Upstream valve appears to have lost its coat No flowmeter on site Yes Assume 5 years based on AWU Useful Life None 4" PRV feeding a 6" main downstream Inlet=90psi Outlet=44psi	the lid is not locked tree is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ rirrently wood blocks resting on compacted earth piping No reported problems with noise but headloss ma	30% 3.24 CKLIST o the vault does not have a concrete flost in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
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Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	\$core 4 3 4 4 3 N/A 3 5 5 1 5 1 7 1 N/A	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9 5 10 3 20 25 1 8 3	PRV Site Site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle da No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance description of the value of value of the value of the value of the value of	the lid is not locked tree is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ rirrently wood blocks resting on compacted earth piping No reported problems with noise but headloss ma	30% 3.24 CKLIST o the vault does not have a concrete flost in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	\$core 4 3 4 4 3 N/A 3 5 5 1 5 1 7 1 N/A	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9 5 10 3 20 25 1 8 3	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle do No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance of the vault stability issues but the vault 67 for more stability issues but the vault 68 for more stability issues and the value of the va	the lid is not locked tree is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ rirrently wood blocks resting on compacted earth piping No reported problems with noise but headloss ma	30% 3.24 CKLIST o the vault does not have a concrete flost in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36
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Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn PM Fn Fn Fn Fn Fn Fn PM INFORMATION	\$core 4 3 4 4 3 N/A 3 5 5 1 5 1 7 1 N/A	Importance Weighting Factor (1-5) 1 2 3 4 5 N/A 3	4 6 12 16 15 N/A 9 5 10 3 20 25 1 8 3	PRV Site Site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? Site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fn R	The site is in a vault within the roadway and Yes The vault has not flooded in the past but the The vault was designed to prevent vehicle do No external site stability issues but the vault 6624 from Google Earth Potential traffic issues during maintenance of the value of the va	the lid is not locked tree is no way to prevent the vault from flooding. Alsamage but the lid ring has damaged by snow plows resting on compacted earth could lead to problem due to proximity to the Heavenly Ski Resort Californ rirrently wood blocks resting on compacted earth piping No reported problems with noise but headloss ma	30% 3.24 CKLIST o the vault does not have a concrete flost in the future ia Base Lodge	3	15% 0.9 70% Overall Total Factored Score (Out of 25) =	6.36

	South Tahoe PUD	Location Description:	Intersection of Keller and Regina	K/J Project Number: 12	270004*00
	Water System Optimization Plan	PRV Facility ID #:	R22-009	Date:	2/22/2012
				Condition Assessment	
		PRV Facility Name:	Keller #4	Inspectors:	Peter Lavallee and Glenn Roderick
		Pressure Zones Served:	Heavenly Valley Zone	Adjacent Pressure Zones:	Keller Zone

Photo Evidence for PM, Fn, R, RE Bolts appear rusted and unservicable, requires confined space entry, not adequate space to work on piping and valves

PHOTOS









				South Tahoe PUD	Location Description	In westbound lane of Comanche Rd	near intersection of Comanche and Apache	K/J Project Numb	er: _{1270004*00}
				Water System Optimization Plan	PRV Facility ID #	:	L38-014	Da	te: 2/2
					PRV Facility Name	: Com	nanche PRV	Condition Assessme Inspecto	
							National Property of the Control of		
					Pressure Zones Served	Com	anche Zone	Adjacent Pressure Zon	es: Arrowhead Zone
				Notes:			Failure Mode Scoring (1 - 5)		
				Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Level of		Financial Efficiency
				For Reliabilty to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	functionality 1: exceeds all requirements	reliability 1: failure >20 yrs	1: best available technology
				4. If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high
				Weighting Factor and multiply by Unweighted Failure Mode Score	3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average
					4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 5 yrs	4: financial efficiency is low
					5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced
			-						
				PRV Site Is Failure Mode Score Calculated or Assigned?	1	N1/A	Calculated	Assigned	Assigned
			1	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 2.33	Assigned 1.00	Assigned 1.00
				Weighted Final Score (1-25) ⁽⁴⁾	5.00	N/A	5.67	3.00	2.00
neck	100%			Criticality Weighting Factor (0 - 100%)		N/A	35%	25%	20%
				Factored Score		N/A	1.98	0.75	0.40
				Criticality Score					30%
				PRV Piping, Valves & Instrumentation					
				Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned
				Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)		1.00 3.00	1.80	2.00	2.00 4.00
eck	100%			Criticality Weighting Factor (0 - 100%)		20%	30%	20%	15%
icon	100%			Factored Score		0.6	2.04	2	0.6
				Criticality Score					70%
			-						
Failure Mode Type	Score	Importance	Einal Score			CONDITION ASSESSMEN	NT CHECKLIST		Overall Total Factored Score (Out of 25)
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	PRV Site		CONDITION ASSESSMEN	NT CHECKLIST		
Failure Mode Type	Score 5		Final Score	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be ac		NT CHECKLIST		
Fn Fn	5 1	Weighting (1-5) 1 2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	The facility is in the roadway and can be ac Within roadway so no access issues	cessed easily as the lid is not locked			Overall Total Factored Score (Out of 25)
Fn Fn Fn	5	1 2 3	5 2 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s	cessed easily as the lid is not locked anding water a few inches below the piping. Howeve		ster level in the box had at one time been	Overall Total Factored Score (Out of 25)
Fn Fn	5 1	Weighting (1-5) 1 2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag	cessed easily as the lid is not locked anding water a few inches below the piping. Howeve		iter level in the box had at one time been	Overall Total Factored Score (Out of 25)
Fn Fn Fn Fn	5 1 5	1 2 3 4	5 2 15 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None	cessed easily as the lid is not locked anding water a few inches below the piping. Howeve		ster level in the box had at one time been	Overall Total Factored Score (Out of 25)
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Fn Fn Fn INFORMATION Fn C Fn Fn Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 5 1 1 N/A 1 1 1 1 1 5 1 1 1 1 1 1 1 N/A	1	5 2 15 4 5 N/A 3 1 2 3 4 25 1 2 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems Yes pipe supports are steel posts that are to the coatings remain adequate and in good the coatings remain adequate and the pipes are sized adequately and there is the valves are still in new condition and the No flowmeter at this site There are pressure gages on both sides of 130 years based on AWU Useful Life There are no other known problems with the company of the pipes are sized adequately and there is 130 years based on AWU Useful Life There are no other known problems with the company of the pipes are sized and the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with the pipes of 120 years based on AWU Useful Life There are no other known problems with	cessed easily as the lid is not locked anding water a few inches below the piping. However e colted to the floor of the vault. Connection to floor was condition no excessive noise or headloss noted ere have been no operational issues with the new value prv	er, a water mark on the walls indicated that the wa		Overall Total Factored Score (Out of 25)

South Tahoe PUD	Location Description:	In westbound lane of Comanche Rd near intersection of Comanche and Apache	K/J Project Number: 1270004*0	00
Water System Optimization Plan	PRV Facility ID #:	L38-014	Date:	
	DDV F UV. N		Condition Assessment	
	PRV Facility Name:	Comanche PRV	Inspectors:	Peter Lav
	Pressure Zones Served:	Comanche Zone	Adjacent Pressure Zones:	Arrowhead
	1			
Photo Evidence for PM, Fn, R, FE		PHOTOS		
2011/05/06-12:	13 PM	2011/05/06 12:13 PM		
2011/05/06 12:T		128L383 2011/05/08 12:14 PM		

2012
nd Phill Torney
nd Iroquois Zones
Total Factored Score
4.13 1.24
Total Factored Score
5.54 3.88
5.12



									1	
				South Tahoe PUD	Location Description	n: Intersection of Apaci	he and Ottawa	K/J Project Number:	1270004*00	
				Water System Optimization Plan	PRV Facility ID	#: κ-39-01	14	Date:	5/1/20	012
					PRV Facility Nam	e: Ottawa	a	Condition Assessment Inspectors:		Glenn Roderick
					Pressure Zones Serve	d: Ottawa Z	one	Adjacent Pressure Zones:	Arrowhead Zone an	nd Irogouis Zone
					Tressure zones serve	u. Ottawa 2	one		Allowieau zolie al	na noquais zone
				Notes:			lure Mode Scoring (1 - 5)			
		'		Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	of Service reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements		2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements		3: financial efficiency is average	
		<u> </u>	1		4: significant deterioration 5: virtually unserviceable	4: less than design requirement 5: significantly less than design requirement	4: fails some requirements 5: Fails all requirements		4: financial efficiency is low 5: asset should be replaced	
					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	o, acosp equi.ement				
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?	-	N/A	Calculated	Assigned	Assigned	
		'		Unweighted Failure Mode Score (1-5)		N/A	2.17	3.00	2.00	Total Factored Score
		!	1	Weighted Final Score (1-25) ⁽⁴⁾	4.00	N/A	5.17	6.00	4.00	
neck	100%	!	1	Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	35% 1.81	25% 1.50	20% 0.80	4.91
		<u> </u>	1	Criticality Score		IN/A	1.81	1.50	30%	1.47
		-		PRV Piping, Valves & Instrumentation						
				Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)	4.00	1.00	4.00	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25)		3.00	11.40	15.00	4.00	
neck	100%			Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	0.55
		<u>'</u>	1	Factored Score Criticality Score		0.6	3.42	3	0.6 70%	8.82 6.17
		—		Criticality Score						
								O	Overall Total Factored Score (Out of 25) =	7.65
								O	verall Total Factored Score (Out of 25) =	7.65
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CH	IECKLIST	O	verall Total Factored Score (Out of 25) =	7.65
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	PRV Site		CONDITION ASSESSMENT CH	IECKLIST	O	verall Total Factored Score (Out of 25) =	7.65
Fn	5	Weighting (1-5)	5	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be a		IECKLIST	O	verall Total Factored Score (Out of 25) =	7.65
Fn Fn	5 1	Weighting (1-5) 1 2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	The facility is in the roadway and can be a Within roadway so no access issues		IECKLIST	O	verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn	5 1 1	Weighting (1-5) 1 2 3	5 2 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues	ccessed easily as the lid is not locked	IECKLIST	00	verall Total Factored Score (Out of 25) =	7.65
Fn Fn	5 1	Weighting (1-5) 1 2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle damage	ccessed easily as the lid is not locked	IECKLIST	00	verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn	5 1 1	1 2 3 4	5 2 3 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth	ccessed easily as the lid is not locked	IECKLIST		verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn	5 1 1 1	1 2 3 4 5 5	5 2 3 4 5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None	ccessed easily as the lid is not locked	IECKLIST	00	verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn INFORMATION	5 1 1 1 1 1 N/A	1 2 3 4 5 N/A	5 2 3 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth	ccessed easily as the lid is not locked	IECKLIST		verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn INFORMATION	5 1 1 1 1 1 N/A	1 2 3 4 5 N/A	5 2 3 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu	ccessed easily as the lid is not locked	IECKLIST		verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn INFORMATION	5 1 1 1 1 1 N/A 4	1 2 3 4 5 N/A	5 2 3 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu	ccessed easily as the lid is not locked	IECKLIST		verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn INFORMATION	5 1 1 1 1 1 N/A	1 2 3 4 5 N/A 3	5 2 3 4 5 N/A 12	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu	ccessed easily as the lid is not locked			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn INFORMATION Fn Fn PM	5 1 1 1 1 1 N/A 4	1 2 3 4 5 N/A 3 1	5 2 3 4 5 N/A 12	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama; None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se	ccessed easily as the lid is not locked ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn INFORMATION Fn Fn Fn C	5 1 1 1 1 1 N/A 4 4 5	1	5 2 3 4 5 N/A 12	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there is	ccessed easily as the lid is not locked ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn INFORMATION Fn Fn C Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 4 4 5	1 2 3 4 5 5 N/A 3 1 2 1 2 1 2 1 2 1 2 2	5 2 3 4 5 N/A 12 4 10	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there in oisolation valves	ccessed easily as the lid is not locked ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn INFORMATION Fn Fn PM	5 1 1 1 1 1 N/A 4 4 5	1	5 2 3 4 5 N/A 12	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there in oisolation valves No flowmeter at this site	ccessed easily as the lid is not locked ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 1 N/A 4 4 5 5 5 5 5 5 3 3	1	5 2 3 4 5 N/A 12 4 10 3 20 25 5 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage: any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service: site has pressure upstream/downstream pressure gages? estimated service life remaining?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama; None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there is no isolation valves No flowmeter at this site no pressure gauges at this site Assume 20 years based on AWU Useful Life	ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in is no excessive noise or headloss noted			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn INFORMATION Fn Fn C Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 4 4 5	1	5 2 3 4 5 N/A 12 4 10 3 20 25 5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage: any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service: site has pressure upstream/downstream pressure gages? estimated service life remaining?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there in o isolation valves No flowmeter at this site no pressure gauges at this site	ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in is no excessive noise or headloss noted			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 1 N/A 4 4 5 5 5 5 5 5 3 3	1	5 2 3 4 5 N/A 12 4 10 3 20 25 5 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there in oo isolation valves No flowmeter at this site Assume 20 years based on AWU Useful Lift There are no other known problems with the	ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in is no excessive noise or headloss noted			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 4 4 5 5 1 5 5 5 5 5	1	5 2 3 4 5 N/A 12 10 3 20 25 5 6 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there in oo isolation valves No flowmeter at this site no pressure gauges at this site Assume 20 years based on AWU Useful Lift There are no other known problems with the	ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in is no excessive noise or headloss noted			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 1 N/A 4 4 5 5 5 5 5 5 3 3	1	5 2 3 4 5 N/A 12 12 4 10 3 20 25 5 6 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)?	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle dama None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there in oisolation valves No flowmeter at this site no pressure gauges at this site Assume 20 years based on AWU Useful Lift There are no other known problems with the site of the pipes with the site of the pipes are sized and problems with the site of the pipes are sized on the pipes are sized o	ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in is no excessive noise or headloss noted			verall Total Factored Score (Out of 25) =	7.65
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Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 4 4 5 5 1 5 5 5 5 5 7	1	5 2 3 4 5 N/A 12 12 4 10 3 20 25 5 6 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle damal None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there is no isolation valves No flowmeter at this site no pressure gauges at this site Assume 20 years based on AWU Useful Lift There are no other known problems with it is the properties of the properties of the problems with it is the properties of the problems with it is the properties of the problems with it is the problems	ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in is no excessive noise or headloss noted			verall Total Factored Score (Out of 25) =	7.65
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 1 1 1 1 1 N/A 4 4 5 5 1 5 5 5 5 5 7	1	5 2 3 4 5 N/A 12 12 4 10 3 20 25 5 6 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin	The facility is in the roadway and can be a Within roadway so no access issues No flooding issues Vault is designed to prevent vehicle damal None 6387 from Google Earth The small box fills with sediment and it mu Dirt bottom that the PRV rests on Can not be evaluated due to amount of se The pipes are sized adequately and there is no isolation valves No flowmeter at this site no pressure gauges at this site Assume 20 years based on AWU Useful Lift There are no other known problems with it 2" PRV 150 Upstream and 62 Downstream Physical Mortality Functionality Reliability	ge ust be removed on a regular basis ediment within the box. Top portion of the PRV is in is no excessive noise or headloss noted			verall Total Factored Score (Out of 25) =	7.65

South Tahoe PUD	Location Description:	Intersection of Apache and Ottawa	K/J Project Number: 1270004*00	
Water System Optimization Plan	PRV Facility ID #:	K-39-014	Date:	5/1/2012
			Condition Assessment	
	PRV Facility Name:	Ottawa	Inspectors:	Peter Lavallee and Glenn Roderick
	Pressure Zones Served:	Ottawa Zone	Adjacent Pressure Zones:	Arrowhead Zone and Iroqouis Zone
Photo Evi	idence for PM, Fn, R, FE			
		PHOTOS		
2011/07/	TIE OT SE FM	2011/07/18 01:32 FM	2011/07/AS 01:38	P.M.

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				South Tahoe PUD	Location Description:	On Bakersfield near intersection w	vith Country Club Drive	K/J Project Numb	DET: 1270004*00	
				Water System Optimization Plan	PRV Facility ID #	K36-002			ate: 5/1/20	012
					PRV Facility Name	Country Club F	PRV	Condition Assessm Inspecto		Glenn Roderick
					Pressure Zones Served:	Country Club Z	one	Adjacent Pressure Zor	nes: Iroquois and Arro	owhead Zones
				Notes:			re Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	el of Service reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop Hif Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
					significant deterioration virtually unserviceable	4: less than design requirement 5: significantly less than design requirement	4: fails some requirements 5: Fails all requirements	4: failure every 3 to 5 yrs 5: failure < 3 yrs	4: financial efficiency is low 5: asset should be replaced	
								· · · · · · · · · · · · · · · · · · ·		
				PRV Site		h./*	6-1-1-1		A	
				Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		N/A N/A	Calculated 2.83	Assigned 3.00	Assigned 1.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	12.00	N/A	7.17	9.00	2.00	
check	100%			Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	
				Factored Score Criticality Score	2.40	N/A	2.51	2.25	0.40 30%	7.56 2.27
				PRV Piping, Valves & Instrumentation					30%	<u></u> /
				Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		1.00	2.80	3.00	2.00	Total Factored Score
check	100%			Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	7.00 15%	3.00 20%	8.20 30%	15.00 20%	4.00 15%	
Circox	100%			Factored Score		0.6	2.46	3	0.6	7.71
				Criticality Score					70%	5.40
									O	7.00
									Overall Total Factored Score (Out of 25) =	7.66
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHEC	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	PRV Site		CONDITION ASSESSMENT CHEC	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn	5	Weighting (1-5)	5	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc		CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn	5 1	Weighting (1-5) 1 2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	The facility is in the roadway and can be acc Within roadway so no access issues	essed easily as the lid is not locked	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn	5 1 5	Weighting (1-5) 1 2 3 4	5 2 15 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage	essed easily as the lid is not locked	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn Fn	5 1 5 1	Weighting (1-5) 1 2 3 4 5	5 2 15 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None	essed easily as the lid is not locked	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn	5 1 5	Weighting (1-5) 1 2 3 4	5 2 15 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None	essed easily as the lid is not locked anding water above PRV	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A	Weighting (1-5) 1 2 3 4 5 N/A	5 2 15 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None 6299 from Google Earth	essed easily as the lid is not locked anding water above PRV	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn Fn Fn Fn INFORMATION Fn	5 1 5 1 1 N/A 4	1 2 3 4 5 N/A 3	5 2 15 4 5 N/A 12	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan	essed easily as the lid is not locked anding water above PRV	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A	1 2 3 4 5 N/A 3	5 2 15 4 5 N/A 12	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had ste Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn INFORMATION Fn Fn	5 1 5 1 1 1 N/A 4	1 2 3 4 5 N/A 3	5 2 15 4 5 N/A 12	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve valve? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn INFORMATION Fn Fn	5 1 5 1 1 1 N/A 4	1 2 3 4 5 N/A 3	5 2 15 4 5 N/A 12	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had ste Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip The pipes are sized adequately and there is Valves are adequate and reliable	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 5 1 1 N/A 4 5 4	1 2 3 4 5 5 N/A 3 1 2 2 3 3 4 5 5 N/A 3 3 4 5 5 1 2 2 3 3 4 5 5 5 5 5 5 5 5 5	5 2 15 4 5 N/A 12 5 8 3 4 25	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn INFORMATION Fn Fn Fn C Fn Fn C Fn C Fn C Fn C Fn Fn Fn C Fn C Fn C Fn C Fn C Fn C Fn C Fn C Fn C Fn C Fn C Fn C Fn C Fn	5 1 5 1 1 N/A 4 5 4	1 2 3 4 5 1 2 1 2 1 2 1 1 2 1 2 1 2 1 2 3 4 4 4 4 4 4 4 4 4	5 2 15 4 5 N/A 12 5 8	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site There are pressure gages on both sides of the	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 5 1 1 N/A 4 5 4	Weighting (1-5) 1 2 3 4 5 N/A 3 1 2 3 4 5 1 2 1 1 2	5 2 15 4 5 5 N/A 12 5 8 8 3 4 25 1	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn INFORMATION Fn Fn Fn Fn PM C Fn Fn Fn PM PM C Fn Fn Fn Fn Fn Fn Fn Fn	5 1 5 1 1 N/A 4 5 4	1 2 3 4 5 5 1 2 5 1 2 2	5 2 15 4 5 5 N/A 12 5 8 8 3 4 25 1 6 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had ste Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site There are pressure gages on both sides of th Assume 20 years based on AWU Useful life Vault cover is marked sewer and not water.	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
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Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A 4 4 5 4 1 1 5 1 1 3 2	## Weighting (1-5) 1	5 2 15 4 5 5 N/A 12 5 8 8 3 4 25 1 6 6 6 N/A	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful life Vault cover is marked sewer and not water. 6" PRV 116 Upstream and 80 Downstream Generally this PRV is off and not used. Down	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted e prv Replace lid.	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A 4 4 5 4 1 1 5 1 1 3 2	## Weighting (1-5) 1	5 2 15 4 5 5 N/A 12 5 8 8 3 4 25 1 6 6 6 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful life Vault cover is marked sewer and not water. 6" PRV 116 Upstream and 80 Downstream Generally this PRV is off and not used. Down	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted e prv Replace lid.	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A 4 4 5 4 1 1 5 1 1 3 2	## Weighting (1-5) 1	5 2 15 4 5 5 N/A 12 5 8 8 3 4 25 1 6 6 6 N/A	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had ste Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pip The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful life Vault cover is marked sewer and not water. 6" PRV 116 Upstream and 80 Downstream Generally this PRV is off and not used. Down Physical Mortality Functionality	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted e prv Replace lid.	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A 4 4 5 4 1 1 5 1 1 3 2	1	5 2 15 4 5 5 N/A 12 5 8 8 3 4 25 1 6 6 6 N/A	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had ste Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pipe The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful life Vault cover is marked sewer and not water. 6" PRV 116 Upstream and 80 Downstream Generally this PRV is off and not used. Down Physical Mortality Functionality Reliability	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted e prv Replace lid.	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A 4 4 5 4 1 1 5 1 1 3 2	1	5 2 15 4 5 5 N/A 12 5 8 8 3 4 25 1 6 6 6 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve valve adequately designed to prevent vehicle damage? Any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fn R	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had ste Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pipe The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful life Vault cover is marked sewer and not water. 6" PRV 116 Upstream and 80 Downstream Generally this PRV is off and not used. Down Physical Mortality Functionality Reliability Financial Efficiency	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted e prv Replace lid.	CKLIST		Overall Total Factored Score (Out of 25) =	7.66
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A 4 4 5 4 1 1 5 1 1 3 2	1	5 2 15 4 5 5 N/A 12 5 8 8 3 4 25 1 6 6 6 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve valve adequately designed to prevent vehicle damage? Any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fn R	The facility is in the roadway and can be acc Within roadway so no access issues No drain and when opened the vault had ste Vault is designed to prevent vehicle damage None 6299 from Google Earth The vault has minimal space and maintenan No pipe supports PRV Coating is in good condition but the pipe The pipes are sized adequately and there is Valves are adequate and reliable No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful life Vault cover is marked sewer and not water. 6" PRV 116 Upstream and 80 Downstream Generally this PRV is off and not used. Down Physical Mortality Functionality Reliability	essed easily as the lid is not locked anding water above PRV ce is very difficult within the vault e coatings are deteriorated no excessive noise or headloss noted e prv Replace lid.	CKLIST		Overall Total Factored Score (Out of 25) =	7.66

South Tahoe PUD	Location Description:	On Bakersfield near intersection with Country Club Drive	K/J Project Number: 1270004*00	
Water System Optimization Plan	PRV Facility ID #:	K36-002	Date:	5/1/2012
	PRV Facility Name:	Country Club PRV	Condition Assessment Inspectors:	Peter Lavallee and Glenn Roderick
	Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Iroquois and Arrowhead Zones
Photo Sv	idence for PM, Fn, R, FE			
PHOLOEV	idence for PM, FII, N, FE	PHOTOS		
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Factored Score			1				T				
PRY Section Present forest Section Pre					South Tahoe PUD	Location Description:	Oflying Rd		K/J Project Numl	per: 1270004*00	
Part					Water System Optimization Plan	PRV Facility ID #:	L37-012			7/-/	012
Part						PRV Facility Name:	Oflying PRV				Glenn Roderick
Part						Pressure Zones Served:	Country Club Zo	one	Adjacent Pressure Zoi	nes: Irogouis	Zone
Part											
Part											
Part					·	Physical Mortality	Capacity			Financial Efficiency	
Part						1: new or excellent condition	1: significantly exceeds design requirement			1: hest available technology	
Part					4. If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance			·	·		
Part					weighting Factor and multiply by Onweighted Fallure Mode Score	·		2: exceeds some requirements			
Second S								•			
Fig. Fig.											
Figure 1						3. VII tudily uliserviceable	3. Significantly less than design requirement	o. rans an requirements	J. Idilure < 5 yrs	5. asset silould be replaced	
Second S					DR\/ Site						
Company Comp							N/A	Calculated	Assigned	Assigned	
1											Total Factored Score
March Marc					423						
Section Sect	check	100%									
Part						I .	· ·				4.18
Section Sect					Criticality Score		·			30%	
Column C											
Second S					Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Assigned	Assigned	
Commonweight Comm					Unweighted Failure Mode Score (1-5)		1.00		2.00		Total Factored Score
February February											
Part Part	check	100%									
Part Part							0.6	2.16	0.8		
Tables Mode Type For Service Wedging (15) Final Some For Service Wedging (15) Final					Criticality Score						
Fig. S	Failure Mode Type	Score	•	Final Score			CONDITION ASSESSMENT CHEC	CKLIST			
Fin					PRV Site						
Fig.	Fn	5	1	5			essed easily as the lid is not locked				
Fin											
Fig. 1 5 5 5 Searching State Fig. Searching State Fig											
No. No.											
Final											
Fig.	Fn			3							
Fin 3 1 3 9 pie supports adequate to prevent movement or vibration? Pipe supports are steel and they were underwater at time of inspection C 1 3 3 3 pipes adequately sized to prevent excessive noise (e.g. ratting) or headloss (velocity > 10 fps)? The pipes are sized adequately and there is no excessive noise or headloss noted Fin 1 4 4 4 4 valves are suitable for efficient and reliable service? Valves are adequate with no history of failure Fin 5 5 5 25 S S S S S S S S S S S S S S S											
PM											
C 1 3 3 3 ples adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 ftps); The pipes are sized adequately and there is no excessive noise or headloss noted Fin 1 4 4 4 valves are suitable for efficient and reliable service? Fin 5 5 25 25 8 the has flowmeter? In this size has flowmeter? Fin 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							•				
Fn 1 4 4 valves re subable for efficient and reliable service; Valves are adequate with no history of failure Fn 5 5 25 25 site has pressure upstream/downstream pressure gages? There are pressure gages on both sides of the prv PM 3 2 6 estimated service life remaining? Assume 20 years based on AWU Useful life Fn 1 3 3 3 3 3 4			3			The pines are sized adequately and there is					
Fn 5 5 25 Sist has flowmeter? No flowmeter at this site Fn 1 1 1 1 1 site has pressure upstream/downstream pressure gages? There are pressure gages on both sides of the prv PM 3 2 6 estimated service life remaining? Assure 20 years based on AWU Useful life Fn 1 3 3 3 Other known problems? There are no other known problems with this prv station Fn 1 3 3 Additional Data INFORMATION N/A N/A N/A N/A N/A N/A N/A Setpoint pressure(s)? 9 PRV INFORMATION N/A N/A N/A setpoint pressure(s)? 10 Upstream and 60 Downstream INFORMATION N/A N/A N/A Setpoint pressure(s)? 10 Upstream and 60 Downstream INFORMATION N/A N/A N/A Setpoint pressure(s)? 10 Upstream and 60 Downstream INFORMATION N/A N/A N/A Merchance in the contraction of the contraction of the contraction of the contraction of t	Ů	-	4				re				
PM 3 2 6 estimated service life remaining? Assume 20 years based on AWU Useful life Fn 1 3 3 Other known problems There are no other known problems with this prv station INFORMATION N/A Setpoint pressure(s)? 120 Upstream and 60 Downstream INFORMATION N/A N/A N/A N/A Setpoint pressure(s)? 120 Upstream and 60 Downstream INFORMATION N/A N/A N/A N/A N/A Setpoint pressure(s)? 120 Upstream and 60 Downstream INFORMATION N/A N/A N/A N/A N/A Setpoint pressure(s)? 120 Upstream and 60 Downstream INFORMATION N/A N/A N/A Physical Mortality Physical Mortality INFORMATION INFORMATION (state) INFORMATION (state) Physical Mortality INFORMATION (state) INFORMATION (st	Fn	5	5	25	site has flowmeter?	No flowmeter at this site					
Fn 1 3 3 3 Onter known problems? There are no other known problems with this prv station Additional Data INFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A Setpoint pressure(s)? 120 Upstream and 60 Downstream INFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A N/			_								
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INFORMATION N/A N/A N/A N/A N/A N/A Setpoint pressure(s) 120 Upstream and 60 Downstream Legent Setpoint pressure(s) 120 Upstream and 60 Downstream Legent Financial Efficiency Financial Efficiency					Additional Data						
INFORMATION N/A N/A N/A N/A setpoint pressure(s)? 120 Upstream and 60 Downstream Legend Physical Mortality Functionality Reliability Financial Efficiency	INFORMATION	N/A	N/A	N/A							
PM Physical Mortality Find the properties of the											
PM Physical Mortality Find the properties of the											
Find the functionality Reliability Find the functionality Reliability Find the functionality Find											
R Reliability FE Financial Efficiency											
FE Financial Efficiency						-					
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	South Tahoe PUD Location Description:	Oflying Rd	K/J Project Number: 1270004*	*00
	Water System Optimization Plan PRV Facility ID #:		Date:	5/1/2012
	PRV Facility Name:	Oflying PRV	Condition Assessment Inspectors:	Peter Lavallee and Glenn Roderick
	Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Iroqouis Zone
	Photo Evidence for PM, Fn, R, FE			
		PHOTOS		













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				South Tahoe PUD	Location Description:	: In front of 3914 Sac	ddle Rd.	K/J Project Numl	per: 1270004*00	
				Water System Optimization Plan	PRV Facility ID #:	R23-019			5/1/20	012
					PRV Facility Name:	: Saddle #1		Condition Assessm Inspect		Glenn Roderick
					Pressure Zones Served:	Four Seasons	S	Adjacent Pressure Zor	nes: Sweeping Turn and U	Ipper Saddle Zone
										Pr
				Notes:			re Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	el of Service reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				4. If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
				weighting Factor and multiply by Univergitted Fallure Mode Score	·					
					3: moderate deterioration	3: meets design requirement	meets all requirements fails some requirements	3: failure every 6 to 10 yrs	financial efficiency is average financial efficiency is low	
					4: significant deterioration 5: virtually unserviceable	less than design requirement significantly less than design requirement	4: Tails some requirements 5: Fails all requirements	4: failure every 3 to 5 yrs 5: failure < 3 yrs	5: asset should be replaced	
						a construction				
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		N/A	2.83	3.00	3.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	8.00	N/A	6.67	9.00	6.00	
check	100%	5		Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	
				Factored Score	1.60	N/A	2.33	2.25	1.20	7.38
				Criticality Score					30%	2.22
				PRV Piping, Valves & Instrumentation						
				Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)		Calculated 1.00	Calculated 3.20	Assigned 3.00	Assigned 2.00	Total Factored Score
				Weighted Final Score (1-5)		3.00	9.40	12.00	4.00	101011 20101 00 00010
check	100%			Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
Circon	20070			Factored Score		0.6	2.82	2.4	0.6	7.77
				Criticality Score					70%	5.44
									Overall Total Factored Score (Out of 25) =	7.65
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHEC	CKLIST			
ramare mode type	365.6	110.8.11.11.8 (2.3)		PRV Site						
Fn	5	1	5	site is secured adequately to prevent unauthorized access/vandalism?						
Fn	4	2	8	adequate vehicle access for year-round maintenance?		d above grade by 3 inches but can be covered by snow	w in the wintertime			
Fn	5	3	15	site/vault drainage adequate to prevent flooding of valve vault?	Dirt floor and there has been no issue with f	flooding in the past				
Fn	1	4	4	PRV vault adequately designed to prevent vehicle damage?		У				
Fn INFORMATION	1 N/A	5 N/A	5 N/A	any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?						
Fn	1	3	3		No other known problems					
				Piping, Valves and Instrumentation						
Fn PM	5	1 2	5 10	pipe supports adequate to prevent movement or vibration?						
FIVI	3	2	10	coatings adequate to protect piping and valves?		no excessive noise or headless noted				
С	1	3	3	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	pipes are sized adequatery and there is i	TO EXCESSIVE HOISE OF HEADIOSS HOLED				
Fn Fn	1 5	4	4 25	valves are suitable for efficient and reliable service?	Valves have no issues No flowmeter at this site					
Fn Fn	5	5	1	site has pressure upstream/downstream pressure gages?		ne prv				
PM	4	2	8	estimated service life remaining?	Valve coatings are completely gone - assume	e 5 yr life remaining before complete rebuild				
Fn	4	3	12		Inlet pipe is deflected between inlet of PRV					
				A 3.20% 1 8-1 -						
INFORMATION	N/A	N/A	N/A	Additional Data						
INFORMATION	N/A N/A	N/A N/A	N/A N/A	nominal size (e.g. 6-inch)? setpoint pressure(s)?	100 Upstream and 100 Downstream					
2	,	,		SS-FS Pressure(s).		alve after the hydrant same pressure due to closed va	alve on D/S side of PRV.			
				Legend						
				PM	Physical Mortality					
				Fn	Functionality					
					Reliability					
				FE	Financial Efficiency	T				
				FE	-					

South Taboe PUD Location Description: In Front of 3934 Seedler Ind. Water System Optimization Plan PRV Facility In Proceedings Against Fig. 18 (2001) PRV Facility Name PRV Facility Name Sandle F1 Condition Assessment Impectors: Pressure Zones Served: Four Season Adjacent Pressure Zones Sweezing Tom and Upper Saddle 2 PROSE PHOTOS PHOTOS					
PRV Facility Name: Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Photo Evidence for PM, Fn, R, FE	mber: _{1270004*00}	In front of 3914 Saddle Rd. K/J Project Number:	Location Description:	South Tahoe PUD	
PRV Facility Name: Saddle #1 Pressure Zones Served: Four Seasons Adjacent Pressure Zones: Sweeping Turn and Upper Saddle Z Sweeping Turn and Upper Saddle Z Photo Evidence for PM, Fn, R, FE	Date: 5/1/2012	R23-019 Date:	PRV Facility ID #:	Water System Optimization Plan	
Pressure Zones Served: Pressure Zones Served: Four Seasons Adjacent Pressure Zones: Sweeping Turn and Upper Saddle Z Photo Evidence for PM, Fn, R, FE			PRV Facility Name:		
Photo Evidence for PM, Fn, R, FE					
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PHOTOS PHOTOS			EE .	Photo Evidence for PM, Fn, R, I	
		PHOTOS			
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201 1/03/13 10:04 6M	2011/07//13 10:04 AM	2011/07/13 10:04 AM			

1										
				South Tahoe PUD	Location Description:	Intersection of Keller Rd and Saddle	e Rd. (End of Keller Rd.)	K/J Project Numb	er: _{1270004*00}	
				Water System Optimization Plan	PRV Facility ID #:	R22-006		Da	te: 5/1/20	12
					PRV Facility Name:	Keller #1		Condition Assessme		Glenn Roderick
					Pressure Zones Served:			Adjacent Pressure Zon		
					Pressure Zones Served:	Upper Saddle	e	Aujacent Pressure 2011	es: Keller, Sweeping Turn an	d Needle Peak Zones
				Notes:			re Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	el of Service reliability	Financial Efficiency	
				,	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				4. If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance	2: minor defects only		·	·	-	
				weighting Factor and multiply by Unweighted Fallure Mode Score	<u> </u>	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
						3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
						4: less than design requirement 5: significantly less than design requirement	4: fails some requirements 5: Fails all requirements	4: failure every 3 to 5 yrs 5: failure < 3 yrs	4: financial efficiency is low 5: asset should be replaced	
					5. Virtually unserviceable	S. Significantly less than design requirement	5. Tans an requirements	J. Tanure < J yrs	5. asset silvala be replaced	
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?	Assigned	N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)	2.00	N/A	2.33	2.00	2.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	4.00	N/A	5.67	6.00	4.00	
check	100%			Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	
				Factored Score	0.80	N/A	1.98	1.50	0.80	5.08
				Criticality Score					30%	1.53
				PRV Piping, Valves & Instrumentation			_			
				Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)	3.00	1.00	2.80	3.00	3.00	Total Factored Score
1 . 1	4000/			Weighted Final Score (1-25)	6.00 15%	3.00	8.20 30%	9.00	6.00 15%	
check	100%			Criticality Weighting Factor (0 - 100%)	15%					
										6.66
1				Factored Score	0.9	0.6	2.46	1.8	0.9	6.66 4.66
									0.9	
		Importance		Factored Score			2.46		0.9 70%	4.66
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	Factored Score Criticality Score	0.9	0.6	2.46		0.9 70%	4.66
		Weighting (1-5)		Factored Score Criticality Score PRV Site	0.9	0.6 CONDITION ASSESSMENT CHEC	2.46		0.9 70%	4.66
Failure Mode Type Fn Fn	Score 5 1	•	Final Score 5 2	Factored Score Criticality Score	0.9 The facility is in the roadway and can be acce	0.6 CONDITION ASSESSMENT CHEC	2.46		0.9 70%	4.66
Fn	5	Weighting (1-5)	5	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	0.9 The facility is in the roadway and can be acce Within roadway so no access issues No drain and when opened the vault had sta	CONDITION ASSESSMENT CHEC	2.46		0.9 70%	4.66
Fn Fn Fn Fn	5 1 5	Weighting (1-5) 1 2 3 4	5 2 15 4	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	0.9 The facility is in the roadway and can be acce Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage	CONDITION ASSESSMENT CHEC	2.46		0.9 70%	4.66
Fn Fn Fn Fn Fn	5 1 5 1	1 2 3 4 5 5	5 2 15 4	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance; site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	0.9 The facility is in the roadway and can be acce Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None	CONDITION ASSESSMENT CHEC	2.46		0.9 70%	4.66
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Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 5 1 1 N/A 1	1 2 3 4 5 5 N/A 3 1 2 2 3 4 4 5 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5 2 15 4 5 N/A 3	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages?	The facility is in the roadway and can be access within roadway so no access issues. No drain and when opened the vault had sta Vault is designed to prevent vehicle damage Noore from Google Earth No other known problems. No pipe supports Coatings on the piping are in poor condition. The pipes are sized adequately and there is road to so the piping are in poor condition. The pipes are sized adequately and there is road programmer to the piping are in poor condition. The pipes are sized adequately and there is road programmer at this site. There are pressure gages on both sides of the piping are in poor condition.	CONDITION ASSESSMENT CHECE essed easily as the lid is not locked and ing water a few inches above the PRV and the coating on the prv shows signs of rust to excessive noise or headloss noted	2.46		0.9 70%	4.66
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Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A 1 5 3 1 1 5 1 3 2	1	5 2 15 4 5 N/A 3 3	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin	The facility is in the roadway and can be access within roadway so no access issues. No drain and when opened the vault had sta Vault is designed to prevent vehicle damage None form Google Earth No other known problems. No pipe supports Coatings on the piping are in poor condition. The pipes are sized adequately and there is road to support the comment of the pipes are sized adequately and there is road to support the pipes are sized adequately and there is road to support the pipes are sized adequately and there is road to support the pipes are sized adequately and there is road to support the pipes are sized adequately and there is road to support the pipes are sized adequately and there is road to support the pipes are sized adequately and there is road to support the pipes are sized adequately and there is road to support the pipes are sized and the pip	CONDITION ASSESSMENT CHECESSED easily as the lid is not locked anding water a few inches above the PRV	2.46 CKLIST		0.9 70%	4.66
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION INFORMATION	5 1 5 1 1 N/A 1 5 3 1 1 5 1 3 2	1	5 2 15 4 5 N/A 3 3	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV ault adequately designed to prevent vehicle damage any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin R	The facility is in the roadway and can be access the state of the facility is in the roadway and can be access. Within roadway so no access issues No drain and when opened the vault had state Nault is designed to prevent vehicle damage None 6877 from Google Earth No other known problems No pipe supports Coatings on the piping are in poor condition. The pipes are sized adequately and there is road No operational issues with the valves No flowmeter at this site. There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life. There are no other known problems with this of PRV with a 1/2" low flow Bypass 70 Upstream and 40 Downstream 3 Isolation valves for this PRV Physical Mortality Functionality	CONDITION ASSESSMENT CHECESSED easily as the lid is not locked anding water a few inches above the PRV	2.46 CKLIST		0.9 70%	4.66

Water System Optimization Plan PRV Facility Name Softwart Pressure Zones Sorrod Inspert Online Pressure Zones Sorrod Inspert Online Pressure Zones Sorrod Inspert Online Pressure Zones Sorrod Inspert Online Pressure Zones Sorrod Inspert Online Pressure Zones Sorrod Inspert Online Pressure Zones Sorrod Inspert Online Insp		South Tahoe PUD	Location Description:	Intersection of Keller Rd and Saddle Rd. (End of Keller Rd.)	K/J Project Number: 1270004*00	
PRV Facility Name: Pressure Zones Served: Upper Saidas Adjacent Pressure Zones Lutius Severing Luman Receive National Professor Part Name Profe		Water System Optimization Plan	PRV Facility ID #:	R22-006	Date:	5/1/2012
Pressure Zones Served: Lugger Sociale Adjacent Pressure Zones Faller, Sweeping Turn and Receibe Prest Zones						
Photo (sidence for PRI, Fin, 1, T) PHOTOS BOTILOTPID decase AX BOTILOTPID decase AX			PRV Facility Name:	Keller #1	Inspectors:	Peter Lavallee and Glenn Roderick
PICTUS ***SCHEMENT IN PROCESS AS TO SCHEMEN			Pressure Zones Served:	Upper Saddle	Adjacent Pressure Zones:	Keller, Sweeping Turn and Needle Peak Zones
THE STATE OF THE S		Photo Evidence for Pl	M, Fn, R, FE			
				PHOTOS		
		11/07/18 08:28 AM 2011/	/G7/13 00:32 AM	2011/07/13 @9/46 AM		011/07/13:09:45/AM
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Т		Г	T					1		
				South Tahoe PUD	Location Descript	ion: In front of 1647	7 Keller Rd	K/J Project Number:	1270004*00	
			,	Water System Optimization Plan	PRV Facility I	I D #: R23-00	07	Date:	5/1/20	012
					PRV Facility Na	amo:	110	Condition Assessment Inspectors:		
					PRV Facility Na	ime: Keller #	#Z	inspectors.	Peter Lavallee and	Glenn Roderick
					Pressure Zones Serv	ved: Middle K	eller	Adjacent Pressure Zones:	Keller, Sweeping Turn, and	Heavenly Valley Zones
				Notes:		Fai	ilure Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Level	of Service	Financial Efficiency	
				2. For Reliability to be determined based on CMMS maintenance records			functionality	reliability		
				For Criticality Weighting Factors to be determined at District Workshop He Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	new or excellent condition minor defects only	significantly exceeds design requirement exceeds design requirement	exceeds all requirements exceeds some requirements	1: failure >20 yrs 2: failure every 11 to 20 yrs	best available technology financial efficiency is high	
				weighting ractor and multiply by onweighted randre wode score	3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
					4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 5 yrs	4: financial efficiency is low	
					5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
				DDV Cit-						
				PRV Site Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)	1.00	N/A N/A	1.67	2.00	2.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾		N/A	5.00	6.00	4.00	
ck	100%			Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	
				Factored Score		N/A	1.75	1.50	0.80	4.65
				Criticality Score					30%	1.40
				PRV Piping, Valves & Instrumentation	Calandar I	Autority 1	Calada	A serieus ad	A - si - si - d	
				Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 3.00	Calculated 1.00	Calculated 1.80	Assigned 2.00	Assigned 2.00	Total Factored Score
				Weighted Final Score (1-25)	6.00	3.00	6.80	6.00	4.00	
				11 0.0.1.00 1 1.00 10 (1 25)						
ck	100%			Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
eck	100%			Factored Score	15% 0.9			20% 1.2	0.6	5.34
eck	100%				15% 0.9	20%	30%	1.2	0.6 70%	3.74
eck	100%			Factored Score	15% 0.9	20%	30%	1.2	0.6	
		Importance	Final Score	Factored Score	15% 0.9	20%	30% 2.04	1.2	0.6 70%	3.74
	100%	Importance Weighting (1-5)	Final Score	Factored Score Criticality Score	15% 0.9	20% 0.6	30% 2.04	1.2	0.6 70%	3.74
		•	Final Score	Factored Score	15% 0.9	20% 0.6 CONDITION ASSESSMENT CH	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn	Score	Weighting (1-5) 1 2	1 2	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	15% 0.9 The facility is in the roadway and the lic Within roadway so no access issues	20% 0.6 CONDITION ASSESSMENT CH	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn	Score 1 1 1 5 5	1 2 3	1 2 15	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	15% 0.9 The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha	20% 0.6 CONDITION ASSESSMENT CH d is locked ad standing water a few inches below the top of the Pf	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn	Score	Weighting (1-5) 1 2	1 2	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	15% 0.9 The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault he Vault is designed to prevent vehicle dar	20% 0.6 CONDITION ASSESSMENT CH d is locked ad standing water a few inches below the top of the Pf	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn Fn Fn INFORMATION	Score 1 1 5 1	1 2 3 4 5 N/A	1 2 15 4 5 N/A	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	15% 0.9 The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth	20% 0.6 CONDITION ASSESSMENT CH d is locked ad standing water a few inches below the top of the Pf	30% 2.04	1.2	0.6 70%	3.74
Fn Fn Fn	Score 1 1 5 1 1 1	1 2 3 4 5 5	1 2 15 4 5	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	15% 0.9 The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None	20% 0.6 CONDITION ASSESSMENT CH d is locked ad standing water a few inches below the top of the Pf	30% 2.04	1.2	0.6 70%	3.74
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Failure Mode Type Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	Score 1 1 5 1 1 N/A 1	1	1 2 15 4 5 N/A 3	Factored Score Criticality Score PRV Site Site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance: site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	15% 0.9 The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems	20% 0.6 CONDITION ASSESSMENT CH d is locked ad standing water a few inches below the top of the Pi	30% 2.04	1.2	0.6 70%	3.74
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Failure Mode Type Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	Score 1 1 5 1 1 N/A 1	1	1 2 15 4 5 N/A 3	Factored Score Criticality Score PRV Site Site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance: site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	The facility is in the roadway and the lit Within roadway so no access issues No drain and when opened the vault he Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting	20% 0.6 CONDITION ASSESSMENT CH d is locked ad standing water a few inches below the top of the Pi	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn PM	Score 1 1 5 1 1 N/A 1 1 3	1	1 2 15 4 5 N/A 3	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance; site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service?	The facility is in the roadway and the lice. The facility is in the roadway and the lice. Within roadway so no access issues. No drain and when opened the vault he Vault is designed to prevent vehicle dar None. 6847 from Google Earth. No other known problems. No supports. PRV Coating is acceptable, but starting. The pipes are sized adequately and the Valves are suitable and efficient.	20% 0.6 CONDITION ASSESSMENT CH d is locked ad standing water a few inches below the top of the Pr mage to deteriorate and pipe wrap appears to be in adequate	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn PM	Score 1 1 1 5 1 1 N/A 1 1 3 1 1 5 5	Neighting (1-5)	1 2 15 4 5 5 N/A 3 1 6 6 3 4 4 25	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance. site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter?	The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequatore is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
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Failure Mode Type Fn Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn PM	Score 1 1 1 5 1 1 N/A 1 1 3 1 1 5 5	Neighting (1-5)	1 2 15 4 5 5 N/A 3 1 6 6 3 4 4 25	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining?	The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequatere is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn PM	Score 1 1 5 1 N/A 1 1 3 1 1 3 1 1 3 3	Weighting (1-5)	1 2 15 4 5 5 N/A 3 3 1 1 6 6 3 4 4 2 2 5 1 6 6	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems?	The facility is in the roadway and the lice. Within roadway so no access issues. No drain and when opened the vault he Vault is designed to prevent vehicle dar None 6847 from Google Earth. No other known problems. No supports. PRV Coating is acceptable, but starting. The pipes are sized adequately and the Valves are suitable and efficient. No flowmeter at this site. There are pressure gages on both sides. Assume 20 years based on AWU Usefu. No other known problems.	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequatere is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn PM	Score 1 1 5 1 N/A 1 1 3 1 1 3 1 1 3 3	Weighting (1-5)	1 2 15 4 5 5 N/A 3 3 1 1 6 6 3 4 4 2 2 5 1 6 6	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems?	The facility is in the roadway and the lice. Within roadway so no access issues. No drain and when opened the vault he Vault is designed to prevent vehicle dar None 6847 from Google Earth. No other known problems. No supports. PRV Coating is acceptable, but starting. The pipes are sized adequately and the Valves are suitable and efficient. No flowmeter at this site. There are pressure gages on both sides. Assume 20 years based on AWU Usefu. No other known problems.	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequatere is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION	Score 1 1 5 1 N/A 1 1 3 1 1 3 1 1 3 3	N/A N/A	1 2 15 4 5 5 N/A 3 3 1 6 6 3 4 4 25 1 6 6 3 N/A	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance. site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data	The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Usefu No other known problems.	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequatere is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	Score 1 1 5 1 1 N/A 1 1 1 3 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1	1	1 2 15 4 5 5 N/A 3 3 1 6 6 3 4 4 25 1 6 6 3 3 3 1	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance. site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data	The facility is in the roadway and the lice Within roadway so no access issues No drain and when opened the vault he Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Usefu No other known problems.	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequater is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION	Score 1 1 5 1 1 N/A 1 1 1 3 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1	N/A N/A	1 2 15 4 5 5 N/A 3 3 1 6 6 3 4 4 25 1 6 6 3 N/A	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Usefu No other known problems. 6" PRV 94 Upstream and 60 Downstream	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequater is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION INFORMATION	Score 1 1 5 1 1 N/A 1 1 1 3 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1	N/A N/A	1 2 15 4 5 5 N/A 3 3 1 6 6 3 4 4 25 1 6 6 3 N/A	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Usefu No other known problems. 6" PRV 94 Upstream and 60 Downstream	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequater is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION	Score 1 1 5 1 1 N/A 1 1 1 3 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1	N/A N/A	1 2 15 4 5 5 N/A 3 3 1 6 6 3 4 4 25 1 6 6 3 N/A	Factored Score Criticality Score PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The facility is in the roadway and the lit Within roadway so no access issues No drain and when opened the vault he Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting: The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Usefu No other known problems. 6" PRV 94 Upstream and 60 Downstream	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequater is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION INFORMATION	Score 1 1 5 1 1 N/A 1 1 1 3 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1	N/A N/A	1 2 15 4 5 5 N/A 3 3 1 6 6 3 4 4 25 1 6 6 3 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fn	The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Usefu No other known problems. 6" PRV 94 Upstream and 60 Downstream Physical Mortality Functionality Reliability	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequater is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION INFORMATION	Score 1 1 5 1 1 N/A 1 1 1 3 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1	N/A N/A	1 2 15 4 5 5 N/A 3 3 1 6 6 3 4 4 25 1 6 6 3 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fn R	The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault he Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting: The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Usefu No other known problems. 6" PRV 94 Upstream and 60 Downstream Physical Mortality Functionality Reliability Financial Efficiency	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequater is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74
Failure Mode Type Fn Fn Fn Fn INFORMATION Fn C Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION	Score 1 1 5 1 1 N/A 1 1 1 3 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1	N/A N/A	1 2 15 4 5 5 N/A 3 3 1 6 6 3 4 4 25 1 6 6 3 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fn R	The facility is in the roadway and the lic Within roadway so no access issues No drain and when opened the vault ha Vault is designed to prevent vehicle dar None 6847 from Google Earth No other known problems No supports PRV Coating is acceptable, but starting The pipes are sized adequately and the Valves are suitable and efficient No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Usefu No other known problems. 6" PRV 94 Upstream and 60 Downstream Physical Mortality Functionality Reliability	CONDITION ASSESSMENT CF d is locked ad standing water a few inches below the top of the PF mage to deteriorate and pipe wrap appears to be in adequater is no excessive noise or headloss noted	30% 2.04	1.2	0.6 70%	3.74

	Water System Optimization Plan	PRV Facility ID #: PRV Facility Name: Pressure Zones Served:	R23-007 Keller #2	Date: Condition Assessment Inspectors:	5/1/2012
			Keller#2		
		Pressure Zones Served:			Peter Lavallee and Glenn Roderick
			Middle Keller	Adjacent Pressure Zones:	Keller, Sweeping Turn, and Heavenly Valley Zones
	Photo Evidence for PM, Fr	n, R, FE	PHOTOS		
	2011/07/13 09:16 AM	2011/07/13 09 1	G AM	2011/97/12 09:25 AM	2011/07/13 09:25
		2011//07//18 09:16 AM		2011/67/A18 09:21 AM	2011/07//18 09:21

		1 1						1			
				South Tahoe PUD	Location Descript	ion: Keller Rd by Heavenly Ca	llifornia Base Camp	K/J Project Number:	1270004*00		
				Water System Optimization Plan	PRV Facility I	D #: R23-00	8	Date:			
					PRV Facility Na	me: Keller#	13	Condition Assessment Inspectors:	Peter Lava	allee	
					Pressure Zones Serv	/ed: Sweeping	Turn	Adjacent Pressure Zones:	ent Pressure Zones: Middle Keller, Heavenly Valley, Four Seasons, Upper Saddle, and No		
				Notes:		Fail	lure Mode Scoring (1 - 5)				
		<u> </u>		Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality	Capacity		of Service reliability	Financial Efficiency		
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	functionality 1: exceeds all requirements		1: best available technology		
				4. If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	·	2: financial efficiency is high		
				Weighting Factor and multiply by Unweighted Failure Mode Score	3: moderate deterioration	3: meets design requirement	3: meets all requirements	· ·	3: financial efficiency is average		
		<u> </u>			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low		
		1			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements		5: asset should be replaced		
				PRV Site							
		<u> </u>		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	Total Eastered Coore	
		<u> </u>		Unweighted Failure Mode Score (1-5)		N/A	3.00	3.00	3.00	Total Factored Score	
un ale	40001	<u> </u>		Weighted Final Score (1-25) ⁽⁴⁾		N/A	7.67	9.00 25%	9.00		
neck	100%	+		Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	35% 2.68	25%	1.80	7.53	
		+		Criticality Score		isjet	2.00	2.23	30%	2.26	
				PRV Piping, Valves & Instrumentation							
				Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned		
				Unweighted Failure Mode Score (1-5)		1.00	2.60	3.00	2.00	Total Factored Score	
				Weighted Final Score (1-25)		3.00	7.60	12.00	4.00		
eck	100%	<u>'</u>		Criticality Weighting Factor (0 - 100%)		20% 0.6	30% 2.28	20%	15% 0.6	6.70	
		<u> </u>		Factored Score Criticality Score		0.6	2.28	2.4	70%	6.78 4.75	
		1						o	verall Total Factored Score (Out of 25) =	7.01	
								O			
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CH	IECKLIST	O			
	Score	•		PRV Site			IECKLIST	0.			
Fn	5	Weighting (1-5)	5	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can b		IECKLIST	Or			
Fn Fn	5 1	Weighting (1-5) 1 2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	The facility is in the roadway and can b Within roadway so no access issues	e accessed easily as the lid is not locked		01			
Fn	5	Weighting (1-5)	5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can b Within roadway so no access issues Always filled with water and there is no	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is		0.			
Fn Fn Fn Fn	5 1 5 1	1 2 3 4 5	5 2 15 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	The facility is in the roadway and can b Within roadway so no access issues Always filled with water and there is no Vone	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is		0.			
Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A	1 2 3 4 5 5 N/A	5 2 15 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can b Within roadway so no access issues Always filled with water and there is no Vault is designed to prevent vehicle dan None 6752 from Google Earth	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is mage		0.			
Fn Fn Fn Fn	5 1 5 1	1 2 3 4 5	5 2 15 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can b Within roadway so no access issues Always filled with water and there is no Vault is designed to prevent vehicle dan None 6752 from Google Earth	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is		0.			
Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A	1 2 3 4 5 5 N/A	5 2 15 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems?	The facility is in the roadway and can b Within roadway so no access issues Always filled with water and there is no Vault is designed to prevent vehicle dar None 6752 from Google Earth PRV is on a blind corner and is extreme	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is mage		01			
Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A	1 2 3 4 5 5 N/A	5 2 15 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can b Within roadway so no access issues Always filled with water and there is no Vault is designed to prevent vehicle dar None 6752 from Google Earth PRV is on a blind corner and is extreme	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is mage		01			
Fn Fn Fn Fn INFORMATION	5 1 5 1 1 N/A 5	1 2 3 4 5 N/A 3	5 2 15 4 5 N/A 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	The facility is in the roadway and can be Within roadway so no access issues Always filled with water and there is not yault is designed to prevent vehicle dar None 6752 from Google Earth PRV is on a blind corner and is extreme	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is mage	s to be completed.				
Fn Fn Fn Fn INFORMATION Fn Fn PM	5 1 5 1 1 1 N/A 5	1	5 2 15 4 5 N/A 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?	The facility is in the roadway and can be Within roadway so no access issues Always filled with water and there is no Yault is designed to prevent vehicle dan None 6752 from Google Earth PRV is on a blind corner and is extreme No pipe supports Wrapped steel pipe with some deterior	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is mage ly dangerous to perform maintenance on	s to be completed.				
Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn F	5 1 5 1 1 1 N/A 5	1 2 3 4 5 N/A 3	5 2 15 4 5 N/A 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	The facility is in the roadway and can be Within roadway so no access issues Always filled with water and there is no access issues Always filled with water and there is no access issues None 6752 from Google Earth PRV is on a blind corner and is extreme No pipe supports Wrapped steel pipe with some deterior The pipes are sized adequately and the	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is mage ly dangerous to perform maintenance on ration and PRV coatings are acceptable, but showing so re is no excessive noise or headloss noted	s to be completed.				
Fn Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 5 1 1 N/A 5	1	5 2 15 4 5 N/A 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter?	The facility is in the roadway and can b Within roadway so no access issues Always filled with water and there is no Vault is designed to prevent vehicle dan None 6752 from Google Earth PRV is on a blind corner and is extreme No pipe supports Wrapped steel pipe with some deterior The pipes are sized adequately and the Valves are in good condition and there No flowmeter at this site	e accessed easily as the lid is not locked of drain. The vault must be pumped out whenver work is mage ly dangerous to perform maintenance on ration and PRV coatings are acceptable, but showing so re is no excessive noise or headloss noted is new stainless steel tubing within the vault and 2 gate	s to be completed.				
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 5 1 1 N/A 5	1	5 2 15 4 5 N/A 15 5 6 3 4 25 1	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be Within roadway so no access issues Always filled with water and there is not Vault is designed to prevent vehicle dan None 6752 from Google Earth PRV is on a blind corner and is extreme No pipe supports Wrapped steel pipe with some deterior The pipes are sized adequately and the Valves are in good condition and there No flowmeter at this site There are pressure gages on both sides	e accessed easily as the lid is not locked o drain. The vault must be pumped out whenver work is mage ly dangerous to perform maintenance on ration and PRV coatings are acceptable, but showing so re is no excessive noise or headloss noted is new stainless steel tubing within the vault and 2 gate of the prv	s to be completed.				
Fn Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 5 1 1 N/A 5 5 3	1	5 2 15 4 5 N/A 15 5 6 3 4 25 1 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining?	The facility is in the roadway and can be Within roadway so no access issues Always filled with water and there is not Vault is designed to prevent vehicle dan None 6752 from Google Earth PRV is on a blind corner and is extreme No pipe supports Wrapped steel pipe with some deterior The pipes are sized adequately and the Valves are in good condition and there No flowmeter at this site There are pressure gages on both sides Assume 20 years based on AWU Useful	e accessed easily as the lid is not locked ordrain. The vault must be pumped out whenver work is mage ly dangerous to perform maintenance on ration and PRV coatings are acceptable, but showing so re is no excessive noise or headloss noted is new stainless steel tubing within the vault and 2 gate of the prv Life	s to be completed.				
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South Tahoe PUD	Location Description:	Keller Rd by Heavenly Californi	ia Base Camp K/J Project Number:	1270004*00
South Fulloc F GB	20 cation 2 comptions	Relief Na by Fleaverily Californi	in base camp	1270004 00
Water System Optimization Plan	PRV Facility ID #:	R23-008	Date:	
			Condition Assessment	
	PRV Facility Name:	Keller #3	Inspectors:	Peter Lavallee
	Pressure Zones Served:	Sweeping Turn	Adjacent Pressure Zones:	vliddle Keller, Heavenly Valley, Four Seasons, Upper Saddle, and Needle Peak Zoer
Photo Evidence for PM, Fn, R, F	FE			
		PHOTOS		











				South Tahoe PUD	Location Description:	Intersection Keller Rd. and	INeedle Peak	K/J Project Numb	er: 1270004*00	
				Water System Optimization Plan	PRV Facility ID #:	Q22-010		Da	te: 5/1/2	2012
					PRV Facility Name:	Keller #5		Condition Assessme Inspecto		d Glenn Roderick
					Pressure Zones Served:	Needle Peak		Adjacent Pressure Zon	es: Heavenly Valley and S	ivening Turn Zones
					riessule Zolles Selveu.	Needle Peak		Adjucent ressure 2011	neavenry valley and s	weeping rurn zones
				Notes:			e Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	l of Service reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
					4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 5 yrs	4: financial efficiency is low	
					5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		N/A	2.33	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	6.00	N/A	5.17	9.00	4.00	
check	100%			Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	
	20071			Factored Score	1.20	N/A	1.81	2.25	0.80	6.06
				Criticality Score					30%	1.82
				PRV Piping, Valves & Instrumentation						
				Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)	4.00	1.00	2.60	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25)	8.00	3.00	7.60	9.00	4.00	
check	100%			Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
				Factored Score Criticality Score	1.2	0.6	2.28	1.8	0.6 70%	6.48 4.54
									Overall Total Factored Score (Out of 25) =	6.35
									Overall Total Factored Store (Out of 25) -	0.33
									Overall Total Factored Score (Out of 25) -	0.33
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHEC	KLIST		Overall Total Pactored Store (Out of 25) -	0.33
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	PRV Site		CONDITION ASSESSMENT CHEC	KLIST		Overall Total Pactored Store (Out of 25) -	0.33
Failure Mode Type	Score 5		Final Score	PRV Site site is secured adequately to prevent unauthorized access/vandalism?			KLIST		Overall Total Pactored Store (Out of 25) -	0.33
		Weighting (1-5)		site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	Facility on the side of the road with no lid on No access issues but can be covered in snow	the lock	KLIST		Overall Total Pactored Store (Out of 25) -	0.33
Fn Fn Fn	5 4 1	Weighting (1-5) 1 2 3	5 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	Facility on the side of the road with no lid on No access issues but can be covered in snow No flooding issues	the lock in the winter	KLIST		Overall Total Pactored Store (Out of 25) =	0.33
Fn Fn Fn Fn	5 4 1 1	Weighting (1-5) 1 2 3 4	5 8 3 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	Facility on the side of the road with no lid on No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the	the lock in the winter	KLIST		Overall Total Pactored Store (Out of 23) -	0.33
Fn Fn Fn Fn Fn	5 4 1 1 1	Weighting (1-5) 1 2 3 4 5	5 8 3 4 5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None	the lock in the winter	KLIST		Overall Total Pactored Store (Out of 23) =	0.33
Fn Fn Fn Fn	5 4 1 1	Weighting (1-5) 1 2 3 4	5 8 3 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None	the lock in the winter roadway	KLIST		Overall Total Pactored Store (Out of 25) -	0.33
Fn Fn Fn Fn Fn INFORMATION	5 4 1 1 1 N/A	1 2 3 4 5 N/A	5 8 3 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	Facility on the side of the road with no lid on No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth	the lock in the winter roadway	KLIST		Overall Total Pactored Store (Out of 23) -	0.33
Fn Fn Fn Fn Fn INFORMATION	5 4 1 1 1 N/A	1 2 3 4 5 N/A	5 8 3 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None G616 from Google Earth Lid marked with Sewer and Not Water.	the lock in the winter roadway	KLIST		Overall Total Pactored Store (Out of 25) -	0.33
Fn Fn Fn Fn Fn INFORMATION Fn	5 4 1 1 1 1 N/A 2	1 2 3 4 5 N/A	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water.	the lock in the winter roadway			Overall Total Pactored Store (Out of 23) -	6.33
Fn Fn Fn Fn INFORMATION Fn Fn	5 4 1 1 1 1 N/A 2	1 2 3 4 5 N/A 3 1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vauel? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl	the lock in the winter roadway ace lid.			Overall Total Pactored Store (Out of 23) -	0.33
Fn Fn Fn Fn Fn INFORMATION Fn	5 4 1 1 1 1 N/A 2	1 2 3 4 5 N/A	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve valve? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust			Overall Total Pactored Store (Out of 23) -	6.33
Fn Fn Fn Fn INFORMATION Fn Fn PM	5 4 1 1 1 1 N/A 2	1 2 3 4 5 N/A 3 1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repi	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust			Overall Total Pactored Store (Out of 25) -	6.33
Fn Fn Fn INFORMATION Fn Fn Fn C Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 4 1 1 1 1 N/A 2	1 2 3 4 5 N/A 3 1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is No issues with the isolation valves	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust			Overall Total Pactored Store (Out of 23) -	0.33
Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 4 1 1 1 1 N/A 2	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is No issues with the isolation valves No flowmeter at this site	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Total Pactored Store (Out of 25) -	0.33
Fn Fn Fn INFORMATION Fn Fn Fn C Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 4 1 1 1 1 N/A 2	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages?	Facility on the side of the road with no lid on No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is no issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Total Pactored Store (Out of 25) -	0.33
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 4 1 1 1 N/A 2 5 5 5	1 2 3 4 5 5 1 1 2 3 4 5 5 1 1 1 5 5 1 5 5	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is No issues with the isolation valves No flowmeter at this site	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Total Pactored Store (Out of 25) -	0.33
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn Fn PM C Fn Fn Fn PM	5 4 1 1 1 N/A 2 2 5 5 5 1 1 1 3	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is No issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Total Pactored Store (Out of 25) -	0.33
Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn PM Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 4 1 1 1 1 N/A 2 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve valve alevation (use Google earth, as-builts, or surveyed elevation)? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is No issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Total Pactored Store (Out of 25) -	0.33
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION INFORMATION	5 4 1 1 1 1 N/A 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault; PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is no lissues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems 6" PRV with a 3/4" Low Flow Bypass	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Total Pactored Store (Out of 25) -	6.33
Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn PM Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 4 1 1 1 1 N/A 2 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault; PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is No issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Iotal Pactoreu Stole (Out of 25) -	0.33
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION INFORMATION	5 4 1 1 1 1 N/A 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	Facility on the side of the road with no lid on No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is No issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems 6" PRV with a 3/4" Low Flow Bypass 105 Upstream and 50 Downstream	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Iotal Pactoreu Store (out of 23) -	0.33
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION INFORMATION	5 4 1 1 1 1 N/A 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure general estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is no issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems 6" PRV with a 3/4" Low Flow Bypass 105 Upstream and 50 Downstream	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Iotal Pactored Store (Out of 23) -	0.33
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION INFORMATION	5 4 1 1 1 1 N/A 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is INO issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems 6" PRV with a 3/4" Low Flow Bypass 105 Upstream and 50 Downstream Physical Mortality	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Iotal Pactored Store (Out of 25) -	0.33
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 4 1 1 1 1 N/A 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is no issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems 6" PRV with a 3/4" Low Flow Bypass 105 Upstream and 50 Downstream	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Iotal Pactored Store (Out of 25) -	0.33
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 4 1 1 1 1 N/A 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve valve? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is no issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems 6" PRV with a 3/4" Low Flow Bypass 105 Upstream and 50 Downstream Physical Mortality Functionality	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Iotal Pactored Store (Out of 23) -	0.33
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	5 4 1 1 1 1 N/A 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fn R	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is No issues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems 6" PRV with a 3/4" Low Flow Bypass 105 Upstream and 50 Downstream Physical Mortality Functionality Reliability	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Iotal Pactoreu Store (out of 25) -	0.33
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION INFORMATION	5 4 1 1 1 1 N/A 2 5 5 5 1 1 1 3 1	1	5 8 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fn R	Facility on the side of the road with no lid or No access issues but can be covered in snow No flooding issues Not designed for traffic since outside of the None 6616 from Google Earth Lid marked with Sewer and Not Water. Repl There are no supports and there is minimal of Coatings are deteriorated and there is visiab The pipes are sized adequately and there is no lissues with the isolation valves No flowmeter at this site There are pressure gages on both sides of the Assume 20 years based on AWU Useful Life No other known problems 6" PRV with a 3/4" Low Flow Bypass 105 Upstream and 50 Downstream Physical Mortality Functionality Reliability Financial Efficiency	the lock in the winter roadway ace lid. clearance between the vault wall and the side of the le rust no excessive noise or headloss noted			Overall Total Pactored Score (Out of 25) -	0.33

	South Tahoe PUD Location Description:	Intersection Keller Rd. andNeedle Peak	K/J Project Number: 1270004*0	00
	Water System Optimization Plan PRV Facility ID #:	Q22-010	Date:	5/1/2012
		Q22-010	Condition Assessment	5/1/2012
	PRV Facility Name:	Keller #5	Inspectors:	Peter Lavallee and Glenn Roderick
	Pressure Zones Served:	Needle Peak	Adjacent Pressure Zones:	Heavenly Valley and Sweeping Turn Zones
	Photo Evidence for PM, Fn, R, FE	PHOTOS		
		PHOTOS		
		(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		
				(a) (b)
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				South Tahoe PUD	Location Description:	Intersection of Pioneer Tra	ail and Marshall	K/J Project Numb	er: 1270004*00	
				Water System Optimization Plan	PRV Facility ID #:	029-014		Da	te: 5/1/20	012
					PRV Facility Name:	Pioneer #1 (Pioneer-	-Marshall)	Condition Assessme Inspecto		Glenn Roderick
					Pressure Zones Served:	Montgomery Est	states	Adjacent Pressure Zon	25: Stateline	Zone
						gee.y -a.		·		
				Notes:			re Mode Scoring (1 - 5)	1.60		
				Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	Physical Mortality	Capacity	functionality	reliability	Financial Efficiency	
				To Critically weighting factors to be determined at District workshop A. If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	new or excellent condition minor defects only	significantly exceeds design requirement exceeds design requirement	exceeds all requirements exceeds some requirements	1: failure >20 yrs 2: failure every 11 to 20 yrs	best available technology financial efficiency is high	
						3: meets design requirement 4: less than design requirement	3: meets all requirements 4: fails some requirements	3: failure every 6 to 10 yrs 4: failure every 3 to 5 yrs	3: financial efficiency is average 4: financial efficiency is low	
					5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
				PRV Site Is Failure Mode Score Calculated or Assigned?	Assigned	N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) ⁽⁴⁾	2.00 4.00	N/A N/A	3.00 7.67	3.00 9.00	2.00 4.00	Total Factored Score
check	100%			Criticality Weighting Factor (0 - 100%) Factored Score	20% 0.80	N/A N/A	35% 2.68	25% 2.25	20% 0.80	6.53
				Criticality Score PRV Piping, Valves & Instrumentation					30%	1.96
				Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 4.00	Calculated 1.00	Calculated 3.00	Assigned 3.00	Assigned 2.00	Total Factored Score
check	100%			Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	8.00 15%	3.00 20%	8.00 30%	9.00 20%	4.00 15%	
				Factored Score Criticality Score	1.2	0.6	2.4	1.8	0.6	6.60 4.62
									Overall Total Factored Score (Out of 25) =	6.58
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHEC	CKLIST			
				PRV Site						
Fn Fn	5 1	2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?		essed easily as the lid is not locked				
Fn Fn	5	3	15	site/vault drainage adequate to prevent flooding of valve vault?		nding water a few inches below the nining				
Fn	1	4	4	PRV vault adequately designed to prevent vehicle damage?		maning water a rew menes below the piping				
Fn	1	5	5	any site stability issues (if yes, describe)						
INFORMATION	N/A	N/A	N/A	valve elevation (use Google earth, as-builts, or surveyed elevation)?						
Fn	5	3	15	other known problems?	No other known problems, but in a high traff	ic area and is very dangerous to set up traffic contro	ol and perform maintenance			
Fn	F	1	5	Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?						
PM	5 5	2	10			iorated and the coating on the valves has started to	o fail.			
C	1	3	3	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	The pipes are sized adequately and there is n					
Fn	1	4	4	valves are suitable for efficient and reliable service?	-					
Fn	5	5	25		No flowmeter at this site	a nnv				
Fn PM	3	1 2	6	site has pressure upstream/downstream pressure gages?	Assume 10 years based on AWU Useful Life d					
Fn	1	3	3		There are no other known problems with this					
				Additional Data						
INIEGO										
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	nominal size (e.g. 6-inch)? setpoint pressure(s)?	140 Upstream and 65 Downstream					
	,		<u> </u>	setpoint pressure(s)?	140 Upstream and 65 Downstream					
	,		<u> </u>	setpoint pressure(s)? Legend	140 Upstream and 65 Downstream					
	,		<u> </u>	setpoint pressure(s)? Legend PM	140 Upstream and 65 Downstream					
	,		<u> </u>	setpoint pressure(s)? Legend PM Fn	140 Upstream and 65 Downstream Physical Mortality					
	,		<u> </u>	setpoint pressure(s)? Legend PM Fn R	140 Upstream and 65 Downstream Physical Mortality Functionality					
	,		<u> </u>	setpoint pressure(s)? Legend PM Fn R FE	140 Upstream and 65 Downstream Physical Mortality Functionality Reliability					
	,		<u> </u>	setpoint pressure(s)? Legend PM Fn R FE	140 Upstream and 65 Downstream Physical Mortality Functionality Reliability Financial Efficiency					



				South Tahoe PUD	Location Description	South Side of the Intersection of Pic	oneer Trail and Marshall Trail	K/J Project Number:	1270004*00	
				Water System Optimization Plan	PRV Facility ID #	029-01	.5	Date:	5/1/20	12
					PRV Facility Name	Pioneer #2 (Pioneer	er-Kokanee)	Condition Assessment Inspectors:	Peter Lavallee and	Glenn Roderick
					Pressure Zones Served	: Montgomery	Estates	Adjacent Pressure Zones:	Stateline	Zone
								,		
				Notes:			lure Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality Level of	of Service reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	meets all requirements fails some requirements	3: failure every 6 to 10 yrs 4: failure every 3 to 5 yrs	3: financial efficiency is average 4: financial efficiency is low	
					4: significant deterioration 5: virtually unserviceable	4: less than design requirement 5: significantly less than design requirement	5: Fails all requirements		5: asset should be replaced	
					,	o , see men eeste continue				
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		N/A	3.00	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾		N/A	7.67	9.00	4.00	
eck	100%			Criticality Weighting Factor (0 - 100%)		N/A	35%	25%	20%	6.70
				Factored Score Criticality Score		N/A	2.68	2.25	0.80	6.53 1.96
				PRV Piping, Valves & Instrumentation					30/6	1.50
				Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		1.00	2.60	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25)		3.00	7.60	9.00	4.00	
eck	100%			Criticality Weighting Factor (0 - 100%)		20%	30%	20%	15%	
				Factored Score		0.6	2.28	1.8	0.6	6.63
				Criticality Score					70% verall Total Factored Score (Out of 25) =	4.64 6.60
									- Court of 25) -	0.00
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CH	IECKLIST			
Tunare Mode Type	Score	vergitting (13)	i iliai scorc							
Fn				PRV Site						
Fn	5	1	5	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be ac	cessed easily as the lid is not locked				
	1	2	2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	The facility is in the roadway and can be ac Within roadway so no access issues					
Fn	1 5	2 3	2 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can be act Within roadway so no access issues No drain and when opened the vault had s	anding water a few inches above the piping.				
Fn	1 5 1	3 4	2 15 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag	anding water a few inches above the piping.				
	1 5	2 3	2 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None	anding water a few inches above the piping.				
Fn Fn	1 5 1 1	2 3 4 5	2 15 4 5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth	anding water a few inches above the piping.	ntrol and perform maintenance			
Fn Fn INFORMATION	1 5 1 1 N/A	2 3 4 5 N/A	2 15 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth	randing water a few inches above the piping.	ntrol and perform maintenance			
Fn Fn INFORMATION	1 5 1 1 N/A	2 3 4 5 N/A	2 15 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high tra	randing water a few inches above the piping.	ntrol and perform maintenance			
Fn Fn INFORMATION Fn	1 5 1 1 N/A 5	2 3 4 5 N/A	2 15 4 5 N/A 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high tra	randing water a few inches above the piping.	ntrol and perform maintenance			
Fn Fn INFORMATION	1 5 1 1 N/A	2 3 4 5 N/A 3	2 15 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high tra No supports	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con	ntrol and perform maintenance			
Fn Fn INFORMATION Fn	1 5 1 1 N/A 5	2 3 4 5 N/A 3	2 15 4 5 N/A 15	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high tra No supports Coatings are deteriorated and there is sign	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con	ntrol and perform maintenance			
Fn Fn Fn PM C	1 5 1 1 N/A 5	2 3 4 5 N/A 3 1 2	2 15 4 5 N/A 15 5 10	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high training the company of the control of the co	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn	1 5 1 1 N/A 5 5 5	2 3 4 5 N/A 3 1 2	2 15 4 5 N/A 15 5 10	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high tra No supports Coatings are deteriorated and there is sign The pipes are sized adequately and there is Valves are adequate for use	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn	1 5 1 1 N/A 5 5 5 5 1 1 1 5	2 3 4 5 N/A 3 1 2 3 4 5	2 15 4 5 N/A 15 5 10 3 4 25	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high tra No supports Coatings are deteriorated and there is sign The pipes are sized adequately and there is Valves are adequate for use No flowmeter at this site	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn	1 5 1 1 N/A 5 5 5	2 3 4 5 N/A 3 1 2	2 15 4 5 N/A 15 5 10	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high tra No supports Coatings are deteriorated and there is sign The pipes are sized adequately and there is Valves are adequate for use No flowmeter at this site	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted	ntrol and perform maintenance			
Fn Fn INFORMATION Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	1 5 1 1 N/A 5 5 5 5 5 1 1 1 5	2 3 4 5 N/A 3 1 2 3 4 5 1	2 15 4 5 N/A 15 5 10 3 4 25	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high training the control of the co	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	1 5 1 1 N/A 5 5 5 5 1 1 1 4	2 3 4 5 5 N/A 3 1 2 3 4 5 5	2 15 4 5 N/A 15 5 10 3 4 25 1 8	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high train to the company of the co	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION	1 5 1 1 N/A 5 5 5 5 1 1 1 5 1 1 N/A	2 3 4 5 N/A 3 1 1 2 3 4 5 1 1 2	2 15 4 5 N/A 15 5 10 3 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high train the control of the contr	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	1 5 1 1 N/A 5 5 5 5 1 1 5 1 4 1	2 3 4 5 N/A 3 1 1 2 3 4 5 1 2	2 15 4 5 N/A 15 5 10 3 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high train the factor of the	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION	1 5 1 1 N/A 5 5 5 5 1 1 1 5 1 1 N/A	2 3 4 5 N/A 3 1 1 2 3 4 5 1 1 2	2 15 4 5 N/A 15 5 10 3 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high training the second of	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION	1 5 1 1 N/A 5 5 5 5 1 1 1 5 1 1 N/A	2 3 4 5 N/A 3 1 1 2 3 4 5 1 1 2	2 15 4 5 N/A 15 5 10 3 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high training the factor of	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION	1 5 1 1 N/A 5 5 5 5 1 1 1 5 1 1 N/A	2 3 4 5 N/A 3 1 1 2 3 4 5 1 1 2	2 15 4 5 N/A 15 5 10 3 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high training the control of the co	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION	1 5 1 1 N/A 5 5 5 5 1 1 1 5 1 1 N/A	2 3 4 5 N/A 3 1 1 2 3 4 5 1 1 2	2 15 4 5 N/A 15 5 10 3 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high training the factor of	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION	1 5 1 1 N/A 5 5 5 5 1 1 1 5 1 1 N/A	2 3 4 5 N/A 3 1 1 2 3 4 5 1 1 2	2 15 4 5 N/A 15 5 10 3 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high tra No supports Coatings are deteriorated and there is sign The pipes are sized adequately and there is Valves are adequate for use No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on extensive externs. There are no other known problems with the of PRV with a 2-1/2" Bypass 115 Upstream and 80 Downstream Physical Mortality Functionality	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			
Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn INFORMATION	1 5 1 1 N/A 5 5 5 5 1 1 1 5 1 1 N/A	2 3 4 5 N/A 3 1 1 2 3 4 5 1 1 2	2 15 4 5 N/A 15 5 10 3 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin	The facility is in the roadway and can be ac Within roadway so no access issues No drain and when opened the vault had s Vault is designed to prevent vehicle damag None 6427 from Google Earth No other known problems, but in a high train the factor of the	anding water a few inches above the piping. e ffic area and is very dangerous to set up traffic con ficant rust no excessive noise or headloss noted he pry	ntrol and perform maintenance			



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				South Tahoe PUD	Location Description	on: End of Front	ier Ct.	K/J Project Number:	1270004*00	
				Water System Optimization Plan	PRV Facility ID) #: Q23-01	8	Date:	5/1/20	012
					PRV Facility Nar	me: Price Rd. I	PRV	Condition Assessment Inspectors:	Peter Lavallee and	Glenn Roderick
					Pressure Zones Serve	ed: Price Rd. Z	'one	Adjacent Pressure Zones:	Heavenly Val	llev Zone
					Tressure zones serv	THE NO. 2	one		Heavenly val	ney Zone
				Notes:		Fail	lure Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level of functionality	of Service reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	meets all requirements fails some requirements	3: failure every 6 to 10 yrs 4: failure every 3 to 5 yrs	3: financial efficiency is average 4: financial efficiency is low	
					4: significant deterioration 5: virtually unserviceable	4: less than design requirement 5: significantly less than design requirement	5: Fails all requirements		5: asset should be replaced	
					,					
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Calculated	
				Unweighted Failure Mode Score (1-5)		N/A	2.67	2.00	2.00	Total Factored Score
	4000/			Weighted Final Score (1-25) ⁽⁴⁾	4.00	N/A	6.17	6.00	4.00	
eck	100%			Criticality Weighting Factor (0 - 100%) Factored Score		N/A N/A	35% 2.16	25% 1.50	20% 0.80	5.26
				Criticality Score		N/O	2.10	2.50	30%	1.58
				PRV Piping, Valves & Instrumentation						
				Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		1.00	2.60	3.00	2.00	Total Factored Score
l.	100%			Weighted Final Score (1-25)	6.00 15%	3.00 20%	7.60 30%	9.00 20%	4.00 15%	
eck	100%			Criticality Weighting Factor (0 - 100%) Factored Score		0.6	2.28	1.8	0.6	6.18
				Criticality Score					70%	4.33
								0	verall Total Factored Score (Out of 25) =	5.90
Failure Manda Tura	C	Importance	Final Score			CONDITION ASSESSMENT CH	ECKLIST			
Failure Mode Type	Score	Weighting (1-5)								
Fn			111101 00010	PRV Site						
	5	1	5	site is secured adequately to prevent unauthorized access/vandalism?	Manhole Lid with no lock					
Fn	4	2	5 8	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	Manhole Lid with no lock Outside of roadway and is buried by sno					
Fn	4	2 3	5 8 9	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	Manhole Lid with no lock Outside of roadway and is buried by snot Little to no water at time of inspection b	out a hiustory of the vault being flooded				
	4	2	5 8	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	Manhole Lid with no lock Outside of roadway and is buried by sno Little to no water at time of inspection b Not necessary due to location outside of	out a hiustory of the vault being flooded				
Fn Fn	4 3 1	2 3 4	5 8 9 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	Manhole Lid with no lock Outside of roadway and is buried by sno Little to no water at time of inspection b Not necessary due to location outside of None	out a hiustory of the vault being flooded				
Fn Fn Fn	4 3 1 1	2 3 4 5	5 8 9 4 5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	Manhole Lid with no lock Outside of roadway and is buried by sno Little to no water at time of inspection b Not necessary due to location outside of None	ut a hiustory of the vault being flooded f roadway				
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Fn Fn INFORMATION Fn Fn	4 3 1 1 N/A 2	2 3 4 5 N/A 3	5 8 9 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	Manhole Lid with no lock Outside of roadway and is buried by snot Little to no water at time of inspection b Not necessary due to location outside of None 6452 from Google Earth The manhole lid is marked sewer and no	out a hiustory of the vault being flooded f roadway ot water	nt condition			
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Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn	4 3 1 1 N/A 2 5 3	2 3 4 5 N/A 3 1 2 3 4 5	5 8 9 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter?	Manhole Lid with no lock Outside of roadway and is buried by snot Little to no water at time of inspection b Not necessary due to location outside of None 6452 from Google Earth The manhole lid is marked sewer and no No pipe supports Coatings in Poor condition with lots of ru The pipes are sized adequately and there No valving issues No flowmeter at this site	out a hiustory of the vault being flooded froadway of water ust on pipes and prv. Coatings on the valves are in gree	at condition			
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Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	4 3 1 1 N/A 2 5 3	2 3 4 5 N/A 3 1 2 3 4 5	5 8 9 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages?	Manhole Lid with no lock Outside of roadway and is buried by snot Little to no water at time of inspection b Not necessary due to location outside of None 6452 from Google Earth The manhole lid is marked sewer and no No pipe supports Coatings in Poor condition with lots of ru The pipes are sized adequately and there No valving issues No flowmeter at this site	out a hiustory of the vault being flooded f roadway of water ust on pipes and prv. Coatings on the valves are in greate is no excessive noise or headloss noted of the prv	at condition			
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Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	4 3 1 1 N/A 2 2 5 3 1 1 5 1 3 1	2 3 4 5 N/A 3 1 1 2 3 4 5 1 1 2	5 8 9 4 5 N/A 6 5 6 3 4 25 1 6 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin	Manhole Lid with no lock Outside of roadway and is buried by sno Little to no water at time of inspection b Not necessary due to location outside of None 6452 from Google Earth The manhole lid is marked sewer and no No pipe supports Coatings in Poor condition with lots of ru The pipes are sized adequately and there No valving issues No flowmeter at this site There are pressure gages on both sides of Assume 20 years based on AWU Useful I There are no other known problems with 6" PRV with a 4" Bypass 107 Upstream and 36 Downstream The manhole lid is marked sewer and no Physical Mortality Functionality Reliability	out a hiustory of the vault being flooded froadway of twater ust on pipes and prv. Coatings on the valves are in gree is no excessive noise or headloss noted of the prv Life h this prv station	at condition			

South Tahoe PUD	Location Description:	End of Frontier Ct.	K/J Project Number: 1270004*00	
Water System Optimization Plan	PRV Facility ID #:	Q23-018	Date:	5/1/2012
, .		·	Condition Assessment	· · · · · · · · · · · · · · · · · · ·
	PRV Facility Name:	Price Rd. PRV	Inspectors:	Peter Lavallee and Glenn Roderick
	Pressure Zones Served:	Price Rd. Zone	Adjacent Pressure Zones:	Heavenly Valley Zone
Photo Evidence for PM, Fn, R, FE				
		PHOTOS		
2011/07/18 11:04 AM	2011/07/13 11	1:05:AM	2034/697/13 11:06 AM	2011/07/13 11:06
	07/13 11:05 AM	2011/07/18 11:	DE AM	2011/07/13 11 03 AM

				South Tahoe PUD	Location Description:	Intersection of Rocky Point a	and Pine Hill Rd.	K/J Project Numb	er: _{1270004*00}	
				Water System Optimization Plan	PRV Facility ID #:	Q21-018		Dat	te: 5/1/2	012
					PRV Facility Name:	Rock Point PR	eV	Condition Assessme Inspecto		d Glenn Roderick
					Pressure Zones Served:	Rocky Point Zo	no.	Adjacent Pressure Zono	es: Heavenly Valley Zone, Stateline	Zono, and Unner Saddle Zono
					riessure zones serveu.	NOUN POINT 20	me .	rajacent ressare zone	neavenry valley 2011e, Stateline	Zone, and Opper Saddle Zone
				Notes:			re Mode Scoring (1 - 5)			
		 		Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	el of Service reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
		 			4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 5 yrs	4: financial efficiency is low	
			<u> </u>		5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		1		PRV Site						
		† 1	 	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		N/A	2.67	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	4.00	N/A	6.17	9.00	4.00	
check	100%			Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	
				Factored Score	0.80	N/A	2.16	2.25	0.80	6.01
		+		Criticality Score					30%	1.80
		-		PRV Piping, Valves & Instrumentation				1		
		-		Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 4.50	Calculated 1.00	Calculated 2.60	Assigned 2.00	Assigned 2.00	Total Factored Score
		+	<u> </u>	Weighted Final Score (1-5)	9.00	3.00	7.60	8.00	6.00	1014111410104
check	100%	†		Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
				Factored Score	1.35	0.6	2.28	1.6	0.9	6.73
				Criticality Score					70%	4.71
		-							Overall Total Factored Score (Out of 25) =	6.51
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHEC	CKLIST		Overall Total Factored Score (Out of 25) =	6.51
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	PRV Site		CONDITION ASSESSMENT CHEC	CKLIST		Overall Total Factored Score (Out of 25) =	6.51
Failure Mode Type	Score 5	•	Final Score	PRV Site site is secured adequately to prevent unauthorized access/vandalism?			CKLIST		Overall Total Factored Score (Out of 25) =	6.51
		Weighting (1-5)		site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	The facility is in the roadway and can be acce Within roadway so no access issues	essed easily as the lid is not locked	CKLIST		Overall Total Factored Score (Out of 25) =	6.51
Fn Fn Fn	5 4 4	Weighting (1-5) 1 2 3	5 8 12	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can be acco Within roadway so no access issues No drain and when opened the vault had sta	essed easily as the lid is not locked nding water at springliune of piping	CKLIST		Overall Total Factored Score (Out of 25) =	6.51
Fn Fn Fn Fn	5 4 4 1	Weighting (1-5) 1 2 3 4	5 8 12 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	The facility is in the roadway and can be acco Within roadway so no access issues No drain and when opened the vault had sta Vault is designed to prevent vehicle damage	essed easily as the lid is not locked nding water at springliune of piping	CKLIST		Overall Total Factored Score (Out of 25) =	6.51
Fn Fn Fn	5 4 4	Weighting (1-5) 1 2 3	5 8 12	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can be accommodate within roadway so no access issues No drain and when opened the vault had stavault is designed to prevent vehicle damage None	essed easily as the lid is not locked nding water at springliune of piping	CKLIST		Overall Total Factored Score (Out of 25) =	6.51
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South Tahoe PUD	Location Description:	Intersection of Rocky Point and Pine Hill Rd.	K/J Project Number: 12700	04*00
Water System Optimization Plan	PRV Facility ID #:	Q21-018	Date:	5/1/2012
	PRV Facility Name:	Rock Point PRV	Condition Assessment Inspectors:	Peter Lavallee and Glenn Roderick
	Pressure Zones Served:	Rocky Point Zone	Adjacent Pressure Zones:	Heavenly Valley Zone, Stateline Zone, and Upper Saddle Zone
Photo Evidence for F	PM, Fn, R, FE	PHOTOS		
2011/07/13 10:54 AM 2011/07/13 10:54 AM		/13 10:54 AM	2011/07/13 10:53 AM	2011/07/13 10-52

				South Tahoe PUD	Location Description:	Intersection of Terrace a	nd Wildwood	K/J Project Numb	per: _{1270004*00}	
				Water System Optimization Plan	PRV Facility ID #:	Q22-023		Da	hte: 5/1/2	012
					PRV Facility Name:	Terrace PR\	1	Condition Assessm Inspecto		l Glenn Roderick
								Adjacent Pressure Zon		
					Pressure Zones Served:	Terrace		Aujacent Pressure 201	Heavenly Va	alley Zone
				Notes:		Failu	re Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Leve	el of Service reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
					significant deterioration virtually unserviceable	4: less than design requirement 5: significantly less than design requirement	4: fails some requirements 5: Fails all requirements	4: failure every 3 to 5 yrs 5: failure < 3 yrs	4: financial efficiency is low 5: asset should be replaced	
					J. Virtually undervicedble	Jo. Significantly less than design requirement	5. Tans an requirements	J. Tallule \ J yl5	5. asset should be replaced	
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
			·	Unweighted Failure Mode Score (1-5)		N/A	2.17	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	6.00	N/A	4.67	9.00	4.00	
check	100%			Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	
				Factored Score Criticality Score	1.20	N/A	1.63	2.25	0.80	5.88 1.77
				PRV Piping, Valves & Instrumentation					30/6	4 177
				Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		5.00	2.60	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25)	5.00	15.00	7.60	6.00	4.00	
check	100%			Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
				Factored Score		3	2.28	1.2	0.6	7.83 5.48
				Criticality Score					70% Overall Total Factored Score (Out of 25) =	7.25
Failure Mode Type										
	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHEC	CKLIST			
- Inde Type	Score	Importance Weighting (1-5)	Final Score	PRV Site		CONDITION ASSESSMENT CHEC	CKLIST			
Fn	Score 5	•	Final Score	site is secured adequately to prevent unauthorized access/vandalism?	No lock on box		CKLIST			
Fn Fn	5 4	Weighting (1-5)	5 8	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	No lock on box Outside of roadway and is buried by snow du		CKLIST			
Fn Fn Fn	5 4 1	Weighting (1-5) 1 2 3	5 8 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	No lock on box Outside of roadway and is buried by snow do No flooding issues	uring winter months	CKLIST			
Fn Fn	5 4	Weighting (1-5)	5 8	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	No lock on box Outside of roadway and is buried by snow du No flooding issues Not necessary due to location outside of roa	uring winter months	CKLIST			
Fn Fn Fn Fn	5 4 1 1	Weighting (1-5) 1 2 3 4	5 8 3 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	No lock on box Outside of roadway and is buried by snow do No flooding issues Not necessary due to location outside of roa None	uring winter months	CKLIST			
Fn Fn Fn Fn Fn	5 4 1 1	Weighting (1-5) 1 2 3 4 5	5 8 3 4 5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	No lock on box Outside of roadway and is buried by snow do No flooding issues Not necessary due to location outside of roa None	uring winter months	CKLIST			
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South Tahoe PUD Lo	ocation Description: Inters	ection of Terrace and Wildwood	K/J Project Number: 1270004*00	
Water System Optimization Plan	PRV Facility ID #:	Q22-023	Date:	5/1/2012
	PRV Facility Name:	Terrace PRV	Condition Assessment Inspectors:	Peter Lavallee and Glenn Roderick
Pre	essure Zones Served:	Terrace	Adjacent Pressure Zones:	Heavenly Valley Zone
Photo Evidence for PM, Fn, R, FE	PH	отоѕ		
221M0W13-10:84 AM	2011/07/	3 10:35 AM		
2017/07/13 10:84 AM	2011/07/1	3 10:35 AM		

		1								
				South Tahoe PUD	Location Description:	Intersection of Overlook	k and Wildwood	K/J Project Num	ber: _{1270004*00}	
				Water System Optimization Plan	PRV Facility ID #:	Not Assign	ed		ate: 5/1/20	12
					PRV Facility Name:	Overlook P	PRV	Condition Assessm Inspect		Glenn Roderick
					Pressure Zones Served:	Heavenly Valley/	'Overlook	Adjacent Pressure Zo	nes: Heavenly Valley Zone, Statelin	ne Zone, and Terrace Zone
				This PRV has been buried and was unknown until recently when the zone boundaries	were being evaluated. As such this PRV	can not be evaluated.				
				Notes:		Failu	ure Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model	Physical Mortality	Capacity		rel of Service	Financial Efficiency	
				For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	functionality 1: exceeds all requirements	reliability 1: failure >20 yrs	1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
				5. Assigned score of 15 was given since PRV is buried and could not be assessed on the	3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
				condition.	4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 5 yrs	4: financial efficiency is low	
					5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
				PRV Site				_		
				Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)			Calculated	Assigned	Assigned	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾						. O.a actorea ocore
check	100%			Criticality Weighting Factor (0 - 100%) Factored Score	20% 0.00	N/A 0.00	35% 0.00	25% 0.00	20% 0.00	0.00
				Criticality Score	0.00	0.00	0.00	0.00	30%	0.00
				PRV Piping, Valves & Instrumentation Is Failure Mode Score Calculated or Assigned?	Assigned	Assigned	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		Assigned	Calculated	Assigned	Assigned	Total Factored Score
check	100%			Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)						
CHECK	100%			Criticality Weighting Factor (0 - 100%)		20%	30%	20%	15%	
				Factored Score	15% 0.00	20% 0.00	30% 0.00	20%	15% 0	0.00
				Factored Score Criticality Score	0.00					0.00
					0.00				70%	
		Importance	F: 16		0.00		0.00		70%	0.00
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	Criticality Score	0.00	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Failure Mode Type	Score	•	Final Score	Criticality Score	0.00	0.00	0.00	0	70%	0.00
Fn Fn	Score	Weighting (1-5) 1 2	0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	0.00 This PRV has been buried and was unknown	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn	Score	Weighting (1-5) 1 2 3	0 0 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	0.00 This PRV has been buried and was unknown	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn		1 2 3 4 5 5	0 0 0 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-rouing maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	0.00 This PRV has been buried and was unknown	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION	Score N/A	Weighting (1-5) 1 2 3 4	0 0 0 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	0.00 This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn		1 2 3 4 5 N/A	0 0 0 0 0 0 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-rouing maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	0.00 This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION		1 2 3 4 5 N/A	0 0 0 0 0 0 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems?	0.00 This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION Fn Fn		1	0 0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve rauel? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	0.00 This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION		1	0 0 0 0 0 0 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation	0.00 This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn INFORMATION Fn Fn Fn Fn C		1 2 3 4 5 5 N/A 3 1 2 1 2 1 2 1 2 3 3 4 5 5 N/A 3 3 3 4 5 5 7 7 7 7 7 7 7 7	0 0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	0.00 This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn INFORMATION Fn Fn PM		1	0 0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?	0.00 This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn		1 2 3 4 5 5 1 1 2 3 4 5 5 1 1 2 5 5 1 5 5 5 5 5 5 5	0 0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to pretect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages?	This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn Fn PM C Fn Fn Fn Fn PM		1 2 3 4 5 5 N/A 3 1 2 2 3 4 5 5 N/A 3 3 4 5 5 1 2 5 5 1 2 5 5 5 5 5 5 5 5 5	0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining?	0.00 This PRV has been buried and was unknown 6429 from Google Earth	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn		1 2 3 4 5 5 1 2 3 4 5 5 1 2 2	0 0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems?	O.00 This PRV has been buried and was unknown 6429 from Google Earth Assume 20 years based on AWU Useful Life	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	N/A	1 2 3 4 5 5 1 2 3 4 5 5 1 2 3 3 4 5 5 1 2 3 3 4 5 5 1 2 3 3 6 6 6 7 7 7 7 7 7 7	0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems?	O.00 This PRV has been buried and was unknown 6429 from Google Earth Assume 20 years based on AWU Useful Life	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn INFORMATION Fn Fn Fn Fn Fn PM C Fn Fn Fn PM		1 2 3 4 5 5 1 2 3 4 5 5 1 2 2	0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems?	O.00 This PRV has been buried and was unknown 6429 from Google Earth Assume 20 years based on AWU Useful Life	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn INFORMATION	N/A	Weighting (1-5) 1 2 3 4 5 N/A 3 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	This PRV has been buried and was unknown 6429 from Google Earth Assume 20 years based on AWU Useful Life 2" PRV Unknown	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn INFORMATION	N/A	Weighting (1-5) 1 2 3 4 5 N/A 3 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage; any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)?	This PRV has been buried and was unknown 6429 from Google Earth Assume 20 years based on AWU Useful Life 2" PRV Unknown	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn INFORMATION	N/A	Weighting (1-5) 1 2 3 4 5 N/A 3 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism?	This PRV has been buried and was unknown 6429 from Google Earth Assume 20 years based on AWU Useful Life 2" PRV Unknown Physical Mortality Functionality	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn INFORMATION	N/A	Weighting (1-5) 1 2 3 4 5 N/A 3 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin	This PRV has been buried and was unknown 6429 from Google Earth Assume 20 years based on AWU Useful Life 2" PRV Unknown Physical Mortality Functionality Reliability	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00
Fn Fn Fn Fn INFORMATION Fn C Fn Fn Fn PM C Fn Fn Fn Fn Fn Fn INFORMATION	N/A	Weighting (1-5) 1 2 3 4 5 N/A 3 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	0 0 0 0 0 N/A 0	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance; site/vault dainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)? setpoint pressure(s)? Legend PM Fin R	This PRV has been buried and was unknown 6429 from Google Earth Assume 20 years based on AWU Useful Life 2" PRV Unknown Physical Mortality Functionality	0.00 CONDITION ASSESSMENT CHE	0.00	0	70%	0.00

South Tahoe PUD Location Description:	Intersection of Overlook and Wildwood	K/J Project Number: 1270004	1*00
Water System Optimization Plan PRV Facility ID #:	Not Assigned	Date:	5/1/2012
PRV Facility Name:	Overlook PRV	Condition Assessment Inspectors:	Peter Lavallee and Glenn Roderick
Pressure Zones Served:	Heavenly Valley/Overlook	Adjacent Pressure Zones:	Heavenly Valley Zone, Stateline Zone, and Terrace Zone
This PRV has been buried and was unknown until recently when the zone boundaries were being evaluated. As such this PRV ca Photo Evidence for PM, Fn, R, FE	not be evaluated.		
	PHOTOS		'
2011/07//18 10:23 AM		2011/07/1	3 10:23 AW

		T								
				South Tahoe PUD	Location Description:	Intersection of Saddle a	nd Wildwood	K/J Project Numb	per: 1270004*00	
				Water System Optimization Plan	PRV Facility ID #:	Q23-021			hte: 5/1/2	2012
					PRV Facility Name:	Saddle #3		Condition Assessme		d Glenn Roderick
					Pressure Zones Served:	Heavenly Valley	Zone	Adjacent Pressure Zon	nes: Stateline	e Zone
						1.02.0, 1.0,		•	-	
				Notes:			re Mode Scoring (1 - 5)			
		+		Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	el of Service reliability	Financial Efficiency	
		 		For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
					4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 5 yrs	4: financial efficiency is low	
		+			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
		+		PRV Site						
		+		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
		+		Unweighted Failure Mode Score (1-5)		N/A N/A	3.50	3.00	2.00	Total Factored Score
		 		Weighted Final Score (1-25) ⁽⁴⁾		N/A	10.00	9.00	4.00	
check	100%	+		Criticality Weighting Factor (0 - 100%)		N/A	35%	25%	20%	
				Factored Score		N/A	3.50	2.25	0.80	8.95
				Criticality Score					30%	2.69
				PRV Piping, Valves & Instrumentation						
				Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		1.00	2.60	4.00	2.00	Total Factored Score
				Weighted Final Score (1-25)		3.00	7.60	12.00	4.00	
check	100%	` 		Criticality Weighting Factor (0 - 100%) Factored Score		20%	30% 2.28	20%	15% 0.6	7.23
		+		Criticality Score		0.0	2.28	2.4	70%	5.06
									Overall Total Factored Score (Out of 25) =	7.75
				·						
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHE	CKLIST			
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	PRV Site		CONDITION ASSESSMENT CHE	CKLIST			
Failure Mode Type	S core 5	•	Final Score			CONDITION ASSESSMENT CHE	CKLIST			
Fn Fn	5 4	Weighting (1-5) 1 2	5 8	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow du	uring winter months				
Fn Fn Fn	5 4 5	Weighting (1-5) 1 2 3	5 8 15	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow du	uring winter months n interior of vault with natural spring flowing down o				
Fn Fn Fn Fn	5 4 5	1 2 3 4	5 8 15 4	PRV Site Site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? Site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow du Dirt floor with ground water level marked or Not necessary due to location outside of roa	uring winter months n interior of vault with natural spring flowing down o				
Fn Fn Fn	5 4 5	Weighting (1-5) 1 2 3	5 8 15	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow du Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curb	uring winter months n interior of vault with natural spring flowing down o				
Fn Fn Fn Fn Fn	5 4 5 1 5	Weighting (1-5) 1 2 3 4 5	5 8 15 4 25	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow du Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curb	uring winter months n interior of vault with natural spring flowing down o				
Fn Fn Fn Fn Fn INFORMATION	5 4 5 1 5 N/A	Weighting (1-5) 1 2 3 4 5 N/A	5 8 15 4 25 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow di Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curt 6552 from Google Earth	uring winter months n interior of vault with natural spring flowing down o				
Fn Fn Fn Fn INFORMATION	5 4 5 1 5 N/A	Weighting (1-5) 1 2 3 4 5 N/A	5 8 15 4 25 N/A	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow di Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curt 6552 from Google Earth No other known problems	uring winter months n interior of vault with natural spring flowing down o				
Fn Fn Fn Fn INFORMATION	5 4 5 1 5 N/A 1	Weighting (1-5) 1 2 3 4 5 N/A	5 8 15 4 25 N/A 3	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow du Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curt 6552 from Google Earth No other known problems	uring winter months n interior of vault with natural spring flowing down o				
Fn Fn Fn Fn INFORMATION Fn Fn	5 4 5 1 5 N/A 1	Weighting (1-5) 1 2 3 4 5 N/A 3	5 8 15 4 25 N/A 3	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow du Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curt 6552 from Google Earth No other known problems No pipe supports	uring winter months n interior of vault with natural spring flowing down o dway b and gutter				
Fn Fn Fn Fn Fn INFORMATION	5 4 5 1 5 N/A 1	Weighting (1-5) 1 2 3 4 5 N/A	5 8 15 4 25 N/A 3	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow di Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curt 6552 from Google Earth No other known problems No pipe supports Coatings are gone and there is significcant ru	uring winter months n interior of vault with natural spring flowing down of dway b and gutter				
Fn Fn Fn Fn INFORMATION Fn Fn	5 4 5 1 5 N/A 1	Weighting (1-5) 1 2 3 4 5 N/A 3	5 8 15 4 25 N/A 3	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow do Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curt 6552 from Google Earth No other known problems No pipe supports Coatings are gone and there is significcant ru The pipes are sized adequately and there is re	uring winter months n interior of vault with natural spring flowing down of dway b and gutter				
Fn Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn PM	5 4 5 1 5 N/A 1	Weighting (1-5) 1 2 3 4 5 N/A 3 1 2 3 4 4 5 4 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4	5 8 15 4 25 N/A 3 5 10	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service?	3 ft manhole lid with No lock on box Outside of roadway and is buried by snow di Dirt floor with ground water level marked or Not necessary due to location outside of roa Natural Spring flowing year round down curl 6552 from Google Earth No other known problems No pipe supports Coatings are gone and there is significcant ru The pipes are sized adequately and there is it No valving issues	uring winter months n interior of vault with natural spring flowing down of dway b and gutter				
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South Tahoe PUD	Location Description:	Intersection of Saddle and Wildwood	K/J Project Number: 1270004*00	
Water System Optimization Plan	PRV Facility ID #:	Q23-021	Date:	5/1/2012
	PRV Facility Name:	Saddle #3	Condition Assessment Inspectors:	Peter Lavallee and Glenn Roderick
	Tito ruemey rume.	Saudie #5	mspectors.	Peter Lavallee and Glefin Roderick
	Pressure Zones Served:	Heavenly Valley Zone	Adjacent Pressure Zones:	Stateline Zone
Photo Evidence for PM, Fn, R, FE				
		PHOTOS		
2011/07/18 10:28 AM		2011/07/13 10:20 AM	2011/07/18 10:2	29 AM
2C11A07/A18 10.20 AM		2011/07/13 10:24 AM	2011/97/13 10	24 AM

				South Tahoe PUD	Location Description:	Intersection of Saddle	and Keller	K/J Project Numl	per: 1270004*00	
				Water System Optimization Plan	PRV Facility ID #:	R23-021		Da	ate: 5/1/2	2012
					PRV Facility Name:	Saddle #2		Condition Assessm Inspect		d Glenn Roderick
					Pressure Zones Served:	Heavenly Valley	Zone	Adjacent Pressure Zor	nes: Stateline Zone and S	Sweeping Turn PRV
				Notes: 1. Capacity score will be based on hydraulic model	Dhusiaal Maybalibu		re Mode Scoring (1 - 5)	el of Service	Financial Efficiency	
				Capacity score will be based on hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality	Capacity	functionality	reliability	Financial Efficiency	
				For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
					4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 3 to 5 yrs	4: financial efficiency is low	
					5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 3 yrs	5: asset should be replaced	
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		N/A	2.33	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	6.00	N/A	5.17	6.00	2.00	
check	100%			Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	
				Factored Score	1.20	N/A	1.81	1.50	0.40	4.91
				Criticality Score					30%	1.47
				PRV Piping, Valves & Instrumentation		,				
				Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned	Total Factored Score
				Unweighted Failure Mode Score (1-5)	2.50 5.00	1.00 3.00	2.40 7.40	3.00	2.00	Total Factored Score
check	100%			Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
CHECK	10070			Factored Score	0.75	0.6	2.22	1.2	0.3	5.07
				Criticality Score			_		70%	3.55
									Overall Total Factored Score (Out of 25) =	5.02
		Importance				CONDITION ASSESSMENT CHEC	CKLIST			
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	DDV Site		CONDITION ASSESSMENT CHEC	CKLIST			
		Weighting (1-5)		PRV Site site is secured adequately to prevent unauthorized access/yandalism?			CKLIST			
Failure Mode Type Fn Fn	Score 5	•	Final Score 5 8	PRV Site site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	Manhole Lid with no lock behind curb and gu	utter	CKLIST			
Fn	5	Weighting (1-5)	5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	Manhole Lid with no lock behind curb and gu Outside of roadway and is buried by snow du Low water in vault and no histroy of flooding	utter uring winter months	CKLIST			
Fn Fn Fn Fn	5 4 1 1	Weighting (1-5) 1 2 3 4	5 8 3 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?	Manhole Lid with no lock behind curb and gr Outside of roadway and is buried by snow dr Low water in vault and no histroy of flooding Not necessary due to location outside of roa	utter uring winter months	CKLIST			
Fn Fn Fn Fn Fn	5 4 1 1	Weighting (1-5) 1 2 3 4 5	5 8 3 4 5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	Manhole Lid with no lock behind curb and gr Outside of roadway and is buried by snow dr Low water in vault and no histroy of flooding Not necessary due to location outside of roa None	utter uring winter months	CKLIST			
Fn Fn Fn Fn	5 4 1 1	Weighting (1-5) 1 2 3 4	5 8 3 4	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	Manhole Lid with no lock behind curb and gr Outside of roadway and is buried by snow dr Low water in vault and no histroy of flooding Not necessary due to location outside of roa None	utter uring winter months	CKLIST			
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	South Tahoe PUD	Location Description:	: Intersection of Saddle and Keller	K/J Project Number: 1270004*00	
	Water System Optimization Plan	PRV Facility ID #:	R23-021	Date:	5/1/2012
		PRV Facility Name:	: Saddle #2	Condition Assessment Inspectors:	Peter Lavallee and Glenn Roderick
		Pressure Zones Served:	Heavenly Valley Zone	Adjacent Pressure Zones:	Stateline Zone and Sweeping Turn PRV
	Photo Evidence for PM, Fn, R, FE				
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				South Tahoe PUD	Location Description	n: Intersection of Susqueha	ına and Minniconjou	K/J Project Number:	1270004*00	
				Water System Optimization Plan	PRV Facility ID #	#: N32-02	22	Date:	5/1/20	012
				ļ ļ	PRV Facility Name	e: Susquehan	na PRV	Condition Assessment Inspectors:		Glenn Roderick
					Pressure Zones Served	d: Susquehan	a Zone	Adjacent Pressure Zones:	Pine Va	allev
						Judgachan	22010			
				Notes:			ilure Mode Scoring (1 - 5)			
			<u> </u>	Capacity score will be based on hydraulic model For Reliabilty to be determined based on CMMS maintenance records	Physical Mortality	Capacity	Level o	of Service reliability	Financial Efficiency	
				·	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
				If Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
			<u> </u>		3: moderate deterioration	3: meets design requirement	3: meets all requirements		3: financial efficiency is average	
					4: significant deterioration 5: virtually unserviceable	4: less than design requirement 5: significantly less than design requirement	4: fails some requirements 5: Fails all requirements		4: financial efficiency is low 5: asset should be replaced	
					5. M. Caury discrete Capie	jo. 5.5 micanay ic55 than design requirement	5. Tails an requirements	or randic so yio	5. dasce silodid de repiaced	
			<u> </u>	PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		N/A	1.83	3.00	2.00	Total Factored Score
			 	Weighted Final Score (1-25) ⁽⁴⁾		N/A	4.17	9.00	2.00	
ieck	100%	4		Criticality Weighting Factor (0 - 100%)	1	N/A	35%	25%	20%	
		+		Factored Score Criticality Score		N/A	1.46	2.25	0.40	4.91 1.47
		+		PRV Piping, Valves & Instrumentation					30/6	AIT!
		+		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Assigned	Assigned	
		 		Unweighted Failure Mode Score (1-5)		1.00	1.80	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25)	9.00	3.00	6.80	9.00	4.00	
eck	100%	,		Criticality Weighting Factor (0 - 100%)		20%	30%	20%	15%	
				Factored Score		0.6	2.04	1.8	0.6	6.39 4.47
		+		Criticality Score					70% Overall Total Factored Score (Out of 25) =	5.95
			<u> </u>							
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CH	HECKLIST			
runare mode Type	30010	Weighting (13)	Tillal Score	PRV Site						
Fn	5	1	5	site is secured adequately to prevent unauthorized access/vandalism?		ccessed easily as the lid is not locked				
Fn	1	2	2	adequate vehicle access for year-round maintenance?						
Fn Fn	2	3 4	6	site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage?						
Fn	1	5	5	any site stability issues (if yes, describe)		ie				
INFORMATION	N/A	N/A	N/A	valve elevation (use Google earth, as-builts, or surveyed elevation)?		<u> </u>	·		·	
Fn	1	3	3	other known problems?	No other known problems					
	I		I							
		+		Piping, Valves and Instrumentation						
Fn	1	1	1	pipe supports adequate to prevent movement or vibration?		polted to the wall of the vault				
PM	5	2	10	coatings adequate to protect piping and valves?						
					The pipes are sized adequately and there is					
C	1	3	3	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?						
Fn Fn	1 5	5	4 25	valves are suitable for efficient and reliable service? site has flowmeter?	No flowmeter at this site	316				
Fn	1	1	1	site has pressure upstream/downstream pressure gages?		the prv				
PM	4	2	8	estimated service life remaining?	Assume 5 years based on AWU Useful Life					
Fn	1	3	3	other known problems?	There are no other known problems with the	his prv station				
		+		Additional Data						
INFORMATION	N/A	N/A	N/A		4" PRV with a 2" Direct action bypass					
INFORMATION	N/A	N/A	N/A	, ,	100 Upstream and 48 Downstream					
				Legend	Physical Mortality					
		+			Functionality					
		+			Reliability					
		<u> </u>			Financial Efficiency					
			1	c	Capacity					

South Tahoe PUD	Location Description:	Intersection of Susquehana and Minniconjou	K/J Project Number: 1270004*00
Water System Optimization Plan	PRV Facility ID #:	N32-022	Date: 5/1/2012
	PRV Facility Name:	Susquehana PRV	Condition Assessment Inspectors: Peter Lavallee and Glenn Roderick
	Pressure Zones Served:	Susquehana Zone	Adjacent Pressure Zones: Pine Valley
Photo Evidence for PM, Fn, R, FE		PHOTOS	
2011/07/18 12:53 FM		2011/07/13 12:39 PM	2011/07/13 12:39 PM
2011/07/13 12:39 PM			

				South Tahoe PUD	Location Description:	In front of 1393 Pine	Valley Rd.	K/J Project Num	ber: _{1270004*00}	
				Water System Optimization Plan	PRV Facility ID #	M34-016			ate: 5/1/20	012
					PRV Facility Name	Pine Valley Pf	RV	Condition Assessm Inspect		Glenn Roderick
					Pressure Zones Served:	Pine Valley zo	ne	Adjacent Pressure Zo	nes: Susquehana, Country Clu	ıb, and Iroqouis Zones
				Notes: 1. Capacity score will be based on hydraulic model	Physical Mortality	Failui Capacity	re Mode Scoring (1 - 5)	el of Service	Financial Efficiency	
				2. For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
				For Criticality Weighting Factors to be determined at District Workshop Hif Failure Mode is "Assigned," then for Weighted Final Score, manually assign Importance	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >20 yrs	1: best available technology	
				Weighting Factor and multiply by Unweighted Failure Mode Score	2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 11 to 20 yrs	2: financial efficiency is high	
					3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 6 to 10 yrs	3: financial efficiency is average	
					significant deterioration virtually unserviceable	4: less than design requirement 5: significantly less than design requirement	4: fails some requirements 5: Fails all requirements	4: failure every 3 to 5 yrs 5: failure < 3 yrs	4: financial efficiency is low 5: asset should be replaced	
					S. Threadily differ viceable	5. Semicancy icos than design requirement	o. Tano an requirements	5. Tantate < 5 yrs	5. asset should be replaced	
				PRV Site						
				Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		N/A	1.83	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25) ⁽⁴⁾	4.00	N/A	4.17	6.00	4.00	
check	100%			Criticality Weighting Factor (0 - 100%)	20%	N/A	35%	25%	20%	4.55
				Factored Score Criticality Score	0.80	N/A	1.46	1.50	0.80	4.56 1.37
				PRV Piping, Valves & Instrumentation					3076	2.07
				Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Assigned	Assigned	
				Unweighted Failure Mode Score (1-5)		5.00	2.20	3.00	2.00	Total Factored Score
				Weighted Final Score (1-25)	9.00	15.00	7.20	9.00	4.00	
check	100%			Criticality Weighting Factor (0 - 100%)	15%	20%	30%	20%	15%	
				Factored Score		3.00	2.16	1.8	0.6	8.91
				Criticality Score					70% Overall Total Factored Score (Out of 25) =	6.24 7.60
									overall rotal ractored score (out of 25) =	7.00
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHEC	CKLIST		Stellar form factorical score (Sut St. 25) =	7.00
Failure Mode Type	Score	Importance Weighting (1-5)	Final Score	PRV Site		CONDITION ASSESSMENT CHEC	CKLIST		Stellar Buttored Score (Sut 8: 25) =	7.00
Fn	5	•	5	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc		CKLIST		Stellar Buttored Score (Sut 6: 25) -	7.00
Fn Fn	5 1	Weighting (1-5) 1 2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	The facility is in the roadway and can be acc Within roadway so no access issues	essed easily as the lid is not locked	CKLIST			7.00
Fn Fn Fn	5 1 1	Weighting (1-5) 1 2 3	5 2 3	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no	essed easily as the lid is not locked	CKLIST			7.00
Fn Fn	5 1	Weighting (1-5) 1 2	5 2	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage	essed easily as the lid is not locked	CKLIST			7.00
Fn Fn Fn Fn Fn INFORMATION	5 1 1 1 1 1 N/A	1 2 3 4 5 N/A	5 2 3 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage None 6488 from Google Earth	essed easily as the lid is not locked	CKLIST			7.00
Fn Fn Fn Fn Fn	5 1 1 1 1	Weighting (1-5) 1 2 3 4 5	5 2 3 4 5	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe)	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage None 6488 from Google Earth	essed easily as the lid is not locked	CKLIST			7.00
Fn Fn Fn Fn Fn INFORMATION	5 1 1 1 1 1 N/A	1 2 3 4 5 N/A	5 2 3 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage None 6488 from Google Earth	essed easily as the lid is not locked	CKLIST			
Fn Fn Fn Fn Fn INFORMATION	5 1 1 1 1 1 N/A	1 2 3 4 5 N/A	5 2 3 4 5 N/A	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer"	essed easily as the lid is not locked	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn	5 1 1 1 1 1 N/A	1 2 3 4 5 N/A	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no I vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer"	essed easily as the lid is not locked	CKLIST			
Fn Fn Fn Fn INFORMATION Fn	5 1 1 1 1 1 N/A 2	1 2 3 4 5 N/A 3	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no I vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped dc Coatings are worn away and flaking. Pipes a	essed easily as the lid is not locked dissue	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn	5 1 1 1 1 1 N/A 2	1 2 3 4 5 N/A 3 1	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no I vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped dc Coatings are worn away and flaking. Pipes a	essed easily as the lid is not locked dissue	CKLIST			
Fn Fn Fn INFORMATION Fn Fn Pn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 2	1 2 3 4 5 N/A 3 1	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped dc Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is	essed easily as the lid is not locked dissue	CKLIST			
Fn Fn Fn INFORMATION Fn Fn C Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 2	1 2 3 4 5 5 N/A 3 1 2 2 3 3 4 5 5 1 2 2 3 3 4 5 5 1 2 5 5 1 5 5 5 5 5 5 5	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no! Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped dc Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate	essed easily as the lid is not locked issue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 2	1 2 3 4 5 1 2 3 4 5 5 1 1 1 2 3 4 5 5 1 1 1 1 1 1 1 1	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no i Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped dc Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the	essed easily as the lid is not locked issue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn PM PM	5 1 1 1 1 N/A 2 3 5 5 1 1 4	1 2 3 4 5 5 1 2 1 2 3 4 5 5 1 2 5 1 2 5 1 2 5 1 2 5 1 2 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 5 5 5 5 5 5 5	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no invalid is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped do Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site. There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 2	1 2 3 4 5 1 2 3 4 5 5 1 1 1 2 3 4 5 5 1 1 1 1 1 1 1 1	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no i Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped dc Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn PM PM PM	5 1 1 1 1 N/A 2 3 5 5 1 1 4	1 2 3 4 5 5 1 2 1 2 3 4 5 5 1 2 5 1 2 5 1 2 5 1 2 5 1 2 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 5 5 5 5 5 5 5	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped do Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn PM PM PM	5 1 1 1 1 N/A 2 3 5 5 1 5 1 4 1	1 2 3 4 5 5 1 2 1 2 3 4 5 5 1 2 5 1 2 5 1 2 5 1 2 5 1 2 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 1 2 5 5 5 5 5 5 5 5 5	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped do Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn PM C Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn Fn	5 1 1 1 1 1 N/A 2 2 3 5 5 1 5 1 4	1 2 3 4 5 5 1 2 2 3 4 5 5 1 2 2 3 3 4 5 5 1 2 2 3 3 4 5 5 1 2 2 3 3 6 6 6 6 6 6 6 6	5 2 3 4 5 N/A 6	site is secured adequately to prevent unauthorized access/vandalism? adequate vehicle access for year-round maintenance? site/vault drainage adequate to prevent flooding of valve vault? PRV vault adequately designed to prevent vehicle damage? any site stability issues (if yes, describe) valve elevation (use Google earth, as-builts, or surveyed elevation)? other known problems? Piping, Valves and Instrumentation pipe supports adequate to prevent movement or vibration? coatings adequate to protect piping and valves? pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? valves are suitable for efficient and reliable service? site has flowmeter? site has pressure upstream/downstream pressure gages? estimated service life remaining? other known problems? Additional Data nominal size (e.g. 6-inch)?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no I vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped of Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn PM INFORMATION INFORMATION	5 1 1 1 1 N/A 2 3 5 5 1 5 1 4 1	1	5 2 3 4 5 N/A 6 3 10 15 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no I vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped dc Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the 4" PRV with a 3" Direct action bypass 90 Upstream and 50 Downstream	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn PM INFORMATION INFORMATION	5 1 1 1 1 N/A 2 3 5 5 1 5 1 4 1	1	5 2 3 4 5 N/A 6 3 10 15 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no invalt is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped do Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the 4" PRV with a 3" Direct action bypass 90 Upstream and 50 Downstream	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn PM INFORMATION INFORMATION	5 1 1 1 1 N/A 2 3 5 5 1 5 1 4 1	1	5 2 3 4 5 N/A 6 3 10 15 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped do Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the 4" PRV with a 3" Direct action bypass 90 Upstream and 50 Downstream	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION	5 1 1 1 1 N/A 2 3 5 5 1 5 1 4 1	1	5 2 3 4 5 N/A 6 3 10 15 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no invalt is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped do Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the 4" PRV with a 3" Direct action bypass 90 Upstream and 50 Downstream	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION	5 1 1 1 1 N/A 2 3 5 5 1 5 1 4 1	1	5 2 3 4 5 N/A 6 3 10 15 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no I vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped of Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the 4" PRV with a 3" Direct action bypass 90 Upstream and 50 Downstream Physical Mortality Functionality	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn PM C Fn Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION	5 1 1 1 1 N/A 2 3 5 5 1 5 1 4 1	1	5 2 3 4 5 N/A 6 3 10 15 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no I vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped do Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the 4" PRV with a 3" Direct action bypass 90 Upstream and 50 Downstream Physical Mortality Functionality Reliability	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			
Fn Fn Fn Fn INFORMATION Fn Fn Fn PM C Fn Fn Fn PM C Fn Fn Fn Fn Fn INFORMATION Fn	5 1 1 1 1 N/A 2 3 5 5 1 5 1 4 1	1	5 2 3 4 5 N/A 6 3 10 15 4 25 1 8 3	site is secured adequately to prevent unauthorized access/vandalism?	The facility is in the roadway and can be acc Within roadway so no access issues No draing but the site is always dry with no! Vault is designed to prevent vehicle damage None 6488 from Google Earth Lid is mismarked "sewer" Concrete blocking but nothing is strapped dc Coatings are worn away and flaking. Pipes a The pipes are sized adequately and there is Valves are adequate No flowmeter at this site There are pressure gages on both sides of the Assume 5 years based on AWU Useful Life There are no other known problems with the 4" PRV with a 3" Direct action bypass 90 Upstream and 50 Downstream Physical Mortality Functionality Reliability Financial Efficiency	essed easily as the lid is not locked sissue bown re corroded no excessive noise or headloss noted	CKLIST			



Appendix A2

Tanks

South Tahoe PUD Water System Optimization Plan Summary of Tank Condition and Capacity Evaluation

Failure Mode Scoring Summary - Criticality Scores

Overall Total Factored California Waterworks Tank Piping & **SCADA** Score (Out of Tank Facility Name: Tank Facility ID #: **Standards** Tank Site Structure Valves System 25) = Lookout Tank LOTK 1.36 0.89 0.38 6.70 3.47 0.60 Echo View Tank 3362312 1.15 0.62 0.38 0.44 5.50 2.91 Tata Tank TATATK 2.19 1.75 1.16 0.50 8.14 2.54 **EVTK** 1.00 2.91 0.77 0.38 0.44 5.50 Angora Tank Arrowhead Tank AHTK 1.92 3.22 0.69 0.42 0.48 6.73 Christmas Valley Tank XMVTK 2.28 1.66 1.67 0.53 0.50 6.65 1.00 3.34 1.54 0.38 6.77 Country Club Tank ССТК 0.50 1.48 3.22 0.65 7.49 Flagpole Tank #1 FPTK1 1.65 0.48 Flagpole Tank #2 FPTK2 1.44 3.22 1.72 0.65 0.48 7.52 Forest Mountain Tank FMTK 1.44 2.91 1.53 0.38 0.50 6.76 Gardner Mountain Tank #1 GMTK1 1.44 3.46 1.56 0.38 0.48 7.32 Gardner Mountain Tank #2 GMTK2 1.44 3.46 1.56 0.38 0.48 7.32 1.44 3.27 0.80 0.38 6.40 H. St. Tank HSTTK 0.50 Heavenly Valley Tank HVTK 1.95 3.34 0.79 1.78 8.36 0.50 ITK1 3.46 2.03 0.88 8.48 Iroquois Tank #1 1.61 0.50 Iroquois Tank #2 ITK2 1.61 3.46 1.84 0.79 0.50 8.21 Keller Tank #1 KTK1 1.32 3.94 2.16 0.83 0.50 8.76 Keller Tank #2 KTK2 1.32 3.94 2.24 0.83 0.62 8.95 Stateline Tank #1 1.65 3.46 0.87 0.38 0.50 6.87 STLTK1 STLTK2 Stateline Tank #2 1.65 3.46 0.87 0.38 0.50 6.87 Cold Creek Tank CCKTK 2.47 1.71 1.11 1.06 0.50 6.85

							T.		
			South Tahoe PUD	Location Description:	Access Rd from Lookout point cire	cle, 807 Lookout Point Circle	K/J Project Numb	per: _{1270004*00}	
			Water System Optimization Plan	Tank Facility ID #:	LOTK		Da	ite: 3/12/20	12
							Condition Assessme	ent	
				Tank Facility Name:	Lookout T	Гank	Inspecto	Peter Lavallee and	Phill Torney
				Pressure Zones Served:	Twin Peaks	Zone	Adjacent Pressure Zon	Stateline, Forest Mountain	, and Flagpole Zones
					Fai	ilure Mode Scoring (1 - 5)			
			Notes: 1. Capacity score will be based on hydraulic model	Physical Mortality			of Service	Financial Efficiency	
			Capacity score will be based on Hydraulic model For Reliability to be determined based on CMMS maintenance records	Physical Mortality	Capacity		reliability	Financial Efficiency	
			For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	functionality 1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
			3. For Criticality Weighting Factors to be determined at District Workshop	2: minor defects only	2: greater than 95% of design requirements		2: failure every 16 to 25 yrs	2: financial efficiency is high	
+					3: greater than 90% of design requirements		3: failure every 10 to 25 yrs	3: financial efficiency is average	
					4: greater than 85% of design requirements	·	4: failure every 5 to 10 yrs	4: financial efficiency is low	
				5: virtually unserviceable	5: less than 85% of design requirements		5: failure < 5 yrs	5: asset should be replaced	
				,					
			California Waterworks Standards						
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)	1.00	N/A	1.64	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	7.27	N/A	N/A	2212.22.2010
	CHECK	100%		20%	N/A N/A	80%	N/A N/A	N/A N/A	
	CHECK	100%	, , ,		-				C 02
			Factored Score		N/A	5.82	N/A	N/A	6.82 1.36
			Criticality Score					20%	1.36
			Tank Site						
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	2.50	1.60	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	10.00	5.60	N/A	
	CHECK	100%	, , ,	N/A	N/A	70%	30%	N/A	
			Factored Score	-	N/A	7.00	1.68	N/A	8.68
			Criticality Score					40%	3.47
			Tank Structure						
			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		1.00	1.75	1.00	N/A	Total Factored Score
			Weighted Final Score (1-25)		5.00	6.75	3.43	N/A	
	CHECK	100%			30%	50%	10%	N/A	
			Factored Score		1.50	3.38	0.34	N/A	5.92
			Criticality Score					15%	0.89
			Piping & Valves						
			, , ,		Calculated	Calculated	N/A	N/A	
-			Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	N/A N/A	N/A N/A	Total Factored Score
-					N/A N/A	3.50	N/A N/A	N/A N/A	
	CHECK	100%	Weighted Final Score (1-25)		N/A 30%	60%	N/A N/A	N/A N/A	
	CHECK	100%	, , ,		30% N/A	2.10	N/A N/A	N/A N/A	3.55
			Factored Score		N/A	2.10	N/A	1501	2.55
			Criticality Score					15%	0.38
			SCADA System						
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	1.50	2.00	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	6.00	5.25	N/A	
	CHECK	100%			N/A	60%	30%	N/A	
			Factored Score	0.80	N/A	3.60	1.58	N/A	5.98
			Criticality Score					10%	0.60
								Overall Total Factored Score (Out of 25) =	6.70

		T						
				South Tahoe PUD	Location Description:	Access Rd from Lookout point circle, 807 Lookout Point Circle	K/J Project Number: 127	0004*00
				South failure 7 op	Location Description.	Access na nom cookout point circle, 807 cookout roint circle	ily stroject italiizeri 12/	0004 00
				Water System Optimization Plan	Tank Facility ID #:	LOTK	Date:	3/12/2012
					Tank Facility Name:	Lookout Tank	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
						LOOKOUL TUTIK		receil Edvalled and Timil Torriey
					Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Stateline, Forest Mountain, and Flagpole Zones
		Importance	Weighted			CONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score	Weighting (1-5)	Score	Calif. Waterworks Standards				
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,				
Fn	1	5	5.00	rodents, or other animals)? Tes sample tap(s) provided to measure water quality into, out of and inside tank and protected				
Fn	1	3	3.00	from freezing? Yes tank designed to minimize dead zones (separate inlet/outlet or mixer)? No mixe				
Fn Fn	4 1	5	20.00 5.00	air-gap provided for tank drain and overflow piping? Yes	er and single main in and out			
Fn	1	3	3.00	tank draining removes residual sediments? Yes				
Fn	1	1	1.00	staff gage provided to manually check level? No CDP	H has indicate a dislike for staff gages and t	he District utilizes a DP Cell attached to SCADA		
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes				
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access (e.g., lighting, fencing, & security monitoring)?	dalism has occurred at this site already			
Fn	1	3	3.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes				
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes				
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Tank no				
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes the				
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Inside o	of the tank was 2011 and exterior was 2008	*		
				Tank Site				
Fn	5	4	20.00	adequate vehicle access for year-round maintenance? Access i	in the winter is isolated			
R	1	3	3.00		s site is indicated as other areas Zone X on	the FEMA flood map.		
R	1	5	5.00	is site vulnerable to wildfires? Yes it w		* * * * * * * * * * * * * * * * * * *		
R	1	5	5.00			ne tank and homes just below the tank have had to divert groundwater around th	neir homes	
R	4	3	12.00	is site close to known active seismic faults? 3,189 ft				
R	1	3	2.00	site drainage adequate to prevent flooding of tank foundation, buildings and critical	re are no drainage issues here			
K	1	3	3.00					
Fn			0.00	access/vandalism? JULIE - 0	do we eliminate this question since a duplic	rate under Calif WW Stds Row 61? TIM		
INFORMATION	N/A	N/A	N/A	other known problems? none				
				Total Characters				
				Tank Structure describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed				
INFORMATION	N/A	N/A	N/A	concrete, etc.)	l Steel			
INFORMATION	N/A	N/A	N/A	what is tank volume? 300,000)			
INFORMATION		5	0.00	what is operational storage requirement?				
INFORMATION		5	0.00	what is fire storage requirement?				
INFORMATION		5	0.00	what is emergency storage available? 0				
C	1	5	5.00	overall tank volume to meet District sizing requirements? date tank was constructed? 1998				
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	date and describe work done to renew or upgrade tank and tank facilities? Inside o	of tank was recoated within the last 5 years			
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes	and the second of the second o			
				3ft of f	freeboard which is adequate based on curre	ent standards at time of construction		
Fn R	1	4	4.00	tank freeboard difficulty from operating flight water level to top of tank overnow? adequate?	and the second s			
R PM	2	5	5.00 10.00	tank designed to withstand snow load and not create safety issue? Yes condition of exterior coatings adequate to protect structure? The coa	itings are adequate but on the north side of	the tank there is some discoloration near the ton of the tank		
Fn	1	4	4.00	adequate openings for ingress/egress? Yes thei		and talk there is some discoloration hear the top of the talk		
INFORMATION	N/A	N/A	N/A		nother planned in 2012 for follow-up coatin	g inspection		
				Pacsive	anodes will be installed in 2012			
PM	11	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate?				
R R	1	2	1.00 2.00	space available to add solar panels? Yes known fire or haz-mat conditions that could be mitigated? None				
R	1	3	3.00	tank foundation type? Concret	te Ring with anchor bolts			
R	1	4	4.00	tank foundation condition? Exceller				
R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? Seismic		tion, but has not been reevaluated since		
R	1	4	4.00	concern with tank compliance with seismic requirements? No				
Fn PM	2	4	16.00 8.00	other known problems (e.g. adequate freeboard, stagnant water)? There a estimated service life remaining? 36 year:		n the wintertime. This tank is tied to Echo View Tank.		
FIVI		4	6.00	estimated service me remaining? 36 years	s according to AWO OSEIUI Life			
				Piping & Valves				
PM	1	5	5.00	coatings adequate to protect piping and valves? Coating	s were redone on internal piping in 2011			
						tank inlet or outlet ning size issues? Once we know the answer for all the teachers	ye should assign a score and shange to En. Tite	
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	Lie The Hydraulic allalysis identity any	tank inter of outlet pipe size issues? Office we know the answer for all the tanks w	re anound assign a score and change to Fit - HM	
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement? Yes				
Fn INFORMATION	N/A	4 N/A	4.00 N/A	valves are suitable for efficient and reliable service? Yes other known problems? None				
PM	1	4	4.00	estimated service life remaining? 46 years	s according t AWU Useful Life			
							-	

				Couth Tahan DUD	Assess Pulfores had a secretar tital 2007 had a secretar Code	K/J Project Number: 1	270004*00			
				South Tahoe PUD Location Description:	Access Rd from Lookout point circle, 807 Lookout Point Circle	K/J Project Number. 1	270004*00			
				Water System Optimization Plan Tank Facility ID #:	LOTK	Date:	3/12/2012			
						Condition Assessment				
				Tank Facility Name:	Lookout Tank	Inspectors:	Peter Lavallee and Phill Torney			
						·	,			
				Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Stateline, Forest Mountain, and Flagpole Zones			
				SCADA system						
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is done when a problem is in	dentified					
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operations						
Fn	2	4	8.00	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewed o	n an annual basis					
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio						
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the las	t year					
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure? There is adequate power to the site						
R	1	3	3.00	spare parts/service support readily available? Parts are readily available at the plant and through	the manufacturer					
INFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site						
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.						
				Additional Data Altitude valve is installed on this tank. It is not used on a regular bases but is used when necessary.						
				Legend	<u> </u>		<u> </u>			
				PM Physical Mortality	•					
				Fn Functionality						
				R Reliability						
				FE Financial Efficiency						
				C Capacity						

South Tahoe PUD	Location Description:	Access Rd from Lookout point circle, 807 Lookout Point Circle	K/J Project Number: 1270004*00	
Water System Optimization Plan	Tank Facility ID #:	LOTK	Date:	3/12/2012
	Tank Facility Name:	Lookout Tank	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
	Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Stateline, Forest Mountain, and Flagpole Zones
Photo Evidence for PM. Fn. R. FE	s the downslope portion of the tank constructed	on fill? Yes Does tank overflow drain adequately to protect tank foundation?	res Any bacterilogical exceedance at this tank? Will Verify	
	s the downstope portion of the talk constructed	PHOTOS	The second concedured at this talk.	
ZOLIVOS KARTOZ MARM	2011/05/24 (1//05//24 02-49 PM	2011/05/24 02:50 PM

			Sc	outh Tahoe PUD	Location Description	Top of Echo View Estates Landlocked by adjacen	nt property owner. 1045 Lamor Court	K/J Project Number:	1270004*00	
			w	Vater System Optimization Plan	Tank Facility ID #	3362312		Date:	2/23/201	2
				order System Optimization Flan		3302312		Condition Assessment	2,23,201	
					Tank Facility Name	Echo View Tai	nk	Inspectors:	Peter Lavallee and	Phill Torney
					Pressure Zones Served	Twin Peaks Zo	one	Adjacent Pressure Zones:	Forest Mountain, Angora Highla	nds, and Flagpole Zones
						Pail	us BAsida Cassima (A. F.)			
				otes:			re Mode Scoring (1 - 5)			
				Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
				For Reliability to be determined based on CMMS maintenance records	A Property Control	In the second second	functionality	reliability	4 1	
			3.			meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements	1: failure every > 25 years 2: failure every 16 to 25 yrs	best available technology financial efficiency is high	
					3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 10 to 25 yrs	3: financial efficiency is average	
						4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
					5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements		5: asset should be replaced	
					5. Virtually unserviceable	J. 1633 CHAIT 03/6 OF GESIGH FEQUITERIES	5. Pails an requirements	J. Tallule > J yls	5. asset siloulu be replaceu	
				California Waterworks Standards						
				Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
				Unweighted Failure Mode Score (1-5)	1.00	N/A	1.36	N/A	N/A	Total Factored Score
				•	5.00	N/A	5.91	N/A	N/A N/A	
				Weighted Final Score (1-25)		•		•	·	
	CHEC	JK .	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
				Factored Score	1.00	N/A	4.73	N/A	N/A	5.73
				Criticality Score					20%	1.15
				Tank Site						
				Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
				Unweighted Failure Mode Score (1-5)	N/A	N/A	2.00	1.60	N/A	Total Factored Score
				Weighted Final Score (1-25)	N/A	N/A	8.00	5.60	N/A	
	CHEC	CK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
				Factored Score	N/A	N/A	5.60	1.68	N/A	7.28
				Criticality Score		-			40%	2.91
				Tank Structure						
				Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
				Unweighted Failure Mode Score (1-5)	1.00	1.00	1.00	1.00	N/A	Total Factored Score
				Weighted Final Score (1-3)	4.00	5.00	3.75	3.43	N/A N/A	
	CHEC	Y	100%		10%	30%	50%	10%	N/A N/A	
	CHECI	Λ	100%	Criticality Weighting Factor (0 - 100%) Factored Score		1.50	1.88	0.34	N/A N/A	4.12
			-		0.40	1.50	1.88	0.34	·	0.62
				Criticality Score					15%	U.62
				Piping & Valves						
				Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	N/A	N/A	
				Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	N/A	N/A	Total Factored Score
				Weighted Final Score (1-25)	4.50	N/A	3.50	N/A	N/A	
	CHEC	CK	100%	Criticality Weighting Factor (0 - 100%)	10%	30%	60%	N/A	N/A	
				Factored Score	0.45	N/A	2.10	N/A	N/A	2.55
				Criticality Score					15%	0.38
				SCADA System						
				Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
				Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	2.00	N/A	Total Factored Score
				Weighted Final Score (1-5)	4.00	N/A N/A	4.00	5.25	N/A N/A	
	CHEC	· · ·	100%	Criticality Weighting Factor (0 - 100%)		N/A N/A	60%	30%	N/A N/A	
	CHECI	Λ.	100%							4 20
ı	1			Factored Score		N/A	2.40	1.58	N/A	4.38
				eart to e						
				Criticality Score					10% verall Total Factored Score (Out of 25) =	0.44 5.50

				South Tahoe PUD Location Description:	Top of Echo View Estates Landlocked by adjacent property owner. 1045 Lamor Court	K/J Project Number: 1270004*00	
				South Tailor FOD Location Description.	Top of Echo view Estates Landiocked by adjacent property owner. 1045 Landio Court	177110Jeet Hamber: 1270004*00)
				Water System Optimization Plan Tank Facility ID #:	3362312	Date:	2/23/2012
						Condition Assessment	
				Tank Facility Name:	Echo View Tank	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Forest Mountain, Angora Highlands, and Flagpole Zones
		Importance			CONDITION ASSESSMENT CHECKLIST		
ailure Mode Type	Score	Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards			
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,			
Fn	1	5	5.00	rodents, or other animals)?			

		Importance		CONDITION ACCESSATINT CUTTOWN IST
Failure Mode Type	Score		Weighted Score	CONDITION ASSESSMENT CHECKLIST
				Calif. Waterworks Standards
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, local
Fn	1	5	5.00	rodents, or other animals)?
				sample tap(s) provided to measure water quality into, out of and inside tank and protected
Fn	1	3	3.00	from freezing? Yes
Fn	1	5	5.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? Mixing System
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes
Fn	1	3	3.00	tank draining removes residual sediments? Ves kick plate at floor with valve to drain tank to floor
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes
_	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access (e.g., lighting, fencing, & security monitoring)? Adjacent to private home and is landlocked. No site fencing or lighting in place at the site.
Fn		3	25.00	
Fn Fn	1 1	5	3.00 5.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes there is one roof hatch and two manways which provide adequate natural light when opened on the interior of the tank
INFORMATION	N/A	N/A	5.00 N/A	adequate isolation valves and bypass to take tank offline and maintain water service? There are adequate isolation valves tank used for CT compliance? yes - bypass pipes blind flanged? Tank not used for CT compliance
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes the tank was constructed to prevent external water from entering the tank
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Coatings are new and were inspected in 2011 during the installation of the passive cathodic protection system
1101		3	3.00	consists of interior country successful country and were inspected in 2011 on ing the installation of the passive carbonic protection system
				Took Site
F-	4	4	16.00	Tank Site
Fn			16.00	adequate vehicle access for year-round maintenance? This tank can be accessed through a private driveway year round but is dependant on the homeowner clearing the driveway
R	1	3	3.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone X on the FEMA flood map.
K	1		5.00	is site vulnerable to wildfires? Yes
R R	<u>1</u> 4	5	5.00	any unstable site conditions (if yes, describe)? None known
K	4	3	12.00	is site close to known active seismic faults? Closest Fault line 4,610 feet from tank
D	1	3	2.00	site drainage adequate to prevent flooding of tank foundation, buildings and critical equipment?
K	1	3	3.00	
Fn			0.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? No site fencing or lighting in place at the site
INFORMATION	N/A	N/A	0.00 N/A	other known problems? No other known site problems
INFORMATION	N/A	IN/A	N/A	Other known problems: NO Other known site problems
				Tank Structure
INFORMATION	N/A	N/A	N/A	describe tank structure type (e.g., welded steel, reinforced concrete, prestressed
INFORMATION	N/A N/A	N/A	N/A N/A	concrete, etc.) welded steel with internal and external coatings what is tank volume? 203,000
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?
INFORMATION	N/A	N/A	N/A	what is emergency storage available?
C	1	5	5.00	overall tank volume to meet District sizing requirements?
INFORMATION	N/A	N/A	N/A	date tank was constructed? 2010
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? Constructed new in 2010, Cathodic protection installed in 2011
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes, access to most of tank site is by foot due to 50 foot by 50 foot parcel size
			0.00	
Fn	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? Tank freeboard is 3 feet which was designed for sloshing due to seismic activity at time of construction and is therefore adequate
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Yes
PM	1	5	5.00	condition of exterior coatings adequate to protect structure? Yes coating new in 2010
Fn	1	4	4.00	adequate openings for ingress/egress? Yes
INFORMATION	N/A	N/A	N/A	date of last interior inspection? Fall 2011
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate? Passive Cathodic installed 2011
R	1	1	1.00	space available to add solar panels? Unistruts were installed on the tank for this purpose
R	1	2	2.00	known fire or haz-mat conditions that could be mitigated? No known hazmat or fire conditions
R	1	3	3.00	tank foundation type? Ring concrete Foundation with anchor bolts
R	1	4	4.00	tank foundation condition? New
R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? Yes when designed in 2009/2010
R	1	4	4.00	concern with tank compliance with seismic requirements? No
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water)? No other known site problems with the tank structure
PM	1	4	4.00	estimated service life remaining? 48 years based on AWU Useful Life
		•		

		T			T		
				South Tahoe PUD Location Description:	Top of Echo View Estates Landlocked by adjacent property owner. 1045 Lamor Cα	urt K/J Project Number: 12700	04*00
				Water System Optimization Plan Tank Facility ID #:	3362312	Date:	2/23/2012
						Condition Assessment	
				Tank Facility Name:	Echo View Tank	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Forest Mountain, Angora Highlands, and Flagpole Zones
				Piping & Valves			
PM	1	5	5.00	coatings adequate to protect piping and valves? Yes coatings installed in 2010			
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	tely		
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement? Yes			
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Valves are new in 2010			
INFORMATION	N/A	N/A	N/A	other known problems? There are no other known piping and valving	issues with this tank		
PM	1	4	4.00	estimated service life remaining? Steel interior Piping has 58 years and valving	has 48 years based on AWU Useful life		
				SCADA system			
R	5	2	10.00	frequency of level transmitter calibration? Calibrated when a problem has been identifie	ed		
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes and monitored by District operations			
Fn	1	4	4.00	alarm log maintained and reviewed annually? Alarm log is maintained but it is not reviewed	d annually		
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio			
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? No communication failures within the last ye	ar		
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?			
R	1	3	3.00	spare parts/service support readily available? Yes and monitored by District operations			
INFORMATION	N/A	N/A	N/A	other known problems? No other known problems with the SCADA			
PM	1	4	4.00	estimated service life remaining? 10 years based on AWU Useful Life			
				Additional Data The tank had a one year follow up inspection	and while down the passive cathodic protection system was installed. This occurred	n the fall of 2011.	
				Legend			<u> </u>
				PM Physical Mortality			
				Fn Functionality			
				R Reliability			
				FE Financial Efficiency			
				C Capacity			

Sc	outh Tahoe PUD	Location Description:	Top of Echo View Estates Landlocked by adjacent property owner. 1045 Lamor Court	K/J Project Number: 1270004*0	00
w	ater System Optimization Plan	Tank Facility ID #:	3362312	Date:	2/23/2012
		Tank Facility Name:	Echo View Tank	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Twin Peaks Zone	Adjacent Pressure Zones:	Forest Mountain, Angora Highlands, and Flagpole Zones
		a harada wa a da a a a a a a a a a a a a a a		heaterille size a consequence of this sect O William (6)	
	Photo Evidence for PM, Fn, R, FE	s the downslope portion of the tank constructe	PHOTOS	bacterilogical exceedance at this tank? Will Verily	
	177				
	# 11				
			- Mr.		
	# 10				
	ac /				
		2011/0	05/06 11:15 AM		
		2011/0	05/06 11:15 AM		
		2011/0	05/06 11:15 AW		
		2011/0	05/06 11:15 AIX		

		9	South Tahoe PUD	Location Description	On Tata Lan	e	K/J Project Number:	1270004*00	
		,	Water System Optimization Plan	Tank Facility ID #	TATATK		Date:	2/23/2	2012
			Tatel System Optimization Figure		TATALK.		Condition Assessment	2,23,2	
				Tank Facility Name	: Tata Tank		Inspectors:	Peter Lavallee an	nd Phill Torney
				Pressure Zones Served	: Stateline Zone or Gardner Mountain 2	Zono dononding on Valving	Adjacent Pressure Zones:	Stateline	o Zono
				Fiessure Zolles Serveu	Stateline Zone of Gardner Mountain 2	zone depending on valving	Aujucite ressure zones.	Stateme	: Zone
		ı	Notes:		Failu	re Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Level	of Service	Financial Efficiency	
		2	2. For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability	_	
		3	3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
				2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
				3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
				4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
				5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
			California Waterworks Standards						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)	5.00	N/A	2.18	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)	25.00	N/A	9.64	N/A	N/A	
CHE	ECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
			Factored Score	5.00	N/A	7.71	N/A	N/A	12.71
			Criticality Score					20%	2.54
			Tank Site						
			Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)	N/A	N/A	0.50	3.20	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	2.00	13.60	N/A	
CHL	ECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A N/A	70%	30%	N/A N/A	
Che	ECK	100%	Factored Score	,	N/A N/A	1.40	4.08	N/A N/A	5.48
			Criticality Score		N/A	1.40	4.08	40%	2.19
								40%	2.13
			Tank Structure						
			Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		1.00	3.75	4.43	N/A	Total Factored Score
			Weighted Final Score (1-25)		5.00	13.75	14.29	N/A	
CHE	ECK	100%	Criticality Weighting Factor (0 - 100%)	10%	30%	50%	10%	N/A	
			Factored Score		1.50	6.88	1.43	N/A	11.64
			Criticality Score					15%	1.75
			Piping & Valves						
			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)	4.50	N/A	3.00	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)	20.50	N/A	9.50	N/A	N/A	
CHE	ECK	100%	Criticality Weighting Factor (0 - 100%)	10%	30%	60%	N/A	N/A	
			Factored Score	2.05	N/A	5.70	N/A	N/A	7.75
			Criticality Score					15%	1.16
			SCADA System						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	1.00	2.25	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	4.00	6.00	N/A	
CHE	ECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	30%	N/A	
CHE		100/6	Factored Score		N/A	2.40	1.80	N/A	5.00
		-	Criticality Score		11/2	2.40	1.00	10%	0.50
	ı		Criticality Score					10/0	0.50

		ı					
				South Tahoe PUD Location Description:	On Tata Lane	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #:	ТАТАТК	Date:	2/23/2012
				Tank Facility Name:	Tata Tank	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
						Adjacent Pressure Zones:	·
				Pressure Zones Served:	Stateline Zone or Gardner Mountain Zone depending on Valving	Aujacent Pressure Zones.	Stateline Zone
lure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards			
Fn	1	5	5.00	tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, rodents, or other animals)? Yes, there have been no issues with contamination (e.g., rainwater, runoff, insects, birds, rodents, or other animals)?	tion from outside sources at this tank		
			3.00	sample tap(s) provided to measure water quality into, out of and inside tank and protected from fractional yes, these taps are provided with easy access o	on the east side of the tank		
Fn	1	3	3.00	nom neezing:			
Fn Fn	5 4	5	25.00 20.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? No, there is a single pipe into the tank which is air-gap provided for tank drain and overflow piping? This tank has a questionable air gap.	also the discharge pipe from the tank		
Fn	3	3	9.00	tank draining removes residual sediments? The tank drain is not adequate and does not rei	move residual sediment from the bottom of the tank		
Fn	1	1	1.00	staff gage provided to manually check level? No District tank has a staff gauge. CDPH has ind		tanks	
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? There is a DP Cell on the tank which is connected.			
Fn	5	5	25.00 3.00	adequate security measures and monitoring to prevent unauthorized access? No, This facility has many problems with unauthorized access? No, This facility has many problems with unauthorized access? There is not adequate lighting to access to interior for inspections cleaning and repair? There is not adequate lighting within the traph.	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
Fn Fn	1	3 5	5.00	adequate lighting & access to interior for inspections, cleaning and repair? There is not adequate lighting within the tank. adequate isolation valves and bypass to take tank offline and maintain water service? The tank can be isolated easily and maintain water service?		ot provide adequate lighting.	
NFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? This tank is not used for CT compliance	30.700.		
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? The tank does prevent entry of exterior flows in			
PM	5	5	25.00	condition of interior coatings adequate to protect structure? Condition of the interior of the tank has been in	dentified to be faulty and in need of recoating		
				Tank Site			
Fn	1 1	3	4.00 3.00	adequate vehicle access for year-round maintenance? The site is accessible year round with no issues is site within 100-yr flood plain? No. This site is indicated as other areas Zone X			
R	5	5	25.00	is site vulnerable to wildfires? Yes there are trees and vacant lots near by but	•		
R	5	5	25.00	any unstable site conditions (if yes, describe)? There are trees touching the tank and the lot him.			
R	4	3	12.00	is site close to known active seismic faults? 1,984 ft. north of a fault line			
		_		site drainage adequate to prevent flooding of tank foundation, buildings and critical There are no drainage issues on this site			
R	1	3	3.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized	the tank		
Fn INFORMATION	N/A	N/A	0.00 N/A	access/vandalism? W, the refieling does not prefer winding in other known problems? No other known site problems			
INFORMATION	N/A	IN/A	N/A	Other known problems: No other known site problems			
				Tank Structure			
NFORMATION	N/A	NI/A	NI/A	describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed bolted with internal and external coatings			
NFORMATION	N/A	N/A N/A	N/A N/A	what is tank volume? 395,328			
NFORMATION	N/A	N/A	N/A	what is operational storage requirement?			
NFORMATION	N/A	N/A	N/A	what is fire storage requirement?			
NFORMATION	N/A	N/A	N/A	what is emergency storage available?			
INFORMATION	N/A	5 N/A	5.00 N/A	overall tank volume to meet District sizing requirements? date tank was constructed? 1968			
NFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? No work has been completed on this tank recei	ntly		
Fn	5	3	15.00	adequate perimeter clearance to facilitate routine O&M? No, there are trees within five feet of the tank			
Fn	4	4	16.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? There is 0.83 feet from the tank overflow to the	e top of the tank. This may not be adequate freeboard in a seismic event		
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Met construction standards at the time of cons			
PM	4	5	20.00	condition of exterior coatings adequate to protect structure? No the tank coating is flaking in places and has			
Fn NFORMATION	N/A	4 N/A	4.00 N/A	adequate openings for ingress/egress? The roof hatch and manway are adequate for a date of last interior inspection? 2010	iccessing the tank but a second manway should be necessary		
	5	3	15.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate? NO			
PM	5	1	5.00	space available to add solar panels? There are no unistruts installed for solar panels	at this tank. Tank life expectancy not recommend adding solar panels unless tank	replaced.	
PM R	5	2	10.00	known fire or haz-mat conditions that could be mitigated? The proximity to trees on the parcel		·	
R R	3	_	15.00	tank foundation type? Metal Ring Foundation and no bolted connection			
R R R	5	3					
R R	5 5	4	20.00	tank foundation condition? The Tank Foundation is stable but would not m	eet current seismic standards on this bolted steel tank		
R R R R	5 5 5	4 5	25.00	has seismic stability been evaluated by a qualified engineer? No	eet current seismic standards on this bolted steel tank		
R R R	5 5	4					

				South Tahoe PUD Location Description:	0.711	K/J Project Number: 1270004*00	
				South Tance POD Location Description:	On Tata Lane	K/3 FTOJECT Namber: 1270004*00	
				To I For the ID II		D. L.	
				Water System Optimization Plan Tank Facility ID #:	TATATK	Date:	2/23/2012
						Condition Assessment	
				Tank Facility Name:	Tata Tank	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Stateline Zone or Gardner Mountain Zone depending on Valving	Adjacent Pressure Zones:	Stateline Zone
				Piping & Valves			
PM	5	5	25.00	coatings adequate to protect piping and valves? Cannot see internal piping but rest of tank has co	eating issues and assume internal nining is in similar condition		
INFORMATION	3	3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?			
Fn	5	3	15.00	tank-piping connections designed to accommodate settlement or movement? There are no records of the connection type at ti	his tank		
Fn	1	4	4.00	valves are suitable for efficient and reliable service? The valves are reliable	ans conc.		
INFORMATION	N/A	N/A	N/A	other known problems? There are no known problems with the tank pipi	ing and valves		
PM	4	4	16.00	estimated service life remaining? 16 years for steel piping and 6 years based on AV	WU Useful Life		
				SCADA system			
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is not done until a proble	em is identified		
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operatio			
Fn	1	4	4.00	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewe	d on an annual basis		
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio			
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the	last year		
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?			
R	2	3	6.00	spare parts/service support readily available? Parts are readily available at the plant and throu	igh the manufacturer		
INFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site			
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.			
					nly frequently enough to maintain good water quality. District staff has discussed the	he necessity for this tank as it is not currently being used for the	ourpose it was originally designed which was to take v
				Additional Data directly from the Tata wells for treatment and di	ISCHIDUCION.		
				Legend			
				PM Physical Mortality			
				Fn Functionality			
				R Reliability			
				FE Financial Efficiency			1
				C Capacity			

	South Tahoe PUD Location Description:	On Tata Lane	K/J Project Number: 1270004*00
	Water System Optimization Plan Tank Facility ID #:	TATATK	Date: 2/23/2012 Condition Assessment
	Tank Facility Name:	Tata Tank	Inspectors: Peter Lavallee and Phill Torney
	Pressure Zones Served:	Stateline Zone or Gardner Mountain Zone depending on Valving	Adjacent Pressure Zones: Stateline Zone
	Photo Evidence for PM, Fn, R, FE Is the downslope portion of the tank construct	ed on fill? Yes Does tank overflow drain adequately to protect tank foundation? Yes Any	bacterilogical exceedance at this tank? Will Verify
		PHOTOS	
			で意識され
	2011/05/003 1/2×40 PM	2011/05/06 12:40 PM	2011/05/06 12:40
			201100000000000000000000000000000000000

			South Tahoe PUD	Location Description	On Top of Angora Ridge access	s via Aberdeen Circle	K/J Project Number:	1270004*00	
			Water System Optimization Plan	Tank Facility ID #	#: EVTK		Date:	3/12/20	012
							Condition Assessment		
				Tank Facility Name	Angora Tan	nk	Inspectors:	Peter Lavallee and	d Phill Torney
				Pressure Zones Served	I: Angora Highla	ands	Adjacent Pressure Zones:	Forest Mo	untain
			Notes:		Failu	re Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model	Physical Mortality	Capacity		l of Service	Financial Efficiency	
			2. For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
			3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
				2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
		-		3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
				4: significant deterioration 5: virtually unserviceable	4: greater than 85% of design requirements 5: less than 85% of design requirements	4: fails some requirements 5: Fails all requirements		4: financial efficiency is low 5: asset should be replaced	
				3. VII LUANY UNSERVICEADIE	3. less than 65% of design requirements	J. rans an requirements	3. Tanute < 3 yrs	3. asset siloulu pe replaceu	
			California Waterworks Standards						
				Calculated	NI/A	Calculated	N1/A	N/A	
			Is Failure Mode Score Calculated or Assigned?		N/A N/A	Calculated	N/A N/A	N/A N/A	Total Factored Score
			Unweighted Failure Mode Score (1-5)	1.00	,	1.18	N/A N/A	·	Total Factored Scott
	OUEOV.	1000/	Weighted Final Score (1-25)	5.00	N/A N/A	5.00	·	N/A	
	CHECK	100%	1 0 0 0 1 1			80%	N/A	N/A	T.00
			Factored Score		N/A	4.00	N/A	N/A	5.00
			Criticality Score					20%	1.00
			Tank Site	<u> </u>					
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)	N/A	N/A	2.00	1.60	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	8.00	5.60	N/A	
	CHECK	100%	, , ,	N/A	N/A	70%	30%	N/A	
			Factored Score		N/A	5.60	1.68	N/A	7.28
			Criticality Score					40%	2.91
			Tank Structure						
			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		1.00	1.50	1.00	N/A	Total Factored Score
			Weighted Final Score (1-25)		5.00	5.75	3.43	N/A	
	CHECK	100%			30%	50%	10%	N/A	
			Factored Score		1.50	2.88	0.34	N/A	5.12
			Criticality Score					15%	0.77
			Piping & Valves						
l			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)	4.50	N/A	3.50	N/A	N/A	
		100%		10%	30%	60%	N/A	N/A	
	CHECK	100%	Factored Score		N/A	2.10	N/A	N/A	2.55
	CHECK	100%						15%	0.38
	CHECK	100%	Criticality Score						
	CHECK	100%	,						
	CHECK	100%	SCADA System		N/Δ	Calculated	Calculated	N/Δ	
	CHECK	100%	SCADA System Is Failure Mode Score Calculated or Assigned?	Calculated	N/A N/Δ	Calculated	Calculated	N/A N/A	Total Factored Scor
	CHECK	100%	SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 1.00	N/A	1.00	2.00	N/A	Total Factored Scor
			SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	Calculated 1.00 4.00	N/A N/A	1.00 4.00	2.00 5.25	N/A N/A	Total Factored Scor
	CHECK	100%	SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 1.00 4.00 10%	N/A N/A N/A	1.00 4.00 60%	2.00 5.25 30%	N/A N/A N/A	
			SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	Calculated 1.00 4.00 10% 0.40	N/A N/A	1.00 4.00	2.00 5.25	N/A N/A	Total Factored Score 4.38 0.44

Location Description: On Top of Angora Ridge access via Aberdeen Circle K/J Project Number: 1270004*00 Mater System Optimization Plan Tank Facility ID #: EVTK Date: 3/12/2012 Tank Facility Name: Angora Tank Angora Tank Angora Highlands Angora Highlands Angora Highlands Angora Highlands Angora Highlands Adjacent Pressure Zones: Forest Mountain Forest Mountain CONDITION ASSESSMENT CHECKLIST CONDITION ASSESSMENT CHECKLIST									
Tank Facility Name: Angora Tank Angora Tank Angora Tank Angora Highlands Adjacent Pressure Zones: Peter Lavallee and Phill Torney Pressure Zones Served: Angora Highlands Adjacent Pressure Zones: Forest Mountain CONDITION ASSESSMENT CHECKLIST CONDITION ASSESSMENT CHECKLIST CONDITION ASSESSMENT CHECKLIST					South Tahoe PUD	Location Description:	On Top of Angora Ridge access via Aberdeen Circle	K/J Project Number: 1270004*00	
Tank Facility Name: Angora Tank Angora Tank Angora Tank Angora Tank Angora Tank Angora Tank Angora Tank Angora Highlands Ango					Water System Optimization Plan	Tank Facility ID #:	EVTK	Date:	3/12/2012
Pressure Zones Served: Angora Highlands Adjacent Pressure Zones: Forest Mountain Importance Weighting (1-5) Weighted Score Calif. Waterworks Standards								Condition Assessment	
Importance CONDITION ASSESSMENT CHECKLIST Score Weighting (1-5) Weighted Score Calif. Waterworks Standards						Tank Facility Name:	Angora Tank	Inspectors:	Peter Lavallee and Phill Torney
tillure Mode Type Score Weighting (1-5) Weighted Score Condition A33133MENT CHECKEST Calif. Waterworks Standards						Pressure Zones Served:	Angora Highlands	Adjacent Pressure Zones:	Forest Mountain
ilure Mode Type Score Weighting (1-5) Weighted Score CONDITION ASSESSMENT CHECKEST Calif. Waterworks Standards									
	ilure Mode Type	Score	•	Weighted Score			CONDITION ASSESSMENT CHECKLIST		
tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,					Calif. Waterworks Standards				
Fig. 1 5 5.00 rodents or other animals?					tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,	Yes			

		Importance		CONDITION ASSESSMENT CHECKLIST
Failure Mode Type	Score	Weighting (1-5) Weighted Sc	core	CONDITION ASSESSMENT CHECKEST
			Calif. Waterworks Standards	
			tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds	
Fn	1	5 5.00	rodents, or other animals)	res
			sample tap(s) provided to measure water quality into, out of and inside tank and protected	
Fn	1	3 3.00	from freezing	
Fn	1	5 5.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)	
Fn	1	5 5.00	air-gap provided for tank drain and overflow piping	
Fn	1	3 3.00		Yes kick plate at floor with valve to drain tank to floor
Fn Fn	1	1 1.00 5 5.00	tank level transmitter provides real-time level feedback to SCADA master	No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA
Fn	3	5 15.00		The site is accessed through a forest service gate and the entire parcel is fenced. No barbed wire and neighbors have indicated unauthorized access has occurred.
Fn	1	3 3.00		Yes there is one roof hatch and two manways which provide adequate natural light when opened on the interior of the tank
Fn	1	5 5.00	adequate isolation valves and bypass to take tank offline and maintain water service	
INFORMATION	N/A	N/A N/A	tank used for CT compliance? yes - bypass pipes blind flanged	
Fn	1	5 5.00		Yes the tank was constructed to prevent external water from entering the tank
PM	1	5 5.00	condition of interior coatings adequate to protect structure?	Coatings are new and were inspected in 2011 during the installation of the passive cathodic protection system
			Tank Site	
Fn	4	4 16.00	adequate vehicle access for year-round maintenance	The site is inaccessible during periods of heavy snowfall and District crews do not generally access the site from October to May. The TRPA prohibits plowing the dirt access road to remove snow.
R	1	3 3.00		No. This site is indicated as other areas Zone X on the FEMA flood map.
R	1	5 5.00		Yes, the tank is on the edge of the Angora Burn Area
R	1	5 5.00	any unstable site conditions (if yes, describe)?	
R	4	3 12.00	is site close to known active seismic faults	
	_		site drainage adequate to prevent flooding of tank foundation, buildings and critica	Yes, the site has adequate drainage.
R	1	3 3.00		
Fn		0.00	access (vandalism)	No, the site is completely fenced but neighbors have indicated unauthorized access to the site
INFORMATION	N/A	N/A N/A	other known problems	None the tank is new in 2010
INTONVATION	N/A	11/4	odie mom prosens	Note the talk is new in 2010
			Tank Structure	
INFORMATION	N/A	N/A N/A	concrete, etc.	Welded Steel Tank with coatings inside and out
INFORMATION	N/A	N/A N/A	what is tank volume	
INFORMATION	N/A	N/A N/A	what is operational storage requirement	
INFORMATION	N/A	N/A N/A	what is fire storage requirement	
INFORMATION	N/A	N/A N/A	what is emergency storage available	
С	1	5 5.00	overall tank volume to meet District sizing requirements	
INFORMATION	N/A	N/A N/A	date tank was constructed	
INFORMATION	N/A	N/A N/A	date and describe work done to renew or upgrade tank and tank facilities?	
Fn	1	3 3.00	adequate perimeter clearance to facilitate routine O&M	Yes
_			tank freeboard dimension from operating high water level to top of tank overflow? adequate	2.1 feet of freeboard, less than 3 ft. standard at time of construction.
Fn	3	4 12.00	tank freeboard dimension from operating high water level to top of tank overflow? adequates	
R PM	1 1	5 5.00 5 5.00	tank designed to withstand snow load and not create safety issue	
Fin	1	4 4.00	condition of exterior coatings adequate to protect structure: adequate openings for ingress/egress?	
INFORMATION	N/A	N/A N/A	date of last interior inspection	
5	,115	.,,,	- 	
PM	1	3 3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate	passive cathodic protection which is new and maintained
R	1	1 1.00	space available to add solar panels	Unistruts were added to the roof for this purpose
R	1	2 2.00	known fire or haz-mat conditions that could be mitigated	
R	1	3 3.00		Concrete ring foundation with anchor bolts
R	1	4 4.00		Excellent installed in 2009
R	1	5 5.00	has seismic stability been evaluated by a qualified engineer	
R	1	4 4.00	concern with tank compliance with seismic requirements	
Fn	1	4 4.00	other known problems (e.g. adequate freeboard, stagnant water)	
PM	1	4 4.00	estimated service life remaining.	48 years based on AWU Useful Life

				South Tahoe PUD Location Description:	On Top of Angora Ridge access via Aberdeen Circle	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #:	EVTK	Date:	3/12/2012
				The system opening the system of the system		Condition Assessment	3, 12, 2312
				Tank Facility Name:	Angora Tank	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Angora Highlands	Adjacent Pressure Zones:	Forest Mountain
				Piping & Valves			
PM	1	5	5.00	coatings adequate to protect piping and valves? Yes coatings installed in 2010			
				pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? Everything is sized adequately and appropriately			
INFORMATION Fn	1	3	0.00 3.00	pipes adequately sized to prevent excessive noise (e.g. ratting) or neadloss (velocity > 10 Tps)? tank-piping connections designed to accommodate settlement or movement? Yes			
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Valves are new in 2010			
INFORMATION	N/A	N/A	N/A	other known problems? There are no other known piping and valving issue	es with this tank		
PM	1	4	4.00	estimated service life remaining? Steel interior Piping has 58 years and valving has 4			
				SCADA system			
R	5	2	10.00	frequency of level transmitter calibration? Calibrated when a problem has been identified			
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes and monitored by District operations			
Fn	1	4	4.00	alarm log maintained and reviewed annually? Alarm log is maintained but it is not reviewed annu	ually		
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio			
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? No communication failures within the last year			
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?			
R	1	3	3.00	spare parts/service support readily available? Yes and monitored by District operations			
INFORMATION	N/A	N/A	N/A	other known problems? No other known problems with the SCADA			
PM	1	4	4.00	estimated service life remaining? 10 years based on AWU Useful Life			
				Additional Data			
					while down the passive cathodic protection system was installed. This occurr	rad in the fall of 2011	
					while down the passive cathodic protection system was installed. This occur	eu III (IIE Iaii OI 2011.	
				Legend Physical Mortality			
				Fn Functionality			
				R Reliability			
		 		FE Financial Efficiency			
				C Capacity			
				- Coperty			

	South Tahoe PUD Location Desc	iption: On Top of Angora Ridge access via Aberdeen Circle	K/J Project Number: 1270004*00
	Water System Optimization Plan Tank Facility	ty ID #:	Date: 3/12/2012
	Tank Facility		Condition Assessment Inspectors: Peter Lavallee and Phill Torney
	Pressure Zones	Served: Angora Highlands	Adjacent Pressure Zones: Forest Mountain
	Photo Evidence for PM, Fn, R, FE Is the downslope portion of the tar	k constructed on fill? Yes Does tank overflow drain adequately to protect tank foundation?	? Yes Any bacterilogical exceedance at this tank? Will Verify
		PHOTOS	
		- Carolina Carolina	
	200	11/05/24 01:45 PM	
	ì		

			South Tahoe PUD		Location Description	On: Through Swing gate off of	of Pinewood Dr	K/J Project Number:	1270004*00	
			Water System Optimization Plan		Tank Facility ID	#: AHTK		Date:	3/15/2	2012
			·		-			Condition Assessment		
					Tank Facility Nam	1e: Arrowhead T	ank	Inspectors:	Peter Lavallee and Je	eremy Rutherdale
					Pressure Zones Serve	ed: Arrowhead Z	one	Adjacent Pressure Zones:	Iroquois and Christi	mas Valley Zone
									_	
			Notes:			Failu	re Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model		Physical Mortality	Capacity		of Service	Financial Efficiency	
			2. For Reliabilty to be determined based on CMMS maintenance records				functionality	reliability		
			3. For Criticality Weighting Factors to be determined at District Workshop		new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
					minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
					moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
					significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
				5:	virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
+			California Waterwork	cs Standards						
			Is Failure Mode Score Calculated	d or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
			Unweighted Failure Mo		3.00	N/A	1.91	N/A	N/A	Total Factored Scor
			Weighted Fina		15.00	N/A	8.27	N/A	N/A	
	CHEC	CK	100% Criticality Weighting Fac		20%	N/A	80%	N/A	N/A	
	CHEC	CK	1 0 0	actored Score	3.00	N/A	6.62	N/A	N/A	9.62
				riticality Score	3.00	N/A	0.02	NA	20%	1.92
									20/0	1.52
				Tank Site						
			Is Failure Mode Score Calculated		N/A	N/A	Calculated	Calculated	N/A	Tatal Fastanad Coon
			Unweighted Failure Mo		N/A	N/A	2.00	2.20	N/A	Total Factored Scor
				al Score (1-25)	N/A	N/A	8.00	8.20	N/A	
	CHEC	CK	100% Criticality Weighting Fac		N/A	N/A	70%	30%	N/A	
				actored Score	N/A	N/A	5.60	2.46	N/A	8.06
			C	riticality Score					40%	3.22
				nk Structure						
			Is Failure Mode Score Calculated	d or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
			Unweighted Failure Mo		1.67	1.00	1.00	2.00	N/A	Total Factored Scor
				al Score (1-25)	7.33	5.00	3.75	4.86	N/A	
	CHEC	СК	100% Criticality Weighting Fac		10%	30%	50%	10%	N/A	
				actored Score	0.73	1.50	1.88	0.49	N/A	4.59
				riticality Score					15%	0.69
				ing & Valves						
			Is Failure Mode Score Calculated		Calculated	Calculated	Calculated	N/A	N/A	
			Unweighted Failure Mo		1.50	N/A	1.00	N/A	N/A	Total Factored Scor
			Weighted Fina	. ,	7.00	N/A N/A	3.50	N/A	N/A	
	CHEC	CK	100% Criticality Weighting Fac		10%	30%	60%	N/A	N/A	
	CHEC	CK		actored Score	0.70	N/A	2.10	N/A	N/A N/A	2.80
				riticality Score	5.70	IV/M	2.10	IN/A	15%	0.42
									13/0	U.42
				ADA System				1		
			Is Failure Mode Score Calculated		Calculated	N/A	Calculated	Calculated	N/A	Tatal Factor 10
			Unweighted Failure Mo		2.00	N/A	1.00	2.00	N/A	Total Factored Scor
				al Score (1-25)	8.00	N/A	4.00	5.25	N/A	
	CHEC	CK	100% Criticality Weighting Fac		10%	N/A	60%	30%	N/A	
				riticality Score	0.80	N/A	2.40	1.58	N/A	4.78 0.48
									10%	

	South Tahoe PUD	Location Description:	Through Swing gate off of Pinewood Dr	K/J Project Number: 1270004*0	00
	Water System Optimization Plan	Tank Facility ID #:	АНТК	Date:	3/15/2012
		Tank Facility Name:	Arrowhead Tank	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
		Pressure Zones Served:	Arrowhead Zone	Adjacent Pressure Zones:	Iroquois and Christmas Valley Zone
Importance			CONDITION ASSESSMENT CHECKLIST		

		1		
		Importance		CONDITION ASSESSMENT CHECKIST
Failure Mode Type	Score	•	Weighted Score	CONDITION ASSESSMENT CHECKLIST
7,000				Calif. Waterworks Standards
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,
Fn	1	5	5.00	rodents, or other animals)?
FII	1	,	3.00	sample tap(s) provided to measure water quality into, out of and inside tank and protected
Fn	1	3	3.00	from freezing? Yes
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? Single inlet/outlet
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes
Fn	3	3	9.00	tank draining removes residual sediments? Some residual sediments remain in the bottom of the tank after draining
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? This tank site has had a history of graffiti, damage to coatings from vandals throwing rocks at the tank, and other unauthorized access
Fn	1	3	3.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Tank not used for CT compliance
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes the tank was constructed to prevent external water from entering the tank
PM	3	5	15.00	condition of interior coatings adequate to protect structure? Some rust has started developing through the coating at joints and at center column support based on the 2008 inspection report.
		1		
				Tank Site
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? No the site is inaccessible after heavy snowfall
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	3	5	15.00	is site vulnerable to wildfires? Yes it is surrounded by forest
R	1	5	5.00	any unstable site conditions (if yes, describe)? No
R	4	3	12.00	is site close to known active seismic faults? 5,134.1 ft. from the nearest fault
				site drainage adequate to prevent flooding of tank foundation, buildings and critical
R	1	3	3.00	equipment? Yes, the site has adequate drainage.
				site lighting, fencing, and security monitoring adequate to discourage unauthorized
Fn			0.00	access/vandalism? No the tank has been pelted with rocks and scratch graffiti
INFORMATION	N/A	N/A	N/A	other known problems? None
				Tank Structure
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed
INFORMATION	N/A	N/A	N/A	concrete, etc.) welded steel
INFORMATION	N/A	N/A	N/A	what is tank volume? 1,078,513
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?
INFORMATION	N/A	N/A	N/A	what is emergency storage available?
С	1	5	5.00	overall tank volume to meet District sizing requirements?
INFORMATION	N/A	N/A	N/A	date tank was constructed? 1995
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? The tank was cleaned and inspected in 2008
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes
				task freehoard dimension from energing high water level to tan of task everflow? adocusts? 6.25 ft. of freeboard which is adequate
Fn	1	4	4.00	tank needodard dimension from operating nigh water level to top of tank overnow? adequate?
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Yes
PM	3	5	15.00	condition of exterior coatings adequate to protect structure? Exterior coatings is in great condition except for the scratches and dings caused by rocks being thrown at the tank
Fn	1	4	4.00	adequate openings for ingress/egress? Yes there are two manways and one roof hatch
INFORMATION	N/A	N/A	N/A	date of last interior inspection? This tank was inspected in 2008
			_	Active Cathodic protection in place (use or pa) and is it points and advanted.
PM	1	3	3.00	passive of active catholic protection in place (yes of no) and is it maintained and adequater
R	5	1	5.00	space available to add solar panels? No
R	4	2	8.00	known fire or haz-mat conditions that could be mitigated? Proximity to trees creates a potential for damage due to wildfire
R	1	3	3.00	tank foundation type? Concrete ring with anchor bolts
R	1	4	4.00	tank foundation condition? Excellent there are no visual defects
R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? No
R	1	4	4.00	concern with tank compliance with seismic requirements? No
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water)? None
PM	1	4	4.00	estimated service life remaining? 33 years based on AWU Useful Life

				South Tahoe PUD Location Description:	Through Swing gate off of Pinewood Dr	K/J Project Number: 1270004*0	0
				Water System Optimization Plan Tank Facility ID #:	АНТК	Date:	3/15/2012
						Condition Assessment	
				Tank Facility Name:	Arrowhead Tank	Inspectors:	Peter Lavallee and Jeremy Rutherdale
						A.U	
				Pressure Zones Served:	Arrowhead Zone	Adjacent Pressure Zones:	Iroquois and Christmas Valley Zone
				Piping & Valves			
PM	2	5	10.00	coatings adequate to protect piping and valves? Inspection in 2008 shows that coatings on internal pipin	ng is adequate		
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?			
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement? Yes			
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Yes			
INFORMATION	N/A	N/A	N/A	other known problems? None			
PM	1	4	4.00	estimated service life remaining? 48 years based on AWU Useful Life			
				SCADA system			
R	5	2	10.00	frequency of level transmitter calibration? Calibrated when a problem has been identified			
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes and monitored by District operations			
Fn	1	4	4.00	alarm log maintained and reviewed annually? Alarm log is maintained but it is not reviewed annually			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio			
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? No communication failures within the last year			
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure? Yes and monitored by District operations			
R	1	3	3.00	spare parts/service support readily available? Yes and monitored by District operations			
INFORMATION	N/A	N/A	N/A	other known problems? No other known problems with the SCADA			
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.			
				Additional Data			
				Legend			
				PM Physical Mortality			
				Fn Functionality			
				R Reliability			
				FE Financial Efficiency			
				C Capacity			

South Tahoe PUD	Location Description:	Through Swing gate off of Pinewood Dr	K/J Project Number: 1270004*0	00
Water System Optimization Plan	Tank Facility ID #:	АНТК	Date:	3/15/2012
	Tank Facility Name:	Arrowhead Tank	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
	Pressure Zones Served:	Arrowhead Zone	Adjacent Pressure Zones:	Iroquois and Christmas Valley Zone
Photo Evidence f	for PM, Fn, R, FE is the downslope portion of the tank constructed on fill?	Yes Does tank overflow drain adequately to protect tank foundation	n? Yes Any bacterilogical exceedance at this tank? Will Verify	
2011/03/HZ 02:HB PN	2011/05/27	PHOTOS O2:42 PM	20111/05/27 02:sig)[PK]	2011/05/27 02:44 PM
Scot 9 FORWARD ORDING PAR	2011/05/27 0	2:42 PM	2011/01/20 02/10/13/1	2001 1/03/27/ 0254-G DIA
		SAZZ OZAG PIN		

		South Tahoe PUD	Location Description	Off of		K/J Project Number:	1270004*00	
		Water System Optimization Plan	Tank Facility ID #	#: XMVTK		Date:	3/12/201	12
		Truce System Optimization Figure		AWVIK		Condition Assessment	3,12,201	12
			Tank Facility Name	Christmas Valley	Tank	Inspectors:	Peter Lavallee and	Phill Torney
								·
			Pressure Zones Served	Christmas Valley	Zone	Adjacent Pressure Zones:	Arrowhead .	Zone
		Notes:			re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records For Coltice lite. We lead to be determined to District We slow as			functionality	reliability		
		3. For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements	1: failure every > 25 years	best available technology financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	2: failure every 16 to 25 yrs 3: failure every 11 to 15 yrs	3: financial efficiency is nigh	
			4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
			ztaan, anserticasie		2 and an requirements	23	z. zzzzesnodia se replacea	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A N/A	1.82	N/A N/A	N/A N/A	Total Factored Score
		, , ,		•		·	·	Total Tuctorcu Score
		Weighted Final Score (1-25)		N/A	8.00	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score		N/A	6.40	N/A	N/A	11.40
		Criticality Score					20%	2.28
		Tank Site			_			
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	0.50	2.40	N/A	Total Factored Score
		Weighted Final Score (1-25)	N/A	N/A	2.00	9.20	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
		Factored Score	N/A	N/A	1.40	2.76	N/A	4.16
		Criticality Score					40%	1.66
		Tank Structure						
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		5.00	1.00	2.00	N/A	Total Factored Score
							1911	
		<u> </u>			3 75	4.86	N/A	
CHECK	100%	Weighted Final Score (1-25)	12.67	25.00	3.75 50%	4.86	N/A N/A	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	12.67 10%	25.00 30%	50%	10%	N/A	11.13
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	12.67 10% 1.27	25.00			N/A N/A	11.13 1.67
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	12.67 10% 1.27	25.00 30%	50%	10%	N/A	11.13 1.67
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves	12.67 10% 1.27	25.00 30% 7.50	50% 1.88	10% 0.49	N/A N/A 15%	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned?	12.67 10% 1.27 Calculated	25.00 30% 7.50 Calculated	50% 1.88 Calculated	10% 0.49 N/A	N/A N/A 15%	1.67
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	12.67 10% 1.27 Calculated 3.00	25.00 30% 7.50 Calculated N/A	50% 1.88 Calculated 1.00	10% 0.49 N/A N/A	N/A N/A 15% N/A N/A	1.67
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25)	12.67 10% 1.27 Calculated 3.00 14.50	25.00 30% 7.50 Calculated N/A N/A	50% 1.88 Calculated 1.00 3.50	10% 0.49 N/A N/A N/A	N/A N/A 15% N/A N/A N/A	1.67
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	12.67 10% 1.27 Calculated 3.00 14.50 10%	25.00 30% 7.50 Calculated N/A N/A 30%	50% 1.88 Calculated 1.00 3.50 60%	10% 0.49 N/A N/A N/A N/A	N/A N/A 15% N/A N/A N/A N/A	1.67 Total Factored Score
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valve Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	12.67 10% 1.27 Calculated 3.00 14.50 10%	25.00 30% 7.50 Calculated N/A N/A	50% 1.88 Calculated 1.00 3.50	10% 0.49 N/A N/A N/A	N/A N/A 15% N/A N/A N/A N/A N/A	1.67 Total Factored Score 3.55
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	12.67 10% 1.27 Calculated 3.00 14.50 10% 1.45	25.00 30% 7.50 Calculated N/A N/A 30%	50% 1.88 Calculated 1.00 3.50 60%	10% 0.49 N/A N/A N/A N/A	N/A N/A 15% N/A N/A N/A N/A	1.67 Total Factored Score
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System	12.67 10% 1.27 Calculated 3.00 14.50 10% 1.45	25.00 30% 7.50 Calculated N/A N/A 30%	50% 1.88 Calculated 1.00 3.50 60%	10% 0.49 N/A N/A N/A N/A N/A	N/A N/A 15% N/A N/A N/A N/A N/A	1.67 Total Factored Score 3.55
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned?	12.67 10% 1.27 Calculated 3.00 14.50 10% 1.45	25.00 30% 7.50 Calculated N/A N/A 30% N/A	50% 1.88 Calculated 1.00 3.50 60%	10% 0.49 N/A N/A N/A N/A N/A N/A Calculated	N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	1.67 Total Factored Score 3.55 0.53
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System	12.67 10% 1.27 Calculated 3.00 14.50 10% 1.45	25.00 30% 7.50 Calculated N/A N/A 30% N/A	50% 1.88 Calculated 1.00 3.50 60% 2.10	10% 0.49 N/A N/A N/A N/A N/A	N/A N/A 15% N/A N/A N/A N/A N/A N/A 15%	1.67 Total Factored Score 3.55 0.53
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned?	12.67 10% 1.27 Calculated 3.00 14.50 10% 1.45 Calculated 2.00	25.00 30% 7.50 Calculated N/A N/A 30% N/A	50% 1.88 Calculated 1.00 3.50 60% 2.10 Calculated	10% 0.49 N/A N/A N/A N/A N/A N/A Calculated	N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	1.67 Total Factored Score 3.55 0.53
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-5)	12.67 10% 1.27 Calculated 3.00 14.50 10% 1.45 Calculated 2.00 8.00	25.00 30% 7.50 Calculated N/A N/A 30% N/A	50% 1.88 Calculated 1.00 3.50 60% 2.10 Calculated 1.00	10% 0.49 N/A N/A N/A N/A N/A Calculated 2.25	N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	1.67 Total Factored Score 3.55 0.53
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Failure Mode Score (1-25)	12.67 10% 1.27 Calculated 3.00 14.50 10% 1.45 Calculated 2.00 8.00 10%	25.00 30% 7.50 Calculated N/A N/A 30% N/A	50% 1.88 Calculated 1.00 3.50 60% 2.10 Calculated 1.00 4.00	10% 0.49 N/A N/A N/A N/A N/A N/A 2 Calculated 2.25 6.00	N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	1.67 Total Factored Score 3.55
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	12.67 10% 1.27 Calculated 3.00 14.50 10% 1.45 Calculated 2.00 8.00 10% 0.80	25.00 30% 7.50 Calculated N/A N/A 30% N/A N/A N/A N/A	50% 1.88 Calculated 1.00 3.50 60% 2.10 Calculated 1.00 4.00 60%	10% 0.49 N/A N/A N/A N/A N/A N/A Calculated 2.25 6.00 30%	N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	1.67 Total Factored Score 3.55 0.53 Total Factored Score

					T		
				South Tahoe PUD Location Description	Off of	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #	хмутк	Date:	3/12/2012
						Condition Assessment	
				Tank Facility Name	Christmas Valley Tank	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served	Christmas Valley Zone	Adjacent Pressure Zones:	Arrowhead Zone
Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards			
Fn	1	5	5.00	tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, rodents, or other animals)?			
				cample tanks) provided to measure water quality into out of and incide tank and protected			

		Importance			CONDITION ASSESSMENT CHECKLIST
Failure Mode Type	Score	Weighting (1-5)	Weighted Score		
				Calif. Waterworks Standards	
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds	Yes
Fn	1	5	5.00	rodents, or other animals):	
_		_	2.00	sample tap(s) provided to measure water quality into, out of and inside tank and protectec from freezing:	Yes
Fn Fn	5	3 5	3.00 25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer):	Come inter and outlet
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping:	
Fn	2	3	6.00		Some residual sediments are left on the bottom of the tank and must be removed
Fn	1	1	1.00		No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master?	
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access?	There is no fence or other site security
Fn	1	3	3.00	adequate lighting & access to interior for inspections, cleaning and repair	
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water services	
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged?	
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank?	
PM	5	5	25.00	condition of interior coatings adequate to protect structure?	Tains planned to be recoated in 2012
				Tank Site	
Fn	1	4	4.00		
P	2	3	6.00		The District is responsible for plowing the road to the tank as part of the agreement with the adjacent land owners No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	4	5	20.00		Yes it is in a densely wooded area
R	1	5	5.00	any unstable site conditions (if yes, describe)	
R	4	3	12.00	is site close to known active seismic faults?	2,950 ft. to the nearest fault
				site drainage adequate to prevent flooding of tank foundation, buildings and critica equipment:	The same and desired in the same state of the sa
R	1	3	3.00	equipment	There are no dramage issues
Fn			0.00	access/vandalism?	No fencing at this location
INFORMATION	N/A	N/A	N/A	other known problems?	None
				Toul Characters	
				Tank Structure	
INFORMATION				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressec concrete, etc.	Welded Tank
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	what is tank volume	
INFORMATION	N/A	N/A	N/A N/A	what is operational storage requirement:	
INFORMATION	N/A	N/A	N/A	what is fire storage requirement	
INFORMATION	N/A	N/A	N/A	what is emergency storage available?	
С	5	5	25.00	overall tank volume to meet District sizing requirements?	
INFORMATION	N/A	N/A	N/A	date tank was constructed:	1998
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities?	
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M?	There is adequate clearance around the outside of the tank
Fn	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate?	Yes, there is 3.8 ft. which complies with standard at time of construction. Freeboard is adequate.
R	1	5	5.00	tank designed to withstand snow load and not create safety issue?	Tank is designed to withstand snow load
PM	5	5	25.00	condition of exterior coatings adequate to protect structure?	Coatings need to be replaced and are planned to be replaced in 2012
Fn	1	4	4.00		There are two manways and one roof hatch
INFORMATION	N/A	N/A	N/A	date of last interior inspection?	2011
PM	3	3	9.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate	Impressed current cathodic protection but it is not maintained
R	5	1	5.00	space available to add solar panels?	
R	4	2	8.00	known fire or haz-mat conditions that could be mitigated?	
R	1	3	3.00		Concrete Ring with anchor bolts
R	1	4	4.00 5.00	tank foundation condition	
R R	1	5	4.00	has seismic stability been evaluated by a qualified engineers concern with tank compliance with seismic requirements	
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water):	
PM	1	4	4.00		Takine 36 years based on AWU Useful Life
. 141	-		00	and the femalistic	<u> </u>

				Т					
				South Tahoe PUD	Location Description:	Off of		K/J Project Number: 1270004*0	00
				Water System Optimization Plan	Tank Facility ID #:	XMVTK		Date:	3/12/2012
				·	-			Condition Assessment	· ·
					Tank Facility Name:	Christmas Valley	Tank	Inspectors:	Peter Lavallee and Phill Torney
		+			Tank racincy ranie.	Christinas valley	Idilk	тізрессоіз.	Peter Lavallee and Phili Torney
					Pressure Zones Served:	Christmas Valley	Zone	Adjacent Pressure Zones:	Arrowhead Zone
				Piping & Valves					
PM	5	5	25.00	coatings adequate to protect piping and valves?	Coatings on the piping will be completed in 2	2012 with the rest of the tank			
INFORMATION		2	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	Yes				
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement?					
Fn	1	4	4.00	valves are suitable for efficient and reliable service?					
INFORMATION	N/A	N/A	N/A	other known problems?					
PM	1	4	4.00	estimated service life remaining?	46 years based on AWU Useful Life				
				SCADA system					
R	5	2	10.00		Transmitter calibration is not done unless a				
Fn	1	4	4.00	automated alarm callout for critical failures and reliability?	Yes all alarms are monitored by District Ope	rations			
Fn	1	4	4.00	alarm log maintained and reviewed annually?		ewed on an annual basis			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?					
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)?	There are no communication failures within	the last year			
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?	There is adequate power to the site				
R	2	3	6.00	spare parts/service support readily available?					
INFORMATION	N/A	N/A	N/A		No other known electrical problems at this s	ite			
PM	2	4	8.00	estimated service life remaining?	Estimated 10 year service life remaining.				
				Additional Data	The access road to the tank is asphalt and th	e road is deteriorating rapidly			
				Legend					
					Physical Mortality				
					Functionality				
		-			Reliability				
					Financial Efficiency				
		1		C	Capacity				

Water System Optimization Plan Tank FedBly Name: Pressure Zones Served: Print Column to PA, Co., CC PHOTOS	South Tahoe PUD	Location Description:	Off of	K/J Project Number: 1270004*00	
Track Facility Name: Christons Valle, Lark Ingenter Personal Zones Ingenter Personal Zones Anglacent Personal Zones Anglacent Personal Zones Ingenter Ingent	Water System Optimization Plan	Tank Facility ID #:	XMVTK	Date:	3/12/2012
Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: Pressure Zones Served: PROJECTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTIOS PROTION PROTIO		Tank Facility Name	Christmas Valley Tank		Potor Lavallon and Phill Tornov
PHOTOS PHOTOS					
PHOTOS		Pressure Zones Served:	Christmas Valley Zone	Adjacent Pressure Zones:	Arrowhead Zone
	Photo Evidence for PM, Fn, R, F	E Is the downslope portion of the tank constructed on fill? You	es Does tank overflow drain adequately to protect tank founda	ation? Yes Any bacterilogical exceedance at this tank? Will Verify	
			PHOTOS		
			2011/06/24 04.39 PM	28911 //GE//28 0/2108 12X	2011/05/24 04:3
2011/05/24 04:87 PM 2011/05/24 04:88 PM	2011/05/724 04:87 PM	2011/05/24 96.28		2011/05/24 04:38 PM	

		South Tahoe PUD	Location Description	Off of Skyline Dr within cluster of	homes, 1697 Skyline Dr	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Tank Facility ID #	сстк		Date:	3/13/	⁷ 2012
		, ,				Condition Assessment		
			Tank Facility Name	Country Club	Tank	Inspectors:	Peter Lavallee and	Jeremy Rutherdale
			Pressure Zones Served	: Country Club 2	Zone	Adjacent Pressure Zones:	Arrowhead and	d Iroquois Zone
		Notes:		Failu	re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity		l of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
		3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
			moderate deterioration significant deterioration	greater than 90% of design requirements greater than 85% of design requirements	meets all requirements fails some requirements	3: failure every 11 to 15 yrs 4: failure every 5 to 10 yrs	financial efficiency is average financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements		5: asset should be replaced	
			3. Virtually discretectable	5. 1635 than 05% of design requirements	5. Tuils un requirements	3. Tulidic \ 3 \ yi 3	5. disset should be replaced	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		unweighted Failure Mode Score Calculated of Assigned? Unweighted Failure Mode Score (1-5)	1.00	N/A N/A	1.18	N/A N/A	N/A N/A	Total Factored Sco
			5.00	N/A N/A	5.00	N/A N/A	N/A N/A	Total ractorea sco
- CUECK	100%	Weighted Final Score (1-25)		N/A N/A		N/A N/A	N/A N/A	
CHECK	100%	7 0 0 1		,	80%			F 00
		Factored Score		N/A	4.00	N/A	N/A	5.00
		Criticality Score					20%	1.00
		Tank Site	<u> </u>					
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	2.00	2.40	N/A	Total Factored Sco
		Weighted Final Score (1-25)		N/A	8.00	9.20	N/A	
CHECK	100%	, , ,	N/A	N/A	70%	30%	N/A	
		Factored Score		N/A	5.60	2.76	N/A	8.36
		Criticality Score					40%	3.34
		Tank Structure						
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		5.00	1.00	2.14	N/A	Total Factored Sco
		Weighted Final Score (1-25)	+	25.00	3.75	5.14	N/A	
CHECK	100%			30%	50%	10%	N/A	
		Factored Score		7.50	1.88	0.51	N/A	10.29
		Criticality Score					15%	1.54
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	N/A	N/A	Total Factored Sco
		Unweighten Faillire Mone Schre 11-51		**/**	3.50	N/A	N/A	
				N/A			N/A	
CHECK	100%	Weighted Final Score (1-25)	4.50	N/A 30%		N/A		2.55
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	4.50 10%	N/A 30% N/A	60%	N/A N/A	·	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	4.50 10% 0.45	30%		N/A N/A	N/A	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	4.50 10% 0.45	30%	60%	·	·	0.38
СНЕСК	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System	4.50 10% 0.45	30% N/A	60% 2.10	N/A	N/A 15%	
СНЕСК	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned?	4.50 10% 0.45	30% N/A N/A	60% 2.10 Calculated	N/A Calculated	N/A 15% N/A	0.38
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	4.50 10% 0.45 Calculated 2.00	30% N/A N/A N/A	60% 2.10 Calculated 1.00	N/A Calculated 2.25	N/A 15% N/A N/A	0.38
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	4.50 10% 0.45 Calculated 2.00 8.00	30% N/A N/A N/A N/A	60% 2.10 Calculated 1.00 4.00	N/A Calculated 2.25 6.00	N/A 15% N/A N/A N/A	0.38
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	4.50 10% 0.45 Calculated 2.00 8.00 10%	30% N/A N/A N/A N/A N/A	60% 2.10 Calculated 1.00 4.00 60%	Calculated 2.25 6.00 30%	N/A 15% N/A N/A N/A N/A	0.38 Total Factored Scor
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	4.50 10% 0.45 Calculated 2.00 8.00 10% 0.80	30% N/A N/A N/A N/A	60% 2.10 Calculated 1.00 4.00	N/A Calculated 2.25 6.00	N/A 15% N/A N/A N/A	0.38

	South Tahoe PUD	Location Description:	Off of Skyline Dr within cluster of homes, 1697 Skyline Dr	K/J Project Number: 12	270004*00
	Water System Optimization Plan	Tank Facility ID #:	сстк	Date:	3/13/2012
				Condition Assessment	
		Tank Facility Name:	Country Club Tank	Inspectors:	Peter Lavallee and Jeremy Rutherdale
		Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Arrowhead and Iroquois Zone

Pallure Mode Type Pallure Mode Type Pallu	
Failure Mode Type Fig. 1	
Calif. Waterworks Standards tank opening designed to prevent contamination (e.g., ramware, nordic lisests, picks, or other animaty) feet	
tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, pirits, roders, or other animals) (es.) Fig. 1 3 3 3.0 Sample tap(s) provided to measure water quality into, out of an disside tank and protected from freezing? Insects, provided to measure water quality into, out of an disside tank and protected from freezing? Insects, provided to measure water quality into, out of an disside tank and protected from freezing? Insects, provided from animals (ed.) (
Fin 1 3 3 3.00 tank designed to measure water quality into, out of and inside tank and protected from freeding? Yes Fin 1 5 5 5.00 tank designed to minimize dead zones (separate intel-Qualite or mixer)? Yes, Mixing System Fin 1 5 5 5.00 tank designed to minimize dead zones (separate intel-Qualite or mixer)? Yes, Mixing System Fin 1 1 3 3 3.00 tank designed to minimize dead zones (separate intel-Qualite or mixer)? Yes, Mixing System Fin 1 1 3 3 3.00 tank designed to minimize dead zones (separate intel-Qualite or mixer)? Yes, Mixing System Fin 1 1 5 5 5.00 tank level transmitter provides real-time level feedback to SCADA master? Yes Fin 1 1 3 3 3.00 daequate security measure unauthorized access for the start gages and the District utilizes a DP Cell attached to SCADA Fin 1 3 3 3.00 daequate security measure variety unauthorized access from starting and repair? Yes there is one roof hatch and two manways which provide adequate natural light when opened on the interior of the tank designed variety in the provides access to interior for inspections, cleaning and repair? Yes there is one roof hatch and two manways which provide adequate natural light when opened on the interior of the tank designed variety in the provides access to interior for inspections, cleaning and repair? Yes there is one roof hatch and two manways which provide adequate natural light when opened on the interior of the tank designed variety in the provides access to repair and provides access the provides access for year-round maintain water service. There are acceptate to solve on a subject to provide access for year-round maintain water service. There are acceptate to solve on a subject to provide access for year-round maintain water service. There are acceptated to provide access for year-round maintain water service. There are accessed to round maintain water service. There are accessed to round maintain water service. There are accessed to provide access for year-round maintain water service. There are accessed to round maint	
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Fin 1 5 5.00 air-gap provided for tank drain and overflow piping? Yes Fin 1 1 3 3.00 tank draining removes regulated sedements? Yes ket key late a floor with valve to drain tank to floor 1 1 1.00 tank level transmitter provides real-time level feedback to SCADA master? Fin 1 5 5.00 tank level transmitter provides real-time level feedback to SCADA master? Fin 3 5 5.15.00 adequate security measures and monitoring to prevent unauthorized access? Fin 1 5 5.00 adequate security measures and monitoring to prevent unauthorized access? Fin 1 5 5.00 adequate sleating to prevent unauthorized access? Fin 1 5 5.00 adequate sleating to prevent unauthorized access? Fin 1 5 5.00 adequate sleating valves and for inspections, cleaning and repair? Yes there is one roof hatch and two manways which provide adequate natural light when opened on the interior of the tank Fin 1 5 5.00 adequate solution valves and bypass to take tank full master service? Fin 1 5 5.00 tank prevent entry for fundf, substrate flow, or drainage lie not be tank? Fin 1 5 5.00 tank prevent entry fundf, substrate flow, or drainage lie not be tank? Fin 1 5 5.00 tank prevent entry fundf, substrate flow, or drainage lie not be tank? Fin 1 5 5.00 tank prevent entry fundf, substrate flow, or drainage lie not be tank? Fin 4 4 4 16.00 adequate vehicle access for year-round maintenance? Fin 4 5 5.00 tank prevent entry fundf, substrate flow, or drainage lie not be tank? Fin 4 5 5.00 tank prevent entry flow flow flow flow flow flow flow flow	
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R 4 5 20.00 is site vulnerable to wildfires? Yes but is within a cluster of homes within a residential neighborhood R 1 5 5.00 any unstable site conditions (if yes, describe)? No R 4 3 12.00 is site close to known active seismic faults? 10,050 ft. to the nearest fault Site drainage adequate to prevent flooding of tank foundation, buildings and critical equipment? As the site drainage adequate to green flooding of tank foundation, buildings and critical equipment? As the site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? Fin 0.00 Site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? The site is accessed through a forest service gate and is in a cluster of houses	emove snow.
R 1 5 5.00 any unstable site conditions (if yes, describe)? No R 4 3 12.00 is site close to known active seismic faults? Site drainage adequate to prevent flooding of tank foundation, buildings and critical R 1 3 3.00 site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? Fn 0.00 site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? The site is accessed through a forest service gate and is in a cluster of houses	
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R 1 3 3.00 equipment? Yes, the site has adequate drainage. Site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? The site is accessed through a forest service gate and is in a cluster of houses	
site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? The site is accessed through a forest service gate and is in a cluster of houses	
Fn 0.00 access/vandalism? The site is accessed through a forest service gate and is in a cluster of houses	
INFORMATION N/A N/A N/A N/A other known problems? None the tank is new in 2010	
Tank Structure	
INFORMATION N/A N/A N/A N/A N/A MA N/A MA N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	
INFORMATION N/A N/A N/A Concrete, etc.)	
INFORMATION N/A N/A N/A N/A what is tank volume? 355,000	
INFORMATION 5 0.00 what is operational storage requirement? INFORMATION 5 0.00 what is fire storage requirement?	
INFORMATION 5 0.00 what is fire storage requirement? INFORMATION 5 0.00 what is emergency storage available?	
C 5 5 25.00 overall tank volume to meet District sizing requirements?	
INFORMATION N/A N/A N/A N/A data tank was constructed? 2008	
INFORMATION N/A N/A N/A date and describe work done to renew or upgrade tank and tank facilities? The tank was constructed in 2008 so no upgrades needed	
Fn 1 3 3.00 adequate perimeter clearance to facilitate routine O&M? Yes	
Aft and it is adequate per standard at time of construction	
Fn 1 4 4.00 tank freeboard dimension from operating high water level to top of tank overflow? adequate? 4ft and it is adequate per standard at time of construction	
R 1 5 5.00 tank designed to withstand snow load and not create safety issue? Yes	
PM 1 5 5.00 condition of exterior coatings adequate to protect structure? Coatings were inspected in 2009	
Fn 1 4 4.00 adequate openings for ingress/egress? Yes INFORMATION N/A N/A N/A N/A date of last interior inspection? 2009	
PM 1 3 3.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? passive cathodic protection which is new and maintained	
R 5 1 5,00 pasted activate brockets in piece (yes in piece	
R 5 2 10.00 known fire or haz-mat conditions that could be mitigated? There are trees within close proximity to the tank which could cause fire damage or damage the tank if they were to fall	
R 1 3 3.00 tank foundation type? Concrete ring foundation with anchor bolts	
R 1 4 4.00 tank foundation condition? Excellent installed in 2008	
R 1 5 5.00 has seismic stability been evaluated by a qualified engineer? Yes and meets current code	
R 1 4 4.00 concern with tank compliance with seismic requirements? No	
Fn 1 4 4.00 other known problems (e.g. adequate freeboard, stagnant water)? None	
PM 1 4 4.00 estimated service life remaining? 46 years based on AWU Useful Life	

				South Tahoe PUD	Location Description:	Off of Skyline Dr within cluster of ho	omes, 1697 Skyline Dr	K/J Project Number: 1270004*0	0
				Water System Optimization Plan	Tank Facility ID #:	ССТК		Date:	3/13/2012
								Condition Assessment	
					Tank Facility Name:	Country Club Tar	nk	Inspectors:	Peter Lavallee and Jeremy Rutherdale
									·
					Pressure Zones Served:	Country Club Zor	ne	Adjacent Pressure Zones:	Arrowhead and Iroquois Zone
				Piping & Valves					
PM	1	5	5.00	coatings adequate to protect piping and valves?					
			3.00			talu.			
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	Everything is sized adequately and appropriat	Leiy			
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement?	yes				
Fn	1	4	4.00	valves are suitable for efficient and reliable service?					
INFORMATION	N/A	N/A	N/A		There are no other known piping and valving	issues with this tank			
PM	1	4	4.00	estimated service life remaining?	56 years based on AWU Useful life.				
				SCADA system					
R	5	2	10.00	frequency of level transmitter calibration?	Calibrated when a problem has been identifie	ed			
Fn	1	4	4.00	automated alarm callout for critical failures and reliability?	Yes and monitored by District operations				
Fn	1	4	4.00	alarm log maintained and reviewed annually?	Alarm log is maintained but it is not reviewed	l annually			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?					
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)?	No communication failures within the last year	ar			
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?	Yes and monitored by District operations				
R	2	3	6.00	spare parts/service support readily available?					
INFORMATION	N/A	N/A	N/A		No other known problems with the SCADA				
PM	2	4	8.00	estimated service life remaining?					
				Additional Data					
				Legend					
					Physical Mortality				
		+			Functionality				
					Reliability				
					Financial Efficiency				
					Capacity				
					capacity				

South Tahoe PUD	Location Description:	Off of Skyline Dr within cluster of homes, 1697 Skyline Dr	K/J Project Number:	1270004*00
Water System Optimization Plan	Tank Facility ID #:	ССТК	Date:	3/13/2012
	Tank Facility Name:	Country Club Tank	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
			Adjacent Pressure Zones:	
	Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Arrowhead and Iroquois Zone
Photo Evidence for PM, Fn, R, FE	Is the downslope portion of the tank construct	ted on fill? Yes Does tank overflow drain adequately to protect tank foundation? Yes PHOTOS	Any bacterilogical exceedance at this tank?	Will Verify
2011/05/25 03 28 BM		2011/03/23 02/32/81/	2011/05/25 03:32 FM	2011/05/25 03 82 FM

		South Tahoe PUD	Location Description	Access Road from Cl	niapa Dr.	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Tank Facility ID #	#: FPTK1		Date:	3/15/20	12
		water system optimization rian	Turner demey 12 7	FFIKI		Condition Assessment		112
			Tank Facility Name	Flagpole Tank	#1	Inspectors:	Peter Lavallee and Jer	emy Rutherdale
			Pressure Zones Served	Flagpole Zon	e	Adjacent Pressure Zones:	Arrowhead and Twi	n Peaks Zones
		Notes:			re Mode Scoring (1 - 5)	-		
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records For Catherine Weighting Fortunate had decomined to District Weighting			functionality	reliability		
		3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
			4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.82	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	8.00	N/A	N/A	
CUECK	4000/			•		•	,	
CHECK	100%	, , ,	20%	N/A	80%	N/A	N/A	
		Factored Score		N/A	6.40	N/A	N/A	7.40
		Criticality Score					20%	1.48
		Tank Site						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	2.00	2.20	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	8.00	8.20	N/A	
CHECK	100%		N/A	N/A	70%	30%	N/A	
en Een	10070	Factored Score		N/A	5.60	2.46	N/A	8.06
		Criticality Score		N/A	3.00	2.40	40%	3.22
		Tank Structure					40%	3.22
							1	
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	Tatal Fastanad Casas
			,					
		Unweighted Failure Mode Score (1-5)		5.00	1.25	2.00	N/A	Total Factored Score
		Weighted Final Score (1-25)	7.00	25.00	4.50	5.71	N/A	Total Factored Score
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	7.00 10%	25.00 30%	4.50 50%	5.71 10%	N/A N/A	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	7.00 10% 0.70	25.00	4.50	5.71	N/A N/A N/A	11.02
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	7.00 10% 0.70	25.00 30%	4.50 50%	5.71 10%	N/A N/A	
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves	7.00 10% 0.70	25.00 30%	4.50 50%	5.71 10%	N/A N/A N/A	11.02
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves	7.00 10% 0.70	25.00 30%	4.50 50%	5.71 10%	N/A N/A N/A	11.02
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	7.00 10% 0.70 Calculated	25.00 30% 7.50	4.50 50% 2.25	5.71 10% 0.57	N/A N/A N/A 15%	11.02 1.65
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	7.00 10% 0.70 Calculated	25.00 30% 7.50 Calculated	4.50 50% 2.25 Calculated	5.71 10% 0.57	N/A N/A N/A 15%	11.02 1.65
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25)	7.00 10% 0.70 Calculated 1.00 4.50	25.00 30% 7.50 Calculated N/A N/A	4.50 50% 2.25 Calculated 2.00 6.50	5.71 10% 0.57 N/A N/A N/A	N/A N/A N/A 15% N/A N/A N/A	11.02 1.65
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	7.00 10% 0.70 Calculated 1.00 4.50 10%	25.00 30% 7.50 Calculated N/A N/A 30%	4.50 50% 2.25 Calculated 2.00 6.50 60%	5.71 10% 0.57 N/A N/A N/A N/A	N/A N/A N/A 15% N/A N/A N/A N/A	11.02 1.65 Total Factored Score
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45	25.00 30% 7.50 Calculated N/A N/A	4.50 50% 2.25 Calculated 2.00 6.50	5.71 10% 0.57 N/A N/A N/A	N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A	11.02 1.65 Total Factored Score
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45	25.00 30% 7.50 Calculated N/A N/A 30%	4.50 50% 2.25 Calculated 2.00 6.50 60%	5.71 10% 0.57 N/A N/A N/A N/A	N/A N/A N/A 15% N/A N/A N/A N/A	11.02 1.65 Total Factored Score
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45	25.00 30% 7.50 Calculated N/A N/A 30% N/A	4.50 50% 2.25 Calculated 2.00 6.50 60% 3.90	5.71 10% 0.57 N/A N/A N/A N/A N/A	N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A 15%	11.02 1.65 Total Factored Score
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-5) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned?	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45	25.00 30% 7.50 Calculated N/A N/A 30% N/A	4.50 50% 2.25 Calculated 2.00 6.50 60% 3.90	5.71 10% 0.57 N/A N/A N/A N/A N/A N/A	N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	11.02 1.65 Total Factored Score 4.35 0.65
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45 Calculated 2.00	25.00 30% 7.50 Calculated N/A N/A 30% N/A	4.50 50% 2.25 Calculated 2.00 6.50 60% 3.90 Calculated 1.00	5.71 10% 0.57 N/A N/A N/A N/A N/A N/A Calculated 2.00	N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	11.02 1.65 Total Factored Scor 4.35 0.65
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Failure Mode Score (1-5)	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45 Calculated 2.00 8.00	25.00 30% 7.50 Calculated N/A N/A 30% N/A	4.50 50% 2.25 Calculated 2.00 6.50 60% 3.90 Calculated 1.00 4.00	5.71 10% 0.57 N/A N/A N/A N/A N/A Calculated 2.00 5.25	N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	11.02 1.65 Total Factored Score 4.35 0.65
		Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45 Calculated 2.00 8.00 10%	25.00 30% 7.50 Calculated N/A N/A 30% N/A N/A N/A N/A	4.50 50% 2.25 Calculated 2.00 6.50 60% 3.90 Calculated 1.00 4.00 60%	5.71 10% 0.57 N/A N/A N/A N/A N/A N/A Calculated 2.00	N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	11.02 1.65 Total Factored Score 4.35 0.65
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Failure Mode Score (1-5)	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45 Calculated 2.00 8.00 10%	25.00 30% 7.50 Calculated N/A N/A 30% N/A	4.50 50% 2.25 Calculated 2.00 6.50 60% 3.90 Calculated 1.00 4.00	5.71 10% 0.57 N/A N/A N/A N/A N/A Calculated 2.00 5.25	N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	11.02 1.65 Total Factored Score 4.35 0.65
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	7.00 10% 0.70 Calculated 1.00 4.50 10% 0.45 Calculated 2.00 8.00 10% 0.80	25.00 30% 7.50 Calculated N/A N/A 30% N/A N/A N/A N/A	4.50 50% 2.25 Calculated 2.00 6.50 60% 3.90 Calculated 1.00 4.00 60%	5.71 10% 0.57 N/A N/A N/A N/A N/A Calculated 2.00 5.25 30% 1.58	N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	1.65 Total Factored Score 4.35 0.65 Total Factored Score

			_				
				South Tahoe PUD Location Description:	Access Road from Chiapa Dr.	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #:	FPTK1	Date:	3/15/2012
				Tank Facility Name:	Flagpole Tank #1	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
				Pressure Zones Served:	Flagpole Zone	Adjacent Pressure Zones:	Arrowhead and Twin Peaks Zones
Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards			
_		_		tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,			
Fn	1	5	5.00	rodents, or other animals)? 1005 sample tap(s) provided to measure water quality into, out of and inside tank and protected			
Fn	1	3	3.00	from freezing? Yes			
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? Same inlet and outlet			
Fn Fn	2	5 3	5.00 6.00	air-gap provided for tank drain and overflow piping? There is an air gap tank draining removes residual sediments? No			
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages a	nd the District utilizes a DP Cell attached to SCADA		
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes			
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? There is no fence or other site security adequate lighting & access to interior for inspections, cleaning and repair? Yes there are two manways and a roof hatch w	high let in a let of light		
Fn Fn	1	5	3.00 5.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes there are two manways and a roof natch w adequate isolation valves and bypass to take tank offline and maintain water service? Yes	nich let in a lot of light		
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? No			
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes			
PM	1	5	5.00	condition of interior coatings adequate to protect structure? This is a concrete block tank with no internal co	atings on the concrete		
				Touls Site			
Fn.	4	4	16.00	Tank Site adequate vehicle access for year-round maintenance? No the site is inaccessible during periods of hea	WAY STOWN		
Fn R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D		nossible	
R	3	5	15.00	is site vulnerable to wildfires? Yes it is surrounded by wooded lots and vacant	· · · · · · · · · · · · · · · · · · ·	70051b1C.	
R	1	5	5.00	any unstable site conditions (if yes, describe)? None			
R	4	3	12.00	is site close to known active seismic faults? 1,750 ft. to nearest fault			
P	1	3	3.00	site drainage adequate to prevent flooding of tank foundation, buildings and critical No site drainage issues			
	-	3	3.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized			
Fn		4	0.00	access/vandalism? There is no site lighting or fencing			
INFORMATION	N/A	N/A	N/A	other known problems? None			
				Tank Structure			
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed			
INFORMATION	N/A	N/A	N/A	concrete, etc.] Reinforced Concrete Block Tank			
INFORMATION	N/A	N/A	N/A	what is tank volume? 221,000			
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?			
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	what is fire storage requirement? what is emergency storage available?			
C	5	5	25.00	overall tank volume to meet District sizing requirements?			
INFORMATION	N/A	N/A	N/A	date tank was constructed? 1964			
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? Work was completed to repair spalling concret			
Fn	2	3	6.00	adequate perimeter clearance to facilitate routine O&M? There are bushes that are against this tank but	work can still be completed		
Fn	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate?			
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Yes			
PM	2	5	10.00	condition of exterior coatings adequate to protect structure? There is some spalling on the south east corner			
Fn INFORMATION	N/A	4 N/A	4.00 N/A	adequate openings for ingress/egress? Single roof hatch. The tank is buried into the hi date of last interior inspection? 2008	I .		
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate?			
R	5	1	5.00	space available to add solar panels? No			
R	2	2	4.00	known fire or haz-mat conditions that could be mitigated? Location of trees in proximity to the tank			
R R	1	3	3.00	tank foundation type? Concrete but cannot be determined the tank is tank foundation condition? Cannot be determined the tank is buried into the			
R R	3	5	4.00 15.00	has seismic stability been evaluated by a qualified engineer? No	ie iiii		
R	1	4	4.00	concern with tank compliance with seismic requirements? No			
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water)? None			
PM	2	4	8.00	estimated service life remaining? 2 years based on AWU Useful Life			
		1	1				

				South Tahoe PUD Location Description:	Access Road from Chiapa Dr.	K/J Project Number: 1270004*	00
				Water System Optimization Plan Tank Facility ID #:	FPTK1	Date:	3/15/2012
				Water System Optimization Film	ITIKI		3/13/2012
						Condition Assessment	
				Tank Facility Name:	Flagpole Tank #1	Inspectors:	Peter Lavallee and Jeremy Rutherdale
				Pursuin Zana Camada		Adjacent Pressure Zones:	
				Pressure Zones Served:	Flagpole Zone	Adjacent Pressure Zones:	Arrowhead and Twin Peaks Zones
				Piping & Valves			
PM	1	5	5.00	coatings adequate to protect piping and valves? Coatings on piping in inspection report look adequate			
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?			
Fn	3	3	9.00	tank-piping connections designed to accommodate settlement or movement? Unknown			
Fn	1	4	4.00	valves are suitable for efficient and reliable service? There have been no issues with and of the valving			
INFORMATION	N/A	N/A	N/A	other known problems? None			
PM	1	4	4.00	estimated service life remaining? 12 years based on AWU Useful Life			
				SCADA system			
R	5	2	10.00	frequency of level transmitter calibration? Calibrated when a problem has been identified			
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes and monitored by District operations			
Fn	1	4	4.00	alarm log maintained and reviewed annually? Alarm log is maintained but it is not reviewed annually			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio			
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? No communication failures within the last year			
R R	1	3	4.00 3.00	adequate power available to run all telemetry and instrumentation on main power failure? Yes and monitored by District operations spare parts/service support readily available? Yes and monitored by District operations			
INFORMATION	N/A	N/A	3.00 N/A	other known problems? No other known problems with the SCADA			
PM	2 N/A	N/A 4	8.00	estimated service life remaining? Estimated 10 years based on AWU Useful Life			
PIVI		4	8.00	estinated service me remaining: Estinated to years based on AWO Oserol Life			
				Additional Data			
				Auditional Data			
				Legend			
				PM Physical Mortality			
				Fn Functionality			
				R Reliability			
				FE Financial Efficiency			
				C Capacity			
-				17877			

South Tahoe PUD	Location Description:	Access Road from Chiapa Dr.	K/J Project Number: 1270004*0	00
Water System Optimization Plan	Tank Facility ID #:	FPTK1	Date:	3/15/2012
	Tank Facility Name:	Flagpole Tank #1	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
	Pressure Zones Served:	Flagpole Zone	Adjacent Pressure Zones:	Arrowhead and Twin Peaks Zones
Photo Evidence for PM, Fn, R, FE	Is the downslope portion of the tank constructed on fill? Y	es Does tank overflow drain adequately to protect tank found	ation? Yes Any bacterilogical exceedance at this tank? Will Verify	
		PHOTOS		
2011/05/27 01:58 PM	2011/05/27/02:06		2011/05/22 02/03 PM	2011/05/27 02:95 PM
2013/CEAZTY 62:683 PM	201 102 02 03 PM			20 h 1 / 05/27 02 07 PM

		South Tahoe PUD	Location Description	: Access Road from end	of Chiapa Dr	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Tank Facility ID #	: FPTK2		Date:	3/15/2	012
		water System Optimization Flan	Talk Lacinty 15 #	FFIRZ		Condition Assessment	3/13/2	012
			Tank Facility Name	: Flagpole Tank	k #2	Inspectors:	Peter Lavallee and Je	remy Rutherdale
			,	Togget the togget the	· · ·	•		,
			Pressure Zones Served	Flagpole Zor	ne	Adjacent Pressure Zones:	Arrowhead and Tw	rin Peaks Zones
		Notes:			re Mode Scoring (1 - 5)	-		
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
		3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements		1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
			4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.73	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	7.73	N/A	N/A	
CHECK	1009		,	N/A	80%	N/A	N/A	
CHECK	100/	Factored Score	,	N/A	6.18	N/A	N/A	7.18
		Criticality Score		N/A	0.18	N/A	10/A 20%	1.44
		Tank Site					20%	1.44
				**/*			21/2	
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	T-4-1 F4 4 C
		Unweighted Failure Mode Score (1-5)		N/A	2.00	2.20	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	8.00	8.20	N/A	
CHECK	1009	, , ,		N/A	70%	30%	N/A	
		Factored Score		N/A	5.60	2.46	N/A	8.06
		Criticality Score					40%	3.22
		Tank Structure	•					
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		5.00	1.50	1.86	N/A	Total Factored Score
		Weighted Final Score (1-25)		25.00	5.75	4.57	N/A	
CHECK	1009	•		30%	50%	10%	N/A	
C. I.E.O.K	1007	Factored Score		7.50	2.88	0.46	N/A	11.50
		Criticality Score		1.55			15%	1.72
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	N/A	N/A	
				N/A	2.00	N/A N/A	N/A N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5)	*	*	6.50	N/A N/A	N/A N/A	Total Factored Score
OUES.		Weighted Final Score (1-25)	·	N/A		-	-	
CHECK	1009	, , ,		30%	60%	N/A	N/A	405
		Factored Score		N/A	3.90	N/A	N/A	4.35
		Criticality Score					15%	0.65
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	1.00	2.00	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	4.00	5.25	N/A	
CHECK	1009		10%	N/A	60%	30%	N/A	
CHECK	1009	Criticality Weighting Factor (0 - 100%)		N/A N/A	60% 2.40	30% 1.58	N/A N/A	4.78
СНЕСК	1009		0.80	•				4.78 0.48

				South Tahoe PUD	Location Description:	Access Road from end of Chiapa Dr	K/J Project Number:	1270004*00
					Tools Socility ID #		Bata	
				Water System Optimization Plan	Tank Facility ID #:	FPTK2	Date:	3/15/2012
					Tank Facility Name:	Flagpole Tank #2	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
		+			Turk Fusine, Fusine.	ridgpole rank #2	spects.s.	reter Lavallee difu Jeremy numeruale
					Pressure Zones Served:	Flagpole Zone	Adjacent Pressure Zones:	Arrowhead and Twin Peaks Zones
		1				J.		
		Importance			C	ONDITION ASSESSMENT CHECKLIST		
Failure Mode Type	Score	Weighting (1-5)	Weighted Score					
				Calif. Waterworks Standards				
52	1	5	5.00	tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, rodents, or other animals)?	Yes			
Fn	1	5	5.00	sample tap(s) provided to measure water quality into, out of and inside tank and protected				
Fn	1	3	3.00	from freezing?				
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)?				
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping?	There is an air gap			
Fn	1	3	3.00		There are minimal sediments left in the tank when draining			
Fn	1	1	1.00		No CDPH has indicate a dislike for staff gages and the Dist	rict utilizes a DP Cell attached to SCADA		
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master?				
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access?				
Fn	1	3	3.00	adequate lighting & access to interior for inspections, cleaning and repair?		a lot of light		
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service?				
INFORMATION	N/A	N/A	N/A E 00	tank used for CT compliance? yes - bypass pipes blind flanged? tank prevent entry of runoff, subsurface flow, or drainage into the tank?				
Fn PM	1	5	5.00	condition of interior coatings adequate to protect structure?		- :- 2000		
Plvi	1	3	5.00	Collution of interior coatings adequate to protect structure.	Interior coatings are still in good condition as of inspection	1 In 2008		
		+		Tank Site				
Fn	4	4	16.00		No the site is inaccessible during periods of heavy snow			
R FR	2	3	6.00			MA flood map. Which means flood hazards are undetermined but	passible	
R	3	5	15.00		Yes it is surrounded by wooded lots and vacant land	VIA 11000 Illap. Willeli illeans 11000 hazarus are unuetermined but j	oossible.	
R	1	5	5.00	any unstable site conditions (if yes, describe)?				
R	4	3	12.00	is site close to known active seismic faults?				
R	1	3	3.00	equipment?	No site drainage issues			
				site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism?	There is no site lighting or fencing			
Fn			0.00					
INFORMATION	N/A	N/A	N/A	other known problems?	None			
				Tank Structure				
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed	Waldad Staal			
INFORMATION	N/A	N/A	N/A	describe tank structure type (e.g., weided steel, boited steel, reinforced concrete, prestressed concrete, etc.)	Weided Steel			
INFORMATION	N/A	N/A	N/A	what is tank volume?	-,			
INFORMATION	N/A	N/A	N/A	what is operational storage requirement? what is fire storage requirement?				
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	what is fire storage requirement? what is emergency storage available?				
C	IN/A	1N/A 5	25.00	overall tank volume to meet District sizing requirements?				
INFORMATION	N/A	N/A	N/A	date tank was constructed?				
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities?				
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M?				
Fn	3	4	12.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate?	1.90 reet of freedoard. 3 ft. freedoard standard. Freeboar	nu not auequate.		
R	1	5	5.00	tank designed to withstand show load and not create safety issue?	Yes			
PM	2	5	10.00	condition of exterior coatings adequate to protect structure?	There is some scratch graffiti on one side of the tank but t	he coatings are in excellent condition		
Fn	1	4	4.00	adequate openings for ingress/egress?	There are two manways and a roof hatch which are adequ	uate		
INFORMATION	N/A	N/A	N/A	date of last interior inspection?	2008			

passive or active cathodic protection in place (yes or no) and is it maintained and adequate? Active Cathodic Protection and it is adequate but not maintained

has seismic stability been evaluated by a qualified engineer? At time of design and construction.

other known problems (e.g. adequate freeboard, stagnant water)? None

estimated service life remaining? 37 years based on AWU Useful Life

concern with tank compliance with seismic requirements? No

ction in place (yes or no) and is it maintained and adequate?

space available to add solar panels?

known fire or haz-mat conditions that could be mitigated?
Location of trees in proximity to the tank
tank foundation type?
Concrete Ring foundation with anchor bolts
tank foundation condition?
The foundation is in excellent condition

6.00

5.00 6.00 3.00 4.00

5.00

4.00

4.00

				South Tahoe PUD	Location Description:	Access Road from end of Chia	pa Dr K/J I	Project Number: 1270004*00	
				Water System Optimization Plan	Tank Facility ID #:	FPTK2		Date:	3/15/2012
							Condit	ion Assessment	
					Tank Facility Name:	Flagpole Tank #2		Inspectors:	Peter Lavallee and Jeremy Rutherdale
					Pressure Zones Served:	Flagpole Zone	Adjacent	Pressure Zones:	Arrowhead and Twin Peaks Zones
				Piping & Valves					
PM	1	5	5.00	coatings adequate to protect piping and valves?	Coatings on piping in inspection report look adequate				
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	Yes				
Fn	3	3	9.00	tank-piping connections designed to accommodate settlement or movement?	Unknown				
Fn	1	4	4.00	valves are suitable for efficient and reliable service?	There have been no issues with and of the valving				
INFORMATION	N/A	N/A	N/A	other known problems?					
PM	1	4	4.00	estimated service life remaining?	47 years based on AWU Useful Life				
				SCADA system					
R	5	2	10.00		Calibrated when a problem has been identified				
Fn	1	4	4.00	automated alarm callout for critical failures and reliability?					
Fn	1	4	4.00		Alarm log is maintained but it is not reviewed annually				
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	Radio				
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)?	No communication failures within the last year				
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?					
R INFORMATION	1 N/A	3	3.00	spare parts/service support readily available?					
PM	, , , , , , , , , , , , , , , , , , ,	N/A 4	N/A 8.00		No other known problems with the SCADA Estimated 10 year service life remaining.				
PIVI	2	4	8.00	estinated service me remaining:	Estimated 10 year service life remaining.				
				Additional Data					
				Additional Data					
				Legend					
					Physical Mortality				
					Functionality				
					Reliability				
					Financial Efficiency				
					Capacity				

Water System Optimization Files Trank Facility ID E Trank Facility Attenue Pressure Zones Pressure Zones Served Pressure Zones Served Pressure Zones Served Pressure Zones Served Pressure Zones Served Pressure Zones Served Pressure Zones Served Pressure Zones Served Pressure Zones Served Pressure Zones P		South Tahoe PUD	Location Description:	Access Road from end of Chiapa Dr	K/J Project Number: 1270004*0	00
Tank Facility Name: Plays of Tank 20 Inspect One: Pressure Zones Served: Rugoset Date Adjacent Pressure Zones Consumer and Tank Pack Zone. Prests Secrete for PRA Fr. R. R. PROTOS		Water System Optimization Plan	Tank Facility ID #:	FPTK2		3/15/2012
Pressure Zones Served: Predict Cidente for PNI, Tr. II, Ti. PHOTOS			Tank Facility Name:	Flagpole Tank #2		Peter Lavallee and Jeremy Rutherdale
PHOTOS PHOTOS PHOTOS SOTT FOLIAGE STAD FOLIAGO FOLI						
PHOTOS WITH LIBRATO PICAL TRA			Pressure zones serveu:	riagpoie Zone	Aujacent Fressure Zones.	Arrownead and Twin Peaks Zones
2011/AN/19 F100 PM 2011/AN/19 F100 PM 2011/AN/19 F100 PM		Photo Evidence for PM, Fn, R, f	FE Is the downslope portion of the tank constructed		ation? Yes Any bacterilogical exceedance at this tank? Will Verify	
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CHECK 10							
CHECK 10	Water System Optimization Plan	Tank Facility I	D#: FMTK		Date:	3/12/201	2
CHECK 10	Trace: System Spannization Flan		TMIK		Condition Assessment	3,12,201	
CHECK 10		Tank Facility Na	me: Forest Mountain	in Tank	Inspectors:	Peter Lavallee and F	Phill Torney
CHECK 10		-					•
CHECK 10		Pressure Zones Serv	ved: Forest Mountain a	and Zone	Adjacent Pressure Zones:	Angora Highlands and Tv	win Peaks Zones
CHECK 10							
CHECK 10	Notes:		Failu	ure Mode Scoring (1 - 5)			
CHECK 10	Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Leve	l of Service	Financial Efficiency	
CHECK 10	For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
CHECK 10	For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	 exceeds all requirements 	1: failure every > 25 years	1: best available technology	
CHECK 10		2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements		2: financial efficiency is high	
CHECK 10		3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
CHECK 10		4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
CHECK 10		5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
CHECK 10	California Waterworks Standards						
CHECK 10	Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
CHECK 10	Unweighted Failure Mode Score (1-5)	1.00	N/A	1.73	N/A	N/A	Total Factored Scor
CHECK 10	Weighted Final Score (1-25)	5.00	N/A	7.73	N/A	N/A	
CHECK 10	100% Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A N/A	N/A	
CHECK 10	Factored Score	1.00	N/A	6.18	N/A N/A	N/A	7.18
CHECK 10	Criticality Score	1.00	IV/M	0.10	IN/A	20%	1.44
CHECK 10	Tank Site					20/0	1,44
CHECK 10		21/2	21/2			21/0	
CHECK 10	Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Scor
CHECK 10	Unweighted Failure Mode Score (1-5)	N/A	N/A	2.00	1.60	N/A	Total Factored Scot
CHECK 10	Weighted Final Score (1-25)	N/A	N/A	8.00	5.60	N/A	
	100% Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
	Factored Score	N/A	N/A	5.60	1.68	N/A	7.28
	Criticality Score					40%	2.91
	Tank Structure						
	Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	T
	Unweighted Failure Mode Score (1-5)	1.00	5.00	1.00	1.57	N/A	Total Factored Scor
	Weighted Final Score (1-25)	4.00	25.00	3.75	4.00	N/A	
CHECK 10	100% Criticality Weighting Factor (0 - 100%)	10%	30%	50%	10%	N/A	
CHECK 10	Factored Score	0.40	7.50	1.88	0.40	N/A	10.18
CHECK 10	Criticality Score					15%	1.53
CHECK 10	Piping & Valves				1		
CHECK 10	Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	N/A	N/A	Tatal Factors 10
CHECK 10	Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	N/A	N/A	Total Factored Scor
CHECK 10	Weighted Final Score (1-25)	4.50	N/A	3.50	N/A	N/A	
	100% Criticality Weighting Factor (0 - 100%)	10%	30%	60%	N/A	N/A	
	Factored Score	0.45	N/A	2.10	N/A	N/A	2.55
	Criticality Score					15%	0.38
	SCADA System				_		
	Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
	Unweighted Failure Mode Score (1-5)		N/A	1.00	2.25	N/A	Total Factored Scor
		8.00	N/A	4.00	6.00	N/A	
CHECK 10	Weighted Final Score (1-25)				30%	N/A	
	100% Criticality Weighting Factor (0 - 100%)	10%	N/A	60%			
		10% 0.80	N/A N/A	2.40	1.80	N/A 10%	5.00 0.50

				South Tahoe PUD Location Description	Access Rd off of Forest Mountain Dr.	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #	FMTK	Date:	3/12/2012
				Tank Facility Name	Forest Mountain Tank	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served	Forest Mountain and Zone	Adjacent Pressure Zones:	Angora Highlands and Twin Peaks Zones
Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST		

		Importance		CONDITION ASSESSMENT CHECKLIST			
Failure Mode Type	Score	Weighting (1-5)	Weighted Score				
				Calif. Waterworks Standards			
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, les			
Fn	1	5	5.00	rodents, or other animals)? Yes			
				sample tap(s) provided to measure water quality into, out of and inside tank and protected			
Fn	1	3	3.00	from freezing?			
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? Same inlet and outlet			
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? There is an air gap			
Fn	1	3	3.00	tank draining removes residual sediments? Yes			
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA			
Fn	11	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes			
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? There is no fence or other site security			
Fn	1	3	3.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes there are two manways and a roof hatch which let in a lot of light			
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes			
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? No			
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes			
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Tank was recoated in 2008			
				Took Site			
F.		4	16.00	Tank Site			
Fn	<u>4</u> 1	-	16.00	adequate vehicle access for year-round maintenance? No access in the wintertime by vehicle but can be walked to			
К	_	3	3.00	is site within 100-yr flood plain?] No. This site is indicated as other areas Zone X on the FEMA flood map.			
R	1	5	5.00	is site vulnerable to wildfires? Yes it was in the Angora Burn Area			
K	4	5	5.00	any unstable site conditions (if yes, describe)? None is site close to known active seismic faults? 5,000 ft. from nearest fault			
ĸ	4	3	12.00	site drainage adequate to prevent flooding of tank foundation, buildings and critical			
D	1	3	3.00	site drainings are experted to prevent flooding or talk foundation, buildings are critical equipment?			
ĸ	1	3	3.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized			
Fn			0.00	Site lighting, letting, and setting monitoring deequate to discontant database and authorized and setting at this location access/vandalism? No fencing at this location			
INFORMATION	N/A	N/A	N/A	other known problems? None			
	,,,	14/1	,/.				
				Tank Structure			
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed			
INFORMATION	N/A	N/A	N/A	concrete, etc.) Welded Tank			
INFORMATION	N/A	N/A	N/A	what is tank volume? 158,000			
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?			
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?			
INFORMATION	N/A	N/A	N/A	what is emergency storage available?			
С	5	5	25.00	overall tank volume to meet District sizing requirements?			
INFORMATION	N/A	N/A	N/A	date tank was constructed? 2001			
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? The tank was recoated in 2008			
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? There is adequate clearance around the outside of the tank			
Fn	4	4	4.00	tack freehoard dimension from energing high water level to top of tank everflow? Edequate 3.9 ft. of freeboard and it is adequate as it complies with standard at time of construction			
FI)	1	5	4.00 5.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? Tank is designed to withstand snow load and not create safety issue? Tank is designed to withstand snow load.			
PM	1	5	5.00	condition of exterior coatings adequate to protect structure? Coatings are in like new condition			
Fivi	1	4	4.00	adequate openings for ingress/egress? There are two manways and one roof hatch			
INFORMATION	N/A	N/A	N/A	date of last interior inspection? 2008			
	,,,	.41.	,,,	·			
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate?			
R	5	1	5.00	space available to add solar panels? _{no}			
R	1	2	2.00	known fire or haz-mat conditions that could be mitigated? None			
R	1	3	3.00	tank foundation type? Concrete Ring with anchor bolts			
R	1	4	4.00	tank foundation condition? Excellent			
R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? Yes at time of installation			
R	1	4	4.00	concern with tank compliance with seismic requirements? No			
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water)? None			
PM	1	4	4.00	estimated service life remaining? 39 years based on AWU Useful Life			

				South Tahoe PUD	Location Description:	Access Rd off of Forest Me	ountain Dr.	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Tank Facility ID #:	FMTK		Date:	3/12/2012
								Condition Assessment	
					Tank Facility Name:	Forest Mountain T	ank	Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Forest Mountain and	Zone	Adjacent Pressure Zones:	Angora Highlands and Twin Peaks Zones
				Piping & Valves					
PM	1	5	5.00	coatings adequate to protect piping and valves?	Yes the coatings on the interior of the tank wer	re done after the Angora fire			
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?					
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement?					
Fn	1	4	4.00	valves are suitable for efficient and reliable service?					
INFORMATION	N/A	N/A	N/A	other known problems?					
PM	1	4	4.00	estimated service life remaining?	49 years based on AWU Useful Life				
				SCADA system					
R	5	2	10.00			Fransmitter calibration is done when a problem is identified			
Fn	1	4	4.00	automated alarm callout for critical failures and reliability?					
Fn	1	4	4.00		The alarm log is maintained but it is not review	ved on an annual basis			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?					
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)?	There are no communication failures within the	e last year			
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?					
R	2	3	6.00		Parts are readily available at the plant and thro				
INFORMATION	N/A	N/A	N/A		No other known electrical problems at this site	2			
PM	2	4	8.00	estimated service life remaining?	Estimated 10 year service life remaining.				
				Additional Data					
				Legend	Physical Mortality				
					Functionality				
					Reliability				
					Financial Efficiency				
				C	Capacity				

South Tahoe PUD	Location Description:	Access Rd off of Forest Mountain Dr.	K/J Project Number:	270004*00
Water System Optimization Plan	Tank Facility ID #:	FMTK	Date:	3/12/2012
	Tank Facility Name:	Forest Mountain Tank	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
	Pressure Zones Served:	Forest Mountain and Zone	Adjacent Pressure Zones:	Angora Highlands and Twin Peaks Zones
Photo Evidence for PM, Fn, R, FE	F In the dayperlane parties of the task constructed as fill? Vo	Does tank quarflow drain adequately to protect tank foundation	a2 Vac Any hactorilarical exceedance at this tank?	HIII Varifu
Those Execute for his, his, is,	s the downshope portion of the tank constructed on him:	PHOTOS	ii: 165 Any Datternogical exceedance at this talik: 1	voi veiny
2011/05/24/20/08/8/8	20111/05/22	OZATIS RM		

			South Tahoe PUD	Location Description	Access Rd from end of	Panther Lane	K/J Project Number:	1270004*00	
			Water System Optimization Plan	Tank Facility ID #	#: GMTK1		Date:	3/15/2	012
			water System Optimization Flan	Turk rucincy 15 h	N GIVITAL		Condition Assessment	5/15/2	012
				Tank Facility Name	Gardner Mountain	Tank #1	Inspectors:	Peter Lavallee and J	eremy Rutherdale
									,
				Pressure Zones Served	Gardner Mountain Zone/Stateline Zo	one depending on Valving	Adjacent Pressure Zones:	Stateline Zone depe	ending on Valving
			Notes:		Failu	re Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
			For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
			3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements		1: best available technology	
				2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
				3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
		1		4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
				5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
			California Waterworks Standards						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		1	Unweighted Failure Mode Score (1-5)		N/A	1.73	N/A	N/A	Total Factored Score
+					N/A	7.73	N/A	N/A	
			Weighted Final Score (1-25)		,		-	·	
	CHECK	100%	, , ,	20%	N/A	80%	N/A	N/A	
			Factored Score	II.	N/A	6.18	N/A	N/A	7.18
			Criticality Score					20%	1.44
			Tank Site						
			Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	2.00	2.60	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	8.00	10.20	N/A	
	CHECK	100%		N/A	N/A	70%	30%	N/A	
	CHECK	10070	Factored Score	·	N/A	5.60	3.06	N/A	8.66
			Criticality Score	•	NA	3.00	3.00	40%	3.46
			Tank Structure					40/0	3,40
			Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	T-1-1 F1 1 C
			Unweighted Failure Mode Score (1-5)		5.00	1.00	2.43	N/A	Total Factored Score
			Weighted Final Score (1-25)		25.00	3.75	6.14	N/A	
	CHECK	100%	, , ,	10%	30%	50%	10%	N/A	
		1	Factored Score	0.40	7.50	1.88	0.61	N/A	10.39
								15%	1.56
			Criticality Score						
			Piping & Valves						
			Piping & Valves		Calculated	Calculated	N/A	N/A	
				Calculated	Calculated N/A	Calculated 1.00	N/A N/A	N/A N/A	Total Factored Score
			Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated			-	· · · · · · · · · · · · · · · · · · ·	Total Factored Scor
	CHECK	100%	Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	Calculated 1.00 4.50	N/A N/A	1.00 3.50	N/A N/A	N/A N/A	Total Factored Score
	СНЕСК	100%	Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 1.00 4.50 10%	N/A N/A 30%	1.00 3.50 60%	N/A N/A N/A	N/A N/A N/A	
	CHECK	100%	Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	Calculated 1.00 4.50 10% 0.45	N/A N/A	1.00 3.50	N/A N/A	N/A N/A N/A N/A	2.55
	CHECK	100%	Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	Calculated 1.00 4.50 10% 0.45	N/A N/A 30%	1.00 3.50 60%	N/A N/A N/A	N/A N/A N/A	
	CHECK	100%	Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-2) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System	Calculated 1.00 4.50 10% 0.45	N/A N/A 30% N/A	1.00 3.50 60% 2.10	N/A N/A N/A N/A	N/A N/A N/A N/A N/A 15%	2.55
	CHECK	100%	Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned?	Calculated 1.00 4.50 10% 0.45	N/A N/A 30% N/A	1.00 3.50 60% 2.10	N/A N/A N/A N/A Calculated	N/A N/A N/A N/A 15%	2.55 0.38
	CHECK	100%	Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 1.00 4.50 10% 0.45	N/A N/A 30% N/A N/A	1.00 3.50 60% 2.10	N/A N/A N/A N/A N/A Calculated 2.00	N/A N/A N/A N/A 15%	2.55 0.38
			Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	Calculated 1.00 4.50 10% 0.45 Calculated 2.00 8.00	N/A N/A 30% N/A N/A N/A	1.00 3.50 60% 2.10 Calculated 1.00 4.00	N/A N/A N/A N/A Calculated 2.00 5.25	N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A	2.55 0.38
	CHECK	100%	Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 1.00 4.50 10% 0.45 Calculated 2.00 8.00 10%	N/A N/A 30% N/A N/A N/A N/A	1.00 3.50 60% 2.10 Calculated 1.00 4.00 60%	N/A N/A N/A N/A N/A Calculated 2.00 5.25 30%	N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A	2.55 0.38 Total Factored Score
			Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-25) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	Calculated 1.00 4.50 10% 0.45 Calculated 2.00 8.00 10% 0.80	N/A N/A 30% N/A N/A N/A	1.00 3.50 60% 2.10 Calculated 1.00 4.00	N/A N/A N/A N/A Calculated 2.00 5.25	N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A	2.55 0.38 Total Factored Score
			Piping & Valves Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 1.00 4.50 10% 0.45 Calculated 2.00 8.00 10% 0.80	N/A N/A 30% N/A N/A N/A N/A	1.00 3.50 60% 2.10 Calculated 1.00 4.00 60%	N/A N/A N/A N/A N/A Calculated 2.00 5.25 30% 1.58	N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A	0.38 Total Factored Score

	South Tahoe PUD	Location Description:	Access Rd from end of Panther Lane	K/J Project Number: 1270004	*00
	Water System Optimization Plan	Tank Facility ID #:	GMTK1	Date:	3/15/2012
		Tank Facility Name:	Gardner Mountain Tank #1	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
		Pressure Zones Served:	Gardner Mountain Zone/Stateline Zone depending on Valving	Adjacent Pressure Zones:	Stateline Zone depending on Valving

		Importance	<u> </u>	COMPLETION ACCESSATALT CUERCULIST		
Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score	CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards		
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,		
Fn	1	5	5.00	rodents, or other animals)? Yes		
				sample tap(s) provided to measure water quality into, out of and inside tank and protected ves		
Fn	1	3	3.00	from freezing?		
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? Same inlet and outlet		
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? There is an air gap		
Fn	1	3	3.00	tank draining removes residual sediments? Yes		
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA		
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes		
Fn Fn	5 1	3	25.00 3.00	adequate security measures and monitoring to prevent unauthorized access? There is no fence or other site security The graffiti and unauthorized access is a problem at this site		
Fn	1	5	5.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes there are two manways and a roof hatch which let in a lot of light adequate isolation valves and bypass to take tank offline and maintain water service? Yes		
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Not used for CT		
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes		
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Yes		
1 141	-		3.00			
				Tank Site		
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? Adequate except for periods of heavy snow		
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.		
R	5	5	25.00	is site vulnerable to wildfires? I ves it is adjacent to open space and wooded lots. The tank is at the edge of the Angora Burn Area and is within the forest		
R	1	5	5.00	any unstable site conditions (if yes, describe)? None		
R	4	3	12.00	is site close to known active seismic faults? 900 ft. from nearest fault		
				site drainage adequate to prevent flooding of tank foundation, buildings and critical		
R	1	3	3.00	equipment? Ves		
Fn			0.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? No there is graffiti in all accessible areas of the tank and on the roof of the tank		
INFORMATION	N/A	N/A	N/A	other known problems? None		
				Tank Structure		
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed		
INFORMATION	N/A	N/A	N/A	concrete, etc.) Welded Steel		
INFORMATION	N/A	N/A	N/A	what is tank volume? 212,000		
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?		
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?		
INFORMATION	N/A	N/A	N/A	what is emergency storage available?		
С	5	5	25.00	overall tank volume to meet District sizing requirements?		
INFORMATION	N/A	N/A	N/A	date tank was constructed? 2002		
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? Exterior has been repainted numerous times due to graffiti		
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes		
Fn	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? 3 ft. of freeboard which is adequate and complies with standard at time of construction		
PII D	1	5	5.00	tank designed to withstand spoul load and not create activities (1900) by the state of contraction to the state of the sta		
PM	1	-		tank designed to withstand snow load and not create safety issue? Yes it met the design loads at the time of construction condition of exterior coatings adequate to protect structure? The coatings are adequate but have been spray painted numerous times		
Fn	1	5	5.00 4.00	adequate openings for ingress/egress? Yes there are two manways and one roof hatch		
INFORMATION	N/A	N/A	4.00 N/A	date of last interior inspection? 2008		
INTONVATION	N/A	IV/A	N/A			
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate? impressed current cathodic protection		
R	5	1	5.00	space available to add solar panels? No		
R	4	2	8.00	known fire or haz-mat conditions that could be mitigated? None other than potential for wildfire		
R	4	3	12.00	tank foundation type? concrete ring with anchor bolts most of the nuts have been removed by vandals		
R	1	4	4.00	tank foundation condition? Excellent		
R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? No		
R	1	4	4.00	concern with tank compliance with seismic requirements? No		
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water)? None		
PM	1	4	4.00	estimated service life remaining? 40 years based on AWU Useful Life		

				South Tahoe PUD Location Description:	Access Rd from end of Panther Lane	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #:	GMTK1	Date:	3/15/2012
				Water System Optimization Film	GWIRI	Condition Assessment	3/13/2012
				Tank Facility Name:	Gardner Mountain Tank #1	Inspectors:	Peter Lavallee and Jeremy Rutherdale
				Pressure Zones Served:	Gardner Mountain Zone/Stateline Zone depending on Valving	Adjacent Pressure Zones:	Stateline Zone depending on Valving
				Piping & Valves			
PM	1	5	5.00	coatings adequate to protect piping and valves? Yes			
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?			
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement? Yes			
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Yes there have been no issues with valving since the	ney were installed		
INFORMATION	N/A	N/A	N/A	other known problems? None	•		
PM	1	4	4.00	estimated service life remaining? 50 years based on AWU Useful Life			
				SCADA system			
R	5	2	10.00	frequency of level transmitter calibration? Calibrated when a problem has been identified			
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes and monitored by District operations			
Fn	1	4	4.00	alarm log maintained and reviewed annually? Alarm log is maintained but it is not reviewed annually?	ally		
INFORMATION	N/A 1	N/A 4	N/A 4.00	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio communication system is reliable (approximate no. of comm. failures in last year)? No communication failures within the last year			
R R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure? Yes and monitored by District operations			
R	1	3	3.00	spare parts/service support readily available? Yes and monitored by District operations			
INFORMATION	N/A	N/A	N/A	other known problems? No other known problems with the SCADA			
PM	2	4	8.00	estimated service life remaining? 11 years remaining according to AWU Useful Life			
				Additional Data			
				Legend			
				PM Physical Mortality			
				Fn Functionality			
				R Reliability FE Financial Efficiency			
			-	Сарасту			

	South Tahoe PUD	Location Description:	Access Rd from end of Panther Lane	K/J Project Number:	1270004*00
	Water System Optimization Plan	Tank Facility ID #:	GMTK1	Date:	3/15/2012
	water system optimization ran			Condition Assessment	
		Tank Facility Name:	Gardner Mountain Tank #1	Inspectors:	Peter Lavallee and Jeremy Rutherdale
		Pressure Zones Served:	Gardner Mountain Zone/Stateline Zone depending on Valving	Adjacent Pressure Zones:	Stateline Zone depending on Valving
	Photo Evidence for PM, Fn, R, F	FE Is the downslone nortion of the tank constructe	d on fill? Yes Does tank overflow drain adequately to protect tank foundation? Yes Any	nacterilogical exceedance at this tank?	Will Varify
		is the downstope portion of the tank constructed	PHOTOS	notice no please executative at this torik.	The Issue
		2011/05/	27 03:22 PM 2011/05/27 03	22 PM	Tenantill tofferen Ref Sept. 1. High refulation re
	2011/05/27 03:22:PM	2011/05	27 03:23 PM	790	2011/05/27 03/24 RM
2011//ds/27 03/24 PM	2011/03/27 08:28 PM	2011/05/2	7 03:25 PM	30 PM	20 M / 05/27 03/30 PM

		Sc	outh Tahoe PUD	Location Descriptio	n: Access road from end	of Panther Ln	K/J Project Number:	1270004*00	
		14	Vater System Optimization Plan	Tank Facility ID	#: GMTK2		Date:	3/15/201	12
			vater system optimization rian	Tank radinty is	GWIKZ			3/13/201	12
				Tank Facility Nam			Condition Assessment		
				Tank Facility Nam	e: Gardner Mountain	n Tank #2	Inspectors:	Peter Lavallee and Jere	emy Rutherdale
				Pressure Zones Serve	d: Gardner Mountain and Stateline Z	one depending on valving	Adjacent Pressure Zones:	Stateline Zone depend	ding on valving
		No	otes:		Failu	ure Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Leve	l of Service	Financial Efficiency	
			For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
		3.	For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
				2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
				3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
				4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
				5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
			California Waterworks Standards						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)	1.00	N/A N/A	1.73	N/A N/A	N/A	Total Factored Scor
				5.00	N/A N/A	7.73	N/A N/A	N/A	
	CHECK	100%	Weighted Final Score (1-25)		N/A N/A		N/A N/A	N/A	
	CHECK	100%	Criticality Weighting Factor (0 - 100%)		•	80%			7.10
			Factored Score		N/A	6.18	N/A	N/A	7.18
			Criticality Score					20%	1.44
			Tank Site						
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	T-1-1 F1 C
			Unweighted Failure Mode Score (1-5)	N/A	N/A	8.00	10.20	N/A	Total Factored Scor
			Weighted Final Score (1-25)		N/A	8.00	10.20	N/A	
	CHECK	100%	Criticality Weighting Factor (0 - 100%)	N/A	N/A	70%	30%	N/A	
			Factored Score	•	N/A	5.60	3.06	N/A	8.66
			Criticality Score					40%	3.46
			Tank Structure						
			Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		5.00	1.00	2.43	N/A	Total Factored Sco
			Weighted Final Score (1-25)		25.00	3.75	6.14	N/A	
	CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	30%	50%	10%	N/A	
			Factored Score		7.50	1.88	0.61	N/A	10.39
			Criticality Score					15%	1.56
			Piping & Valves						
			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	N/A	N/A	Total Factored Sco
			Weighted Final Score (1-25)	4.50	N/A	3.50	N/A	N/A	
	CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	30%	60%	N/A	N/A	
			Factored Score		N/A	2.10	N/A	N/A	2.55
			Criticality Score					15%	0.38
			SCADA System						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	1.00	2.00	N/A	Total Factored Sco
			Weighted Final Score (1-25)		N/A	4.00	5.25	N/A	
	CHECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	30%	N/A	
	CHECK	100/6	Factored Score		N/A	2.40	1.58	N/A	4.78
			Criticality Score		N/O	2.70	2.50	10%	0.48
			Citicality Score					verall Total Factored Score (Out of 25) =	0,40

		South Tahoe PUD	Location Description:	Assessment of the state of	K/J Project Number:	43770004#00
		South Tande POD	Location Description:	Access road from end of Panther Ln	K/J FTOJECT Number.	1270004*00
		Water System Optimization Plan	Tank Facility ID #:	GMTK2	Date:	3/15/2012
					Condition Assessment	
			Tank Facility Name:	Gardner Mountain Tank #2	Inspectors:	
			Pressure Zones Served:	Gardner Mountain and Stateline Zone depending on valving	Adjacent Pressure Zones:	Stateline Zone depending on valving
Failure Manda Tura	C	Importance		CONDITION ASSESSMENT CHECKLIST		

Failure Mode Type	Score	Importance Weighting (1-5)	Weighted Score	CONDITION ASSESSMENT CHECKLIST
Tunuic Mode Type	30010	Weighting (1 3)	Weighted Score	Calif. Waterworks Standards
Fn	1	5	F 00	tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, redepts, or other animals). Yes
rii	1	3	5.00	rodents, or other animals)? '
Fn	1	3	3.00	from Freezing?
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? Same inlet and outlet
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? There is an air gap
Fn	1	3	3.00	tank draining removes residual sediments? Yes
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? There is no fence or other site security The graffiti and unauthorized access is a problem at this site
Fn	1	3	3.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes there are two manways and a roof hatch which let in a lot of light
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Not used for CT
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Yes
				Tank Site
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? Adequate except for periods of heavy snow
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	5	5	25.00	is site vulnerable to wildfires? Yes it is adjacent to open space and wooded lots. The tank is at the edge of the Angora Burn Area and is within the forest
R	1	5	5.00	any unstable site conditions (if yes, describe)? None
R	4	3	12.00	is site close to known active seismic faults? 900 ft. from nearest fault
				site drainage adequate to prevent flooding of tank foundation, buildings and critical
R	1	3	3.00	equipment? I res
				site lighting, fencing, and security monitoring adequate to discourage unauthorized No there is graffiti in all accessible areas of the tank and on the roof of the tank
Fn			0.00	accessy variations:
INFORMATION	N/A	N/A	N/A	other known problems? None
				Tank Structure
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed concrete, prestressed Welded Steel
INFORMATION	N/A	N/A	N/A	Concrete, etc.)
INFORMATION	N/A	N/A	N/A	what is tank volume? 212,000
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?
INFORMATION	N/A	N/A	N/A	what is emergency storage available?
C	5	5	25.00	overall tank volume to meet District sizing requirements?
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	date tank was constructed? 1998
Fn	1	3	3.00	date and describe work done to renew or upgrade tank and tank facilities? Exterior has been repainted numerous times due to graffiti adequate perimeter clearance to facilitate routine O&M? Yes
FII		3	3.00	
Fn	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? 3 feet which is adequate? 3 feet which is adequate?
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Yes it met the design loads at the time of construction
PM	1	5	5.00	condition of exterior coatings adequate to protect structure? The coatings are fine but the graffiti is thick on the lower section
Fn	1	4	4.00	adequate openings for ingress/egress? Yes there are two manways and one roof hatch
INFORMATION	N/A	N/A	N/A	date of last interior inspection?] 2008
	,	4	,	
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate? impressed current cathodic protection
R	5	1	5.00	space available to add solar panels? No
R	4	2	8.00	known fire or haz-mat conditions that could be mitigated? None other than potential for wildfire
R	4	3	12.00	tank foundation type? concrete ring with anchor bolts and some of the nuts have been removed
R	1	4	4.00	tank foundation condition? Excellent
R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? No
R	1	4	4.00	concern with tank compliance with seismic requirements? No
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water)? None
PM	1	4	4.00	estimated service life remaining? 36 years based on AWU Useful Life

			<u> </u>						
				South Tahoe PUD	Location Description:	Access road from end of I	Panther Ln	K/J Project Number: 1270004*0	0
				Water System Optimization Plan	Tank Facility ID #:	GMTK2		Date:	3/15/2012
								Condition Assessment	
					Tank Facility Name:	Gardner Mountain Ta	ank #2	Inspectors:	Peter Lavallee and Jeremy Rutherdale
					•				
					Pressure Zones Served:	Gardner Mountain and Stateline Zone	e depending on valving	Adjacent Pressure Zones:	Stateline Zone depending on valving
				Piping & Valves					
PM	1	5	5.00	coatings adequate to protect piping and valves?					
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	Yes				
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement?	Yes				
Fn	1	4	4.00	valves are suitable for efficient and reliable service?		they were installed			
INFORMATION	N/A	N/A	N/A	other known problems?					
PM	1	4	4.00	estimated service life remaining?	46 years based on AWU Useful Life				
				SCADA system					
R	5	2	10.00		Calibrated when a problem has been identified				
Fn	1	4	4.00	automated alarm callout for critical failures and reliability?					
Fn	1	4	4.00		Alarm log is maintained but it is not reviewed a	nnually			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?					
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)?	No communication failures within the last year				
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?	Yes and monitored by District operations				
R	1	3	3.00	spare parts/service support readily available?					
INFORMATION	N/A	N/A	N/A	other known problems?	No other known problems with the SCADA				
PM	2	4	8.00	estimated service life remaining?	11 years remaining according to AWU Useful Lif	e			
				Additional Data					
				Legend					
					Physical Mortality				
					Functionality				
				R	Reliability				
				FE	Financial Efficiency				
					Capacity				

	South Tahoe PUD	Location Description:	Access road from end of Panther Ln	K/J Project Number: 1270004*0	0
	Water System Optimization Plan	Tank Facility ID #:	GMTK2	Date:	3/15/2012
				Condition Assessment	
		Tank Facility Name:	Gardner Mountain Tank #2	Inspectors:	Peter Lavallee and Jeremy Rutherdale
		Pressure Zones Served:	Gardner Mountain and Stateline Zone depending on valving	Adjacent Pressure Zones:	Stateline Zone depending on valving
	Photo Evidence for PM,	Fn, R, FE is the downslope portion of the tank constructed		Yes Any bacterilogical exceedance at this tank? Will Verify	
			PHOTOS		
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	South Tahoe PL	D	Location Descript	ion: Access road from corner of H St. ar	nd Tata Lane, 1389 Tata Ln	K/J Project Number:	1270004*00	
	Water System (ptimization Plan	Tank Facility	D #: HSTTK		Date:	3/8/201	2
	water system c	pullization rian	Tank I denicy	D #1.				2
			Tools Coellins No			Condition Assessment		
			Tank Facility Na	me: H. St. Tan	ık	Inspectors:	Peter Lavallee and	Mark Gray
			Pressure Zones Ser	/ed: H. St. Zon		Adjacent Pressure Zones:	Stateline Z	ono
			riessure Zones Ser	11. 31. 2011	ie .	Adjudent Fessure Zonesi	Stateline 2	one
	Neteri			Failu	ure Mode Scoring (1 - 5)			
	Notes:	Il be based on hydraulic model	Physical Mortality	Capacity		el of Service	Financial Efficiency	
	' '	e determined based on CMMS maintenance records	Filysical Wortainty	Сарасіту	functionality	reliability	Financial Efficiency	
	-		1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
			4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standards			0.1.1.1		11/4	
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	Total Factored Scor
		Unweighted Failure Mode Score (1-5)	1.00	N/A	1.73	N/A	N/A	Total Factored Sco
		Weighted Final Score (1-25)	5.00	N/A	7.73	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	20%	N/A	80%	N/A	N/A	
		Factored Score	1.00	N/A	6.18	N/A	N/A	7.18
		Criticality Score					20%	1.44
		Tank Site						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	Total Factored Coor
		Unweighted Failure Mode Score (1-5)	N/A	N/A	8.00	8.60	N/A	Total Factored Scor
	1004	Weighted Final Score (1-25)	N/A	N/A	8.00	8.60	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score	N/A N/A	N/A N/A	70% 5.60	30% 2.58	N/A N/A	0.10
		Criticality Score	N/A	N/A	5.60	2.58	N/A 40%	8.18 3.27
		· ·					40%	3.27
		Tank Structure					21/2	
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	Total Factored Sco
		Unweighted Failure Mode Score (1-5)	2.33 10.33	1.00 5.00	1.00 3.75	3.14 9.57	N/A	Total Pactored 300
CHECK	100%	Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	10.33	30%	50%	9.57	N/A N/A	
CHECK	100%	Factored Score	1.03	1.50	1.88	0.96	N/A N/A	5.37
		Criticality Score	1.03	1.50	1.00	0.50	15%	0.80
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)	1.00	N/A	1.00	N/A N/A	N/A N/A	Total Factored Scor
		Weighted Final Score (1-25)	4.50	N/A	3.50	N/A	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	30%	60%	N/A	N/A	
1		Factored Score	0.45	N/A	2.10	N/A	N/A	2.55
		Criticality Score				<u> </u>	15%	0.38
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	1.00	2.25	N/A	Total Factored Sco
		Weighted Final Score (1-25)	8.00	N/A	4.00	6.00	N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	N/A	60%	30%	N/A	
		Factored Score		N/A	2.40	1.80	N/A	5.00
		Criticality Score					10%	0.50
		·					verall Total Factored Score (Out of 25) =	6.40

			!	South Tahoe PUD	Location Description:	Access road from corner of H St. and Tata Lane, 1389 Tata Ln	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Tank Facility ID #:	HSTTK	Date:	3/8/2012
							Condition Assessment	
					Tank Facility Name:	H. St. Tank	Inspectors:	Peter Lavallee and Mark Gray
					Pressure Zones Served:	H. St. Zone	Adjacent Pressure Zones:	Stateline Zone
lure Mode Type	Score	Importance Weighting (1-5)	Weighted Score			CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards				
				tank apprings designed to provent contamination (a.g. rainwater rupoff insects birds				

Company Comp					
Part Part			•		CONDITION ASSESSMENT CHECKLIST
	Failure Mode Type	Score	Weighting (1-5)	Weighted Score	
1					
Part			_		I Voc
1	Fn	1	5	5.00	
1	En	1	2	2.00	
See an approximate of the second process of	****		-		-
1					
1					
			-		
		1	5		
Fig. 1			5		
March Marc	Fn	1	3		
March Marc					V
Fig. 1	Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service?
Part	INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Not used for CT compliance
To	Fn	1	5	5.00	
Fig. 4	PM	1	5	5.00	condition of interior coatings adequate to protect structure? Interior coating was replaced in 2011
Fig. 4					
R					Tank Site
R	Fn	4	4	16.00	adequate vehicle access for year-round maintenance? Yes but is limited during periods of heavy snow
R	R	1	3	3.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone X on the FEMA flood map.
F.	R	4	5	20.00	is site vulnerable to wildfires? Yes near forested area at edge of residential neighborhood
Second process of the contingence of the continge	R	1	5	5.00	any unstable site conditions (if yes, describe)? None
## 1	R	4	3	12.00	is site close to known active seismic faults? 1,177 ft. to the nearest fault line
More More					site drainage adequate to prevent flooding of tank foundation, buildings and critical
ste lighting, feroling, and security monitoring adoquebes to dange as executy monitoring adoquebes to access workdown in the law has a history of usual touried access access workdown in the law has a history of usual touried access and to the law has a history of usual touried access and tourism in the law has a history of usual touried access and tourism in the law has a history of usual touried access and tourism in the law has a history of usual touried access and tourism in the law has a history of usual touried access and tourism in the law has a history of usual touried access and tourism in the law has a history of usual tourism in the law has a history of usual touried access and tourism in the law has a history of usual touried access and tourism in the law has a history of usual tourism in the law has a history of usual tourism in the law has a history of usual tourism in the law has a history of usual tourism in the law has a history of usual tourism in the law has a history of usual tourism in the law has history of us	R	1	3	3.00	equipment?
## MODIALITY NA NA NA NA NA NA NA NA NA NA NA NA NA					site lighting fancing and equility manitoring adequate to discourage unauthorized
TROBATION N/A N/A N/A N/A N/A N/A N/A N/A N/A N/					access/vandalism?
INFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A N/	INFORMATION	N/A	N/A	N/A	other known problems? None
INFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A N/					
INFORMATION N/A N/A N/A N/A SAME Concrete, etc.) INFORMATION N/A N/A N/A N/A SAME SAME SAME SAME SAME SAME SAME SAM					Tank Structure
INFORMATION N/A N/A N/A N/A SAME Concrete, etc.) INFORMATION N/A N/A N/A N/A SAME SAME SAME SAME SAME SAME SAME SAM					describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed Welded Steel
INFORMATION N/A					concrete, etc.)
INFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A N/					
INFORMATION N/A N/A N/A N/A date and describe work done to renew or upgrade tank was constructed? 1590 INFORMATION N/A N/A N/A date and describe work done to renew or upgrade tank was constructed? 1590 INFORMATION N/A N/A N/A N/A date and describe work done to renew or upgrade tank was constructed? 1590 INFORMATION N/A N/A N/A N/A date and describe work done to renew or upgrade tank was constructed? 1590 INFORMATION N/A N/A N/A N/A date and describe work done to renew or upgrade tank was constructed? 1590 INFORMATION N/A N/A N/A N/A date and describe work done to renew or upgrade tank was constructed. The contings on the tank have been rehabbed on the interior in 2011 and will be repainted on the extenior in 2012. INFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A N/					
S S S S S S S S S S					
INFORMATION N/A N/A N/A N/A N/A N/A date and describe work done to review or upgrade tank and tank facilities? Fin 1 3 3 3.00 adequate perimeter dearrance to facilitate routine O&MP? Fin 1 4 4 4.00 tank freeboard dimension from operating high water level to top of tank overflow? adequate? Fin 1 5 5 5.00 tank feeboard dimension from operating high water level to top of tank overflow? adequate? Fin 1 4 4 4.00 condition of exterior coatings and equate to protect structure? Fin 1 4 4 4.00 condition of exterior coatings adequate to protect structure? Fin 1 4 4 4.00 date of last interior inspection? Fin 1 5 5 5.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? Fin 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5				,	
INFORMATION N/A N/A N/A date and describe work done to renew or uggrade tank and tank facilities? Fin 1 3 3.00 adequate perimeter clearance to facilitate routine OSMM yes Fin 1 4 4.00 tank freeboard dimension from operating high water level to top of tank overflow? adequate? R 1 5 5.00 tank designed to withstand snow load and not create safety issue? Fin 1 4 4.00 condition of exterior coatings adequate to protect structure? Fin 1 4 4.00 condition of exterior coatings adequate to protect structure? Fin 1 4 4.00 adequate openings for ingress/depress? INFORMATION N/A N/A N/A DATA date of last interior inspection? Fin 1 5 5 5.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 5 1 5.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 6 5 1 5.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 7 5 1 5.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 7 6 1 5.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 7 7 8 9 9 0 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 8 1 4 4.00 passive cathodic protection in place (yes or no) and is it maintained and adequate? Fin 2 4 4.00 passive cathodic protection in place (yes or no) and is it maintained and adequate? Fin 3 3 3 9.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? Fin 4 4 4.00 passive cathodic protection in place (yes or no) and is it maintained and adequate? Fin 5 1 4 4.00 passive cathodic protection in place (yes or no) and is it maintained and adequate? Fin 5 1 4 4.00 passive cathodic protection in place (yes or no) and is it maintained and adequate? Fin 5 1 4 4.00 passive cathodic protection in place (yes or no) and is it maintained and adequate? Fin 5 1 4 4.00 passive cathodic protection in place (yes or no) and			_		
Fin 1 4 4.00 tank freeboard dimension from operating high water level to top of tank overflow? adequate? Fin 1 4 4.00 tank freeboard dimension from operating high water level to top of tank overflow? adequate? Fin 1 5 5.00 tank designed to winkstand snow loads and not create safety issue? Fin 1 4 4.00 tank freeboard dimension from operating high water level to top of tank overflow? adequate Power			,	,	
Fin 1 4 4.00 tank freeboard dimension from operating high water level to top of tank overflow? adequated by the three requirements of its construction date PM 4 5 20.00 condition of exterior coatings adequate to protect structure; Fin 1 4 4.00 adequate copenings for ingress/gerss? INFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A N/					
He 1 4 4.00 tank freeboard dimension from operating high water level to top of tank overflow? adequater PA 5 5.00 (mank designed to withstand snow load and not review safety) savely Met the requirements of its construction date PM 4 5 20.00 condition of exterior coatings adequate to protect structure? Fin 1 4 4.00 adequate openings for ingress/egress? Now PA N/A N/A N/A N/A N/A N/A date of last interior inspection? PM 1 3 3.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequater PA PA PA PA PA PA PA PA PA PA PA PA PA	FN	1	3	3.00	
R 1 5 5.00 tank designed to withstand snow load and not create safety issue? PM 4 5 20.00 condition of exterior coatings adequate to protect structure? FN 1 4 4.00 adequate openings for ingresy/egress? INFORMATION N/A N/A N/A N/A N/A N/A N/A date of last interior inspection PM 1 3 3.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 5 1 5.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 6 4 2 8.00 known fire or haz-mat conditions that could be mitigated? R 7 8 9 9 0 tank doubton that could be mitigated? R 8 1 1 4 4.00 known fire or haz-mat conditions that could be mitigated? R 8 1 1 4 4.00 tank foundation type? R 9 4 4 5 20.00 has seismic stability been evaluated by a qualified engineer? R 4 4 5 4.00 onter known problems (e.g. adequate freedown, stagent water)? FN 9 1 4 4.00 onter known problems (e.g. adequate freedown, stagent water)? FN 1 4 4.00 onter known problems (e.g. adequate freedown, stagent water)? FN 1 4 4.00 onter known problems (e.g. adequate freedown, stagent water)? FN 1 4 4.00 onter known problems (e.g. adequate freedown, stagent water)? FN 1 4 4.00 onter known problems (e.g. adequate freedown, stagent water)? FN 2 5 20.00 branch mark compliance with seismic requirements? FN 2 6 7 20.00 branch mark compliance with seismic requirements? FN 2 6 7 20.00 branch mark compliance with seismic requirements? FN 3 6 7 20.00 branch mark compliance with seismic requirements? FN 4 6 7 20.00 branch mark compliance with seismic requirements? FN 4 6 7 20.00 branch mark compliance with seismic requirements? FN 5 7 20.00 branch mark compliance with seismic requirements? FN 6 7 20.00 branch mark compliance with seismic requirements? FN 6 7 20.00 branch mark compliance with seismic requirements? FN 7 20.00 branch mark compliance with seismic requirements? FN 7 20.00 branch mark compliance with seismic requirements? FN 7 20.00 branch mark compliance with seismic requirements? FN 8 4 6 7 20.0	En	1	4	4.00	tank freehoard dimension from operation high water level to too of tank overflow? adequate? Yes and complies with standard at time of construction
PM 4 5 20.00 condition of exterior coatings adequate to protect structure? Not currently but planned to be recoated in the summer of 2012 Fin 1 4 4.00 adequate openings for ingress/egress? two manways and one roof hatch N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	R R	-			
Fn 1 4 4.00 adequate openings for ingress/egress? Now manways and one roof hatch NFORMATION N/A N/A N/A N/A N/A N/A N/A N/A N/A date of last interior inspection? PM 1 3 3.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 5 1 5.00 Formation space available to add solar panels? R 4 2 8.00 Known fire or haz-mat conditions that could be mitigated? R 3 3 3 9.00 Sknown fire or haz-mat conditions that could be mitigated? R 4 1 4 4.00 Formation space available to add solar panels? R 5 1 4 4 4.00 Maintain stype? R 6 4 5 2.00 Assismic stability been evaluated by a qualified engineer? R 7 4 4 16.00 Concern with tank compliance with sessinic requirements? Fn 1 4 4.00 Other known problems (e.g. adequate freeboard, stagnant water)? None	PM				condition of exterior coatings adequate to protect structure? Not currently but planned to be recoated in the summer of 2012
INFORMATION N/A N/A N/A N/A N/A date of last interior inspection? PM 1 3 3.00 passive or active cathodic protection in place (yes or no) and is it maintained and adequate? R 5 1 5.00 space available to add solar panels? R 4 2 8.00 known fire or haz-mat conditions that could be mitigated? R 5 3 3 9.00 tank foundation type? R 1 4 4.00 tank foundation conditions? R 4 5 2.000 has seismic stability been evaluated by a qualified engineer? R 4 4 6 5 0.000 toher known problems (e.g. adequate freeboard, stagnant water)? Fin 1 4 4.00 other known problems (e.g. adequate freeboard, stagnant water)? None					
R 5 1 5.00 Space available to add solar panels R 5 1 5.00 Space available to add solar panels R 6 1 5.00 Space available to add solar panels R 6 1 2 8.00 Known fire or haz-mat conditions that could be mitigated? Fire hazard and fall hazard from trees in close proximity to the tank 9 1 4 4.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 8 1 1 4 4 5.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 9 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1	INFORMATION	N/A	N/A		
R 5 1 5.00 Space available to add solar panels R 5 1 5.00 Space available to add solar panels R 6 1 5.00 Space available to add solar panels R 6 1 2 8.00 Known fire or haz-mat conditions that could be mitigated? Fire hazard and fall hazard from trees in close proximity to the tank 9 1 4 4.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 7 5 20.00 Space available to add solar panels R 8 1 1 4 4 5.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 8 1 5 20.00 Space available to add solar panels R 9 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1					A precise cathodic protection system has been planned and is writing for the one year inspection on the interior continue before another as installed
R 4 2 8.00 known fire or haz-mat conditions that could be mitigated? Fire hazard and fall hazard from trees in close proximity to the tank R 3 3 9.00 tank foundation type? Concrete ring with no anchor bolts R 1 4 4.00 tank foundation condition? No spalling of concrete and in good condition R 4 5 20.00 has seismic stability been evaluated with seismic requirements? No spalling of concrete and in good condition R 4 1 6.00 concern with tank compliance with seismic requirements? No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition No spalling of concrete and in good condition	PM		3		passive of active cathodic protection in place (yes of no) and is it maintained and adequate?
R 3 3 9.00 tank foundation type? Concrete ring with no anchor bolts R 1 4 4.00 tank foundation condition? No spalling of concrete and in good condition R 4 5 20.00 has seismic stability been evaluated by a qualified engineer? No spalling of concrete and in good condition R 4 5 4 16.00 concern with tank compliance with seismic requirements? No spalling of concrete and in good condition Oncern with tank compliance with seismic requirements? No spalling of concrete and in good condition Oncern with tank compliance with seismic requirements? No spalling of concrete and in good condition Oncern with tank compliance with seismic requirements? No spalling of concrete and in good condition Oncern with tank compliance with seismic requirements? No spalling of concrete and in good condition	R				
R 1 4 4.00 tank foundation condition? No spalling of concrete and in good condition R 4 5 20.00 has seismic stability been evaluated by a qualified engineer? no R 4 1 16.00 concern with tank compliance with seismic requirements? Fn 1 4 4.00 other known problems (e.g. adequate freeboard, stagnant water)? None	R				
R 4 5 20.00 has seismic stability been evaluated by a qualified engineer? no R 4 4 16.00 concern with tank compliance with seismic requirements? yes Fn 1 4 4.00 other known problems (e.g. adequate freeboard, stagnant water)? None	.,				
R 4 4 16.00 concern with tank compliance with seismic requirements? yes Fn 1 4 4.00 other known problems (e.g. adequate freeboard, stagnant water)? None	10		•		
Fn 1 4 4.00 other known problems (e.g. adequate freeboard, stagnant water)? None	R		-		
TW 2 4 0.00 Communes 1 to years according to Awo Oserial Life	1.11				
	FIVI		4	0.00	Committee Service are remaining. To years according to Awo oserul the

		T					
				South Tahoe PUD Location Description:	Access road from corner of H St. and Tata Lane, 1389 Tata Ln	K/J Project Number: 1270004*00	
					Access road from corner of motivation rate carrey 2003 rate 211	7,1 1,111 1 12 12 12 13	
				Water System Optimization Plan Tank Facility ID #:	HSTTK	Date:	3/8/2012
						Condition Assessment	· '
				Tank Facility Name:	H Ct. To 1	Inspectors:	D. 1 1
				Tank racinty Name.	H. St. Tank	inspectors.	Peter Lavallee and Mark Gray
				Duranina Zanas Camada		Adjacent Pressure Zones:	
				Pressure Zones Served:	H. St. Zone	Adjacent Pressure Zones:	Stateline Zone
				Piping & Valves			
PM	1	5	5.00	coatings adequate to protect piping and valves? Pining inside the tank was recoated in 2011			
				Ves			
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?			
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement? Yes			
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Yes			
INFORMATION	N/A	N/A	N/A	other known problems? None			
PM	1	4	4.00	estimated service life remaining? 28 years according to AWU Useful Life			
				SCADA system			
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is only done when a protection			
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operation	ons		
Fn	1	4	4.00	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewed	ed on an annual basis		
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio	lask was		
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the	last year		
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?			
R	2	3	6.00	spare parts/service support readily available? Parts are readily available at the plant and through	igh the manufacturer		
INFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site	-Bit the managedie.		
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.			
		· ·	0.00	commeted out the community.			
				Additional Data			
				Legend			
				PM Physical Mortality			
				F _{II} Functionality			
				R Reliability			
				FE Financial Efficiency			
				C Capacity			

Water System Optimization Plan Trank Facility ID R Trank Facility Name: A Lis Lis A Condition Assessment Impactsors: Inspectsors: I	Tank Facility Name: Pressure Zones Pressure Zones Punts takene for PALIN, 1, 11 PRESSURE RESIDENCE PRESSURE	South Tahoe PUD	Location Description:	Access road from corner of H St. and Tata Lane,	, 1389 Tata Ln K/J Project Number: 1270004*00	
Tank Facility Name: 13 15 Type Inspectors: Procurs John Pressure Zones Served: 11 15 C. June Adjacent Pressure Zon	Trank Facility Name: Pressure Zones Served: Product Indexes for PRA Fac, 8, 17 Illustrations and Served Indexes of PRA Fac, 9, 17 Illustrations and Served In	Water System Optimization Plan	Tank Facility ID #:	нѕттк		3/8/2012
PHOTOS PHOTOS	PHOTOS PHOTOS		Tank Facility Name:	H. St. Tank		Peter Lavallee and Mark Gray
PROTOS PROTOS	PROTOS PROTOS		Pressure Zones Served:	H. St. Zone	Adjacent Pressure Zones:	Stateline Zone
PHOTOS PROTOS	PHOTOS WAS IN ACRONICED CONSIDERATION WAS IN ACCOUNTED CONSI	Photo Suidon	co for DM. En. D. EE is the downslane nation of the tank construct	ad on fill? Yes Does tank overflow drain adequately to prote	ct tank foundation? We Any hacterilagical exceedance at this tank? Will Work,	
		Prioto Eviden	te for PM, PH, K, PE as the downslope portion of the talk constructe		te tails roundation: 169 Auty Dacteringical exceedance at this tails: 1000 Vecty	
2001 1/036/200 030:030 PMS	201 J (CB/20) S0-50 PM	2011/08	720 C22-82 FM	2011/05/20 02:32 PM	2011/05//2	20 02:632 FM
		2011/03	V20 ©2:22 FW			

			South Tahoe PUD	Location Description	Access Road through Heavenly Ski	Resort's CA Base Lodge	K/J Project Number:	1270004*00	
			Water System Optimization Plan	Tank Facility ID #	t: HVTK		Date:	3/15/201	12
			water System Optimization Flair	Turk rucincy 15 h	TO THE STATE OF TH		Condition Assessment	3/13/201	12
				Tank Facility Name	Heavenly Valley	Tank	Inspectors:	Peter Lavallee and Jere	emy Rutherdale
					nearemy vancy			r etc. Edvance and sere	in, nameralie
				Pressure Zones Served	Heavenly Valley	Zone	Adjacent Pressure Zones:	Stateline Z	one
								_	
			Notes:		Failu	re Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
			2. For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
			3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements		1: best available technology	
				2: minor defects only 3: moderate deterioration	greater than 95% of design requirements greater than 90% of design requirements	exceeds some requirements meets all requirements	2: failure every 16 to 25 yrs 3: failure every 11 to 15 yrs	financial efficiency is high financial efficiency is average	
				4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is average	
				5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements		5: asset should be replaced	
				J. Virtually unserviceable	5. 1655 than 6576 of design requirements	5. Tans an requirements	5. Tallule < 5 yls	5. asset should be replaced	
+			California Waterworks Standards						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)		N/A N/A	1.36	N/A N/A	N/A N/A	Total Factored Score
					N/A N/A	5.91	N/A N/A	N/A N/A	
	CUEOU.	4000	Weighted Final Score (1-25)	25.00	N/A N/A	80%	·	·	
	CHECK	100%	, , ,		•		N/A	N/A	0.70
			Factored Score		N/A	4.73	N/A	N/A	9.73
			Criticality Score					20%	1.95
			Tank Site		_		1		
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	2.00	2.40	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	8.00	9.20	N/A	
	CHECK	100%	, , ,	N/A	N/A	70%	30%	N/A	
			Factored Score		N/A	5.60	2.76	N/A	8.36
			Criticality Score					40%	3.34
			Tank Structure						
			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		1.00	1.00	3.71	N/A	Total Factored Score
			Weighted Final Score (1-25)		5.00	3.75	11.71	N/A	
	CHECK	100%	•	10%	30%	50%	10%	N/A	
		1	Factored Score		1.50	1.88	1.17	N/A	5.28
1			Criticality Score		<u> </u>		·	15%	0.79
			Pining & Valves					N/A	
			Piping & Valves Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	N/A		Total Factored Score
			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated N/A	Calculated 4.50	N/A N/A		Total Factored Score
			Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 5.00	N/A	4.50	N/A	N/A	Total Factored Scott
	CHECK	100%	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	Calculated 5.00 22.50	N/A N/A	4.50 16.00	N/A N/A	N/A N/A	Total Factored Score
	СНЕСК	100%	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 5.00 22.50 10%	N/A N/A 30%	4.50 16.00 60%	N/A N/A N/A	N/A N/A N/A	
	CHECK	100%	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	Calculated 5.00 22.50 10% 2.25	N/A N/A	4.50 16.00	N/A N/A	N/A N/A N/A N/A	11.85
	СНЕСК	100%	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score	Calculated 5.00 22.50 10% 2.25	N/A N/A 30%	4.50 16.00 60%	N/A N/A N/A	N/A N/A N/A	
	CHECK	100%	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System	Calculated 5.00 22.50 10% 2.25	N/A N/A 30% N/A	4.50 16.00 60% 9.60	N/A N/A N/A N/A	N/A N/A N/A N/A 15%	11.85
	CHECK	100%	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-2) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned?	Calculated 5.00 22.50 10% 2.25	N/A N/A 30% N/A	4.50 16.00 60% 9.60	N/A N/A N/A N/A N/A Calculated	N/A N/A N/A N/A 15%	11.85 1.78
	CHECK	100%	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 5.00 22.50 10% 2.25 Calculated 2.00	N/A N/A 30% N/A N/A	4.50 16.00 60% 9.60 Calculated 1.00	N/A N/A N/A N/A N/A Calculated 2.25	N/A N/A N/A N/A 15%	11.85 1.78
			Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	Calculated 5.00 22.50 10% 2.25 Calculated 2.00 8.00	N/A N/A 30% N/A N/A N/A	4.50 16.00 60% 9.60 Calculated 1.00 4.00	N/A N/A N/A N/A Calculated 2.25 6.00	N/A N/A N/A N/A 15% N/A N/A N/A	11.85 1.78
	CHECK	100%	Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 5.00 22.50 10% 2.25 Calculated 2.00 8.00 10%	N/A N/A 30% N/A N/A N/A N/A	4.50 16.00 60% 9.60 Calculated 1.00 4.00 60%	N/A N/A N/A N/A Calculated 2.25 6.00 30%	N/A N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A	11.85 1.78 Total Factored Score
			Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	Calculated 5.00 22.50 10% 2.25 Calculated 2.00 8.00 10% 0.80	N/A N/A 30% N/A N/A N/A	4.50 16.00 60% 9.60 Calculated 1.00 4.00	N/A N/A N/A N/A Calculated 2.25 6.00	N/A N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A N/A	11.85 1.78 Total Factored Score
			Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score Criticality Score SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 5.00 22.50 10% 2.25 Calculated 2.00 8.00 10% 0.80	N/A N/A 30% N/A N/A N/A N/A	4.50 16.00 60% 9.60 Calculated 1.00 4.00 60%	N/A N/A N/A N/A N/A Calculated 2.25 6.00 30% 1.80	N/A N/A N/A N/A N/A 15% N/A N/A N/A N/A N/A N/A N/A	11.85 1.78 Total Factored Score

	South Tahoe PUD	Location Description:	Access Road through Heavenly Ski Resort's CA Base Lodge	K/J Project Number: 12	270004*00
	Water System Optimization Plan	Tank Facility ID #:	нутк	Date:	3/15/2012
		Tank Facility Name:	Heavenly Valley Tank	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
		Pressure Zones Served:	Heavenly Valley Zone	Adjacent Pressure Zones:	Stateline Zone
		_			

		1					
		Importance		CONDITION ASSESSMENT CHECKLIST			
Failure Mode Type	Score	Weighting (1-5)	Weighted Score				
				Calif. Waterworks Standards			
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, lyes			
Fn	1	5	5.00	rodents, or other animals)?			
-		2	2.00	sample tap(s) provided to measure water quality into, out of and inside tank and protected from freezing? Yes			
Fn Fn	1	3	3.00 5.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? Separated inlet and outlet			
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes			
Fn	1	3	3.00	tank draining removes residual sediments? Yes			
Fn	1	1	1.00	staff gage provided to manually check level? There is a staff gauge on this tank but it has been removed from operation and a DP cell is now connected to the tank			
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes			
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? There is no fencing or other security on the site and there is minimal graffiti around the tank. It is adjacent to a Heavenly Ski Resort Run			
Fn	1	3	3.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes			
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes			
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Not used for CT compliance			
Fn PM	1 5	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes condition of interior coatings adequate to protect structure? The interior of this tank needs to be recoated			
FIVI	э	3	25.00	Common of interior contings adequate to protect structure: The interior of this talk needs to be reconted			
				Tank Site			
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? Yes but is limited during periods of heavy snow			
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.			
R	4	5	20.00	is site vulnerable to wildfires? Yes it is on wooded lots and adjacent to a large open space Within a forested area.			
R	1	5	5.00	any unstable site conditions (if yes, describe)? None			
R	4	3	12.00	is site close to known active seismic faults? 3,907 ft. to nearest fault line			
				site drainage adequate to prevent flooding of tank foundation, buildings and critical There are no drainage issues at this tank			
R	1	3	3.00	equipment?			
_				site lighting, fencing, and security monitoring adequate to discourage unauthorized There is no fence around this tank and it is easily accessible by skiers			
Fn	N1/A	21/2	0.00	access/vandalism? other known problems? None			
INFORMATION	N/A	N/A	N/A	Other known problems: NONe			
				Tank Structure			
				describe tank structure type (e.g. welded steel, holted steel, reinforced concrete, prestressed			
INFORMATION	N/A	N/A	N/A	concrete, etc.)			
INFORMATION	N/A	N/A	N/A	what is tank volume? 1,050,000			
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?			
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?			
INFORMATION	N/A	N/A	N/A	what is emergency storage available?			
С	1	5	5.00	overall tank volume to meet District sizing requirements?			
INFORMATION	N/A	N/A	N/A	date tank was constructed? 1984 date and describe work done to renew or upgrade tank and tank facilities? None			
INFORMATION Fn	N/A 1	N/A 3	N/A 3.00	adequate perimeter clearance to facilitate routine O&M? Yes			
FII	1	3	3.00				
Fn	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? Yes and complies with standard at time of construction			
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? It was designed for the snow loads of the day			
PM	3	5	15.00	condition of exterior coatings adequate to protect structure? The coatings have graffiti on them and there are minor locations of rust where coatings have already worn off			
Fn	1	4	4.00	adequate openings for ingress/egress? Yes there were two manways and a roof hatch			
INFORMATION	N/A	N/A	N/A	date of last interior inspection? 2006			
				passive or active cathodic protection in place (was or no) and is it maintained and adequate)			
PM	1	3	3.00	passive of active catholic protection in place (yes of no) and is it maintained and adequate:			
R	5 4	2	5.00 8.00	space available to add solar panels? No known fire or haz-mat conditions that could be mitigated? None other than wildfire hazard			
R	4	3	12.00	tank foundation type? Concrete ring foundation with no anchor bolts			
R	4	4	16.00	tank foundation condition? Foundation is good but the grout between the metal tank ring and the concrete ring has started pulling away and is missing in some locations			
R	4	5	20.00	has seismic stability been evaluated by a qualified engineer? No			
R	4	4	16.00	concern with tank compliance with seismic requirements? Yes			
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water)? None			
PM	1	4	4.00	estimated service life remaining? 22 years according to AWU Useful Life			

				South Tahoe PUD Location Description:	Access Road through Heavenly Ski Resort's CA Base Lodge	K/J Project Number: 1270004*00		
				Tool: Facility ID #		Peter		
				Water System Optimization Plan Tank Facility ID #:	HVTK	Date:	3/15/2012	
						Condition Assessment		
				Tank Facility Name:	Heavenly Valley Tank	Inspectors:	Peter Lavallee and Jeremy Rutherdale	
				Pressure Zones Served:	Heavenly Valley Zone	Adjacent Pressure Zones:	Stateline Zone	
				Piping & Valves				
PM	5	5	25.00	coatings adequate to protect piping and valves? Coatings on the interior piping needs to be replaced				
			25.55	Voc				
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?				
Fn	4	3	12.00	tank-piping connections designed to accommodate settlement or movement? No				
Fn	5	4	20.00	valves are suitable for efficient and reliable service? None				
INFORMATION	N/A	N/A	N/A	other known problems? None				
PM	5	4	20.00	estimated service life remaining? 32 years according to AWU Useful Life				
				SCADA system				
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is only done when a problen	n is identified			
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operations				
Fn	1	4	4.00	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewed or	n an annual basis			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio				
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the last	year			
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure? There is adequate power to the site				
R	2	3	6.00	spare parts/service support readily available? Parts are readily available at the plant and through	the manufacturer			
INFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site				
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.				
				Additional Data There is a pipe that pulls water for Heavenly snown	naking at this tank. Heavenly is allowed to take water starting at 22' and above.			
				Legend				
				PM Physical Mortality				
				Fn Functionality				
				R Reliability				
				FE Financial Efficiency				
				C Capacity				

	South Tahoe PUD	Location Description:	Access Road through Heavenly Ski Resort's CA Base Lodge	K/J Project Number:	1270004*00
	Water System Optimization Plan	Tank Facility ID #:	нутк	Date:	3/15/2012
		Tank Facility Name:	Heavenly Valley Tank	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
		Pressure Zones Served:	Heavenly Valley Zone	Adjacent Pressure Zones:	Stateline Zone
	Photo Evidence for PM, Fn, R, FI	E Is the downslope portion of the tank constructed on	fill? Yes Does tank overflow drain adequately to protect tank foundation? Yes	Any bacterilogical exceedance at this tank?	Will Verify
			PHOTOS	,	
2811A33/27 19:81 AM	2011/05/27 10:35 AM	2011/05/27 10:3	2011/05/22 S		-20,17,805/27 (10:537) AXXI
2011/05/27 16:33 AM	201V05/27 10/82 AM	2011/05/27 10:	97 AM 2011/03/2	9 10:20 AM	2011/05/27 10:40 AM
		011/8-72-1-10-12 AM	2011/05/22=00035 AN	Per march (Action) (Aller)	2011//05/27 10:33 AM

			South Tahoe PUD	Location Description	: Access Road from Iroc	quois Circle	K/J Project Number:	1270004*00	
			Water System Optimization Plan	Tank Facility ID #	: ІТК1		Date:	3/13/20:	12
			water System Optimization Flan	Tank Tacincy 15 H	·		Condition Assessment		112
				Tank Facility Name	: Iroquois Tank	: #1	Inspectors:	Peter Lavallee and Jer	remy Rutherdale
									•
				Pressure Zones Served	: Iroquois Zon	ne	Adjacent Pressure Zones:	Country Club and Arr	rowhead Zones
			Notes:			re Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
			For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
			3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
				2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
				3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
				4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	
				5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
			California Waterworks Standards						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	2.09	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	8.82	N/A	N/A	
	CUECK	4000			·		·	·	
	CHECK	1009	, , ,	20%	N/A	80%	N/A	N/A	
			Factored Score	II.	N/A	7.05	N/A	N/A	8.05
			Criticality Score					20%	1.61
			Tank Site						
			Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	2.00	2.60	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	8.00	10.20	N/A	
	CHECK	1009		N/A	N/A	70%	30%	N/A	
	6.1261	1007	Factored Score		N/A	5.60	3.06	N/A	8.66
			Criticality Score		14/1	3.00	5.00	40%	3.46
			Tank Structure					4070	3.40
			Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	T-4-1 F4 C
			Unweighted Failure Mode Score (1-5)		5.00	2.00	4.29	N/A	Total Factored Score
			Weighted Final Score (1-25)		25.00	7.75	13.71	N/A	
	CHECK	1009	, , ,	10%	30%	50%	10%	N/A	
			Factored Score		7.50	3.88	1.37	N/A	13.55
			Criticality Score					15%	2.03
			Piping & Valves						
			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	2.50	N/A	N/A	Total Factored Score
1			Weighted Final Score (1-25)	10.50	N/A	8.00	N/A	N/A	
		1009		10%	30%	60%	N/A	N/A	
	CHECK	1007	Factored Score		N/A	4.80	N/A	N/A	5.85
	CHECK				17711			15%	0.88
	CHECK		Criticality Score					1570	
	CHECK		Criticality Score						
	CHECK		SCADA System		N/A	6-1-1-1	Calle Land	N/c	
	CHECK		SCADA System Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	Calculated	N/A	Total Factors of Security
	CHECK		SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5)	Calculated 2.00	N/A	1.00	2.25	N/A	Total Factored Score
			SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	Calculated 2.00 8.00	N/A N/A	1.00 4.00	2.25 6.00	N/A N/A	Total Factored Score
	CHECK	1009	SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 2.00 8.00 10%	N/A N/A N/A	1.00 4.00 60%	2.25 6.00 30%	N/A N/A N/A	
		1009	SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%) Factored Score	Calculated 2.00 8.00 10% 0.80	N/A N/A	1.00 4.00	2.25 6.00	N/A N/A N/A N/A	5.00
		1009	SCADA System Is Failure Mode Score Calculated or Assigned? Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25) Criticality Weighting Factor (0 - 100%)	Calculated 2.00 8.00 10% 0.80	N/A N/A N/A	1.00 4.00 60%	2.25 6.00 30% 1.80	N/A N/A N/A	Total Factored Score 5.00 0.50 8.48

				South Tahoe PUD	Location Description:	Access Road from Iroquois Circle	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Tank Facility ID #:	ITK1	Date:	3/13/2012
					Tank Facility Name:	Iroquois Tank #1	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
					Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Country Club and Arrowhead Zones
Failure Mode Type S	Score	Importance Weighting (1-5)	Weighted Score			CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards				
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,				

		Importance		COMPLETION ACCESSORATION CHECKING
Failure Mode Type	Score	•	Weighted Score	CONDITION ASSESSMENT CHECKLIST
Tunare mode 17pc	360.0	110.8.11.18 (2.37	Treignieu store	Calif. Waterworks Standards
-		_	F 00	tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, ves
Fn	1	5	5.00	rodents, or other animals)? CS sample tap(s) provided to measure water quality into, out of and inside tank and protected
Fn	1	2	2.00	
Fn Fn	5	5	3.00 25.00	from freezing? Yes tank designed to minimize dead zones (separate inlet/outlet or mixer)? No mixing system same inlet and outlet
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes
Fn	3	3	9.00	tank draining removes residual sediments? No
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? No. Vandalism has occurred at this site already. There is a history of unauthorized access, there is no fencing. There are numerous trail head in this location.
Fn	3	3	9.00	adequate lighting & access to interior for inspections, cleaning and repair? No
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Tank not used for CT compliance
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes the tank was constructed to prevent external water from entering the tank
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Yes
				Tank Site
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? No this site is accessible only by foot in the winter time
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	5	5	25.00	is site vulnerable to wildfires? The site is adjacent to open wooded areas
R	1	5	5.00	any unstable site conditions (if yes, describe)? None
R	4	3	12.00	is site close to known active seismic faults? 10900 ft. to nearest fault line
				site drainage adequate to prevent flooding of tank foundation, buildings and critical There are no drainage issues at this tank site
R	1	3	3.00	equipment?
				site lighting, fencing, and security monitoring adequate to discourage unauthorized There is a history of unauthorized access at this tank site and no fencing. There are numerous trail heads in this location
Fn			0.00	access/vandailsm?
INFORMATION	N/A	N/A	N/A	other known problems? None
				Tank Structure
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed Welded Steel
INFORMATION	N/A	N/A	N/A	concrete, etc.)
INFORMATION	N/A	N/A	N/A	what is tank volume? 230,000
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?
INFORMATION	N/A	N/A	N/A	what is emergency storage available?
C	5	5	25.00	overall tank volume to meet District sizing requirements?
INFORMATION INFORMATION	N/A N/A	N/A N/A	N/A N/A	date tank was constructed? 1959 date and describe work done to renew or upgrade tank and tank facilities? Interior coated in 2011
Fn	1 N/A	N/A 3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes
rii	1	3	3.00	
Fn	5	4	20.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? No freeboard in this tank
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Yes
PM	1	5	5.00	condition of exterior coatings adequate to protect structure? Exterior coatings are in good condition with no visible defects
Fn	1	4	4.00	adequate openings for ingress/egress? Yes two manways and a roof hatch
INFORMATION	N/A	N/A	N/A	date of last interior inspection? 2011
	.4	,,.	,,.	
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate? Impressed current cathodic protection
R	5	1	5.00	space available to add solar panels? No
R	5	2	10.00	known fire or haz-mat conditions that could be mitigated? Potential for wild fire based on proximity to forest
R	5	3	15.00	tank foundation type? metal ring not anchored
R	5	4	20.00	tank foundation condition? Poor condition
R	5	5	25.00	has seismic stability been evaluated by a qualified engineer? Not since construction
R	4	4	16.00	concern with tank compliance with seismic requirements? Yes
Fn	1	4	4.00	other known problems (e.g. adequate freeboard, stagnant water)? None
PM	4	4	16.00	estimated service life remaining? Exceeds AWU Useful life
-			*	

				South Tahoe PUD Location Description:	Access Road from Iroquois Circle	K/J Project Number: 1270004*0	00		
				Water System Optimization Plan Tank Facility ID #:	ITK1	Date:	3/13/2012		
				Trace System Spanning and Market System Spanning and Span	TINE	Condition Assessment	3/13/2012		
				Tank Facility Name:					
				Tank raunty Name.	Iroquois Tank #1	Inspectors:	Peter Lavallee and Jeremy Rutherdale		
				Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Country Club and Arrowhead Zones		
				Piping & Valves					
PM	1	5	5.00	coatings adequate to protect piping and valves? Interior coated in 2011					
r ivi		,	3.00	counting adequate to protect piping and tortest. Intertor coated in 2011					
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? Yes					
Fn	4	3	12.00	tank-piping connections designed to accommodate settlement or movement? Unknown					
Fn	1	4	4.00		valves are suitable for efficient and reliable service? Yes				
INFORMATION	N/A	N/A	N/A	other known problems? None					
PM	4	4	16.00	estimated service life remaining? 7 years based on AWU Useful Life					
				SCADA system					
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is only done when a problem is ide	entified				
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operations					
Fn	1	4	4.00	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewed on an a	nnual basis				
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio					
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the last year					
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure? There is adequate power to the site					
R	2	3	6.00	spare parts/service support readily available? Parts are readily available at the plant and through the ma	anufacturer				
INFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site					
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.					
				Additional Data					
				Legend					
				PM Physical Mortality					
				Fn Functionality					
				R Reliability					
				FE Financial Efficiency					
				^C Capacity					

South Tahoe PUD Location Description: Access Road from Iroquois Circle Water System Optimization Plan Tank Facility ID #: ITK1 Date: 3/13/2012 Condition Assessment Inspectors: Peter Lavallee and Jeremy Rutherdal Pressure Zones Served: Iroquois Zone Adjacent Pressure Zones: Country Club and Arrowhead Zones	
Water System Optimization Plan Tank Facility ID #: Tank Facility ID #: Tank Facility Name: Tank Facility Name: Iroquois Tank #1 Inspectors: Peter Lavallee and Jeremy Rutherdal	
Tank Facility Name: Iroquois Tank #1 Condition Assessment Inspectors: Peter Lavallee and Jeremy Rutherdal	5/2012
Tressure zones serveu.	
	Allowitead Zolles
Photo Evidence for PM, Fn, R, FE Is the downslope portion of the tank constructed on fill? Ves Does tank overflow drain adequately to protect tank foundation? Yes Any bacterilogical exceedance at this tank? Will Verify PHOTOS	
Restranta da de la contra del la contra del la co	

		South Tahoe PUD	Location Description	Access Road from Iron	quois Circle	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Tank Facility ID #	ITK2		Date:		
		Trace System Optimization Fian		TIN2		Condition Assessment		
			Tank Facility Name	Iroquois Tank	#2	Inspectors:	Peter Lava	allee
			Pressure Zones Served	Iroquois Zon	ne	Adjacent Pressure Zones:	Country Club and Arr	rowhead Zones
				Faille	ua Baada Caasina (a. F.)			
		Notes:			re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model Capacity score will be based on hydraulic model Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records For Criticality Weighting Factors to be determined at District Workshop	4	1t	functionality	reliability	1. hast available to the slave	
		3. For Childanty Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	meets or exceeds design requirements greater than 95% of design requirements	exceeds all requirements exceeds some requirements	1: failure every > 25 years 2: failure every 16 to 25 yrs	best available technology financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is night	
			4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements		5: asset should be replaced	
			· · · · · · · · · · · · · · · · · · ·	<u> </u>	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	2.09	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	8.82	N/A	N/A	
CHECK	100%		20%	N/A	80%	N/A	N/A	
CITEOR	10070	Factored Score		N/A	7.05	N/A	N/A	8.05
		Criticality Score	II.	.4			20%	1.61
		Tank Site						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
				N/A	2.00	2.60	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5)		N/A N/A	8.00		N/A N/A	Total Factorea Score
		Weighted Final Score (1-25)	·	•		10.20	·	
CHECK	100%	, , ,	N/A	N/A	70%	30%	N/A	0.00
		Factored Score		N/A	5.60	3.06	N/A	8.66 3.46
		Criticality Score					40%	3.46
		Tank Structure	<u> </u>		1	1		
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		5.00	2.00	2.14	N/A	Total Factored Score
		Weighted Final Score (1-25)		25.00	7.75	5.14	N/A	
CHECK	100%	, , ,	10%	30%	50%	10%	N/A	
		Factored Score		7.50	3.88	0.51	N/A	12.29
		Criticality Score					15%	1.84
		Piping & Valves						
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	2.50	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)	4.50	N/A	8.00	N/A	N/A	
CHECK	100%	, , ,	10%	30%	60%	N/A	N/A	
		Factored Score		N/A	4.80	N/A	N/A	5.25
		Criticality Score					15%	0.79
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.00	N/A	1.00	2.25	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	4.00	6.00	N/A	
CHECK	100%			N/A	60%	30%	N/A	
15	100/0			N/A	2.40	1.80	N/A	5.00
		Factored Score	0.80					
		Factored Score Criticality Score		N/A	2.40	1.00	-	
		Factored Score Criticality Score		N/A	2.70		10% verall Total Factored Score (Out of 25) =	0.50 8.21

				South Tahoe PUD Location Description:	Access Road from Iroquois Circle	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #:	ITK2	Date:	
				The state of the s	11116	Condition Assessment	
				Tank Facility Name:	Iroquois Tank #2	Inspectors:	Peter Lavallee
				Pressure Zones Served:	Iroguois Zone	Adjacent Pressure Zones:	Country Club and Arrowhead Zones
				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	noquos zone		country clab and renowned zones
ailure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST		
				Calif. Waterworks Standards			
-		-	F 00	tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,			
Fn	1	5	5.00	rodents, or other animals)? sample tap(s) provided to measure water quality into, out of and inside tank and protected			
Fn	1	3	3.00	from freezing? Yes			
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? No mixing system same inlet and outlet			
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes			
Fn	3	3	9.00	tank draining removes residual sediments? No			
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and th	e District utilizes a DP Cell attached to SCADA		
Fn Fn	5	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes adequate security measures and monitoring to prevent unauthorized access? No vandalism has occurred at this site already. Ther	re is history of unauthorized access at this tank site and no fensing. There	are numerous trail heads in this location	
Fn	3	3	25.00 9.00	adequate lighting & access to interior for inspections, cleaning and repair? No	re is history of unauthorized access at this tank site and no fencing. There	e are numerous trail neads in this location.	
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes			
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Tank not used for CT compliance			
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes the tank was constructed to prevent external was	ater from entering the tank		
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Yes			
				Tank Site			
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? No this site is accessible only by foot in the winter ti			
R R	2	3 5	6.00 25.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the site vulnerable to wildfires? The site is adjacent to open wooded areas	he FEMA flood map. Which means flood hazards are undetermined but p	ossible.	
R	1	5	5.00	any unstable site conditions (if yes, describe)? None			
R	4	3	12.00	is site close to known active seismic faults? 10900 ft. to nearest fault line			
				site drainage adequate to prevent flooding of tank foundation, buildings and critical			
R	1	3	3.00	equipment? There are no drainage issues at this tank site			
				site lighting, fencing, and security monitoring adequate to discourage unauthorized access/vandalism? There is a history of unauthorized access at this tank	k site and no fencing. There are numerous trail heads in this location		
Fn	11/4	21/2	0.00				
INFORMATION	N/A	N/A	N/A	other known problems? None			
				Tank Structure			
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed			
INFORMATION	N/A	N/A	N/A	concrete, etc.) Welded Steel			
INFORMATION	N/A	N/A	N/A	what is tank volume? 300,000			
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?			
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?			
INFORMATION	N/A	N/A	N/A	what is emergency storage available?			
C	5	5	25.00	overall tank volume to meet District sizing requirements?			
INFORMATION	N/A N/A	N/A	N/A N/A	date tank was constructed? 2001 date and describe work done to renew or upgrade tank and tank facilities? None since construction			
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes			
Fn	5	4	20.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate?			
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Yes			
PM	1	5	5.00	condition of exterior coatings adequate to protect structure? Exterior coatings are in good condition with no visible	le defects		
Fn	1	4 N/A	4.00	adequate openings for ingress/egress? Yes two manways and a roof hatch date of last interior inspection? 2011			
INFORMATION	N/A	N/A	N/A				
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate?			
R	5	1	5.00	space available to add solar panels? No			
R	5	2	10.00	known fire or haz-mat conditions that could be mitigated? Potential for wild fire based on proximity to forest			
R	1	3	3.00	tank foundation type? concrete ring with anchor bolts			
R	1	4	4.00	tank foundation condition? Excellent condition with no cracking or spalling			
R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? Not since construction			
R	1	4	4.00	concern with tank compliance with seismic requirements? No			

concern with tank compliance with seismic requirements? No
other known problems (e.g. adequate freeboard, stagnant water)?
estimated service life remaining?
39 years based on AWU Useful Life

4.00 4.00

				South Tahoe PUD Location Description:	Access Road from Iroquois Circle	K/J Project Number: 1270004*00			
				Water System Optimization Plan Tank Facility ID #:	ITK2	Date:			
				- Control of the Cont		Condition Assessment			
				Tank Facility Name:	1 1. T. 1.10	Inspectors:	D. L L		
				rain racinty Name.	Iroquois Tank #2	inspectors.	Peter Lavallee		
				Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Country Club and Arrowhead Zones		
				Pressure zones serveu.	iroquois zone	Aujacent Flessure Zones.	Country Club and Arrownead Zones		
				Piping & Valves					
PM	1	5	5.00	coatings adequate to protect piping and valves? Coatings are adequate					
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?					
Fn	4	3	12.00	tank-piping connections designed to accommodate settlement or movement? Unknown					
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Yes					
NFORMATION	N/A	N/A	N/A	other known problems? None					
PM	1	4	4.00	estimated service life remaining? 49 years based on AWU Useful Life					
				SCADA system					
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is only done when a problem is ide	ntified				
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operations	H. Z				
Fn NFORMATION	1 N/A	4 N/A	4.00 N/A	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewed on an are type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio	nnual basis				
	,		,						
R R	1 1	4	4.00 4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the last year adequate power available to run all telemetry and instrumentation on main power failure? There is adequate power to the site					
R	2	3	6.00	spare parts/service support readily available? Parts are readily available at the plant and through the ma	nufacturer				
NFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site	mulacturei				
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.					
				Additional Data					
				Legend					
				PM Physical Mortality					
				Fn Functionality					
				R Reliability					
FE Financial Efficiency									
				C Capacity					

South Tahoe PUD Water System Optimization Plan	Location Description: Tank Facility ID #:	Access Road from Iroquois Circle ITK2	K/J Project Number: 1270004*00 Date: Condition Assessment	
	Tank Facility Name:	Iroquois Tank #2	Inspectors:	Peter Lavallee
	Pressure Zones Served:	Iroquois Zone	Adjacent Pressure Zones:	Country Club and Arrowhead Zones
Photo Evidence for PM, Fn, R, F	FE Is the downslope portion of the tank constructed on fill?	Yes Does tank overflow drain adequately to protect tank foundat	ion? Yes Any bacterilogical exceedance at this tank? Will Verify	
		PHOTOS		
2011/05/25 03:52 PM	W. See Executive.		2011/09/28 08:50 PM	
			ZONT VESTAGE SPRING PAN	

		:	South Tahoe PUD	Location Description	Access Road from Sherman Way	y, 1696 Sherman Way	K/J Project Number:	1270004*00	
		,	Water System Optimization Plan	Tank Facility ID #	KTK1		Date:	3/14/20:	112
			Trace: System Spannization Flan		KIKI		Condition Assessment	3) 14) 20	
				Tank Facility Name	Keller Tank #	‡ 1	Inspectors:	Peter Lavallee and Jer	remy Rutherdale
				Pressure Zones Served	Keller Zone		Adjacent Pressure Zones:	Middle Keller and Upp	nor Saddle zones
				Tressure zones serveu	Kener Zone	:		Wildlie Keller and Opp	er Jaudie Zones
		ı	Notes:		Failu	re Mode Scoring (1 - 5)			
		:	Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Level	of Service	Financial Efficiency	
			2. For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
		:	3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements		1: best available technology	
				2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	-	2: financial efficiency is high	
				3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
				4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
				5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
			California Waterworks Standards						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	1.73	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	7.00	N/A	N/A	
СН	IECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	80%	N/A	N/A	
		244/1	Factored Score		N/A	5.60	N/A	N/A	6.60
			Criticality Score		·		,	20%	1.32
			Tank Site						
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	2.00	3.40	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	8.00	14.20	N/A	
CHI	IECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	70%	30%	N/A N/A	
СП	IECK	100%	Factored Score		N/A	5.60	4.26	N/A N/A	9.86
			Criticality Score	•	IN/A	3.00	4.20	40%	3.94
								40%	3.34
			Tank Structure			1 21 11 1		21/2	
			Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	Total Factored Seem
			Unweighted Failure Mode Score (1-5)		5.00	2.25	4.29	N/A	Total Factored Score
	IFOU	100:	Weighted Final Score (1-25)		25.00	8.75	14.00	N/A	
СНІ	IECK	100%	Criticality Weighting Factor (0 - 100%)		30%	50%	10%	N/A	44.44
			Factored Score		7.50	4.38	1.40	N/A	14.41 2.16
			Criticality Score					15%	2.10
			Piping & Valves		1	1	1		
			Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	N/A	N/A	Total Factored Score
			Unweighted Failure Mode Score (1-5)		N/A	2.00	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	6.50	N/A	N/A	
СНІ	IECK	100%	Criticality Weighting Factor (0 - 100%)		30%	60%	N/A	N/A	
			Factored Score		N/A	3.90	N/A	N/A	5.55
			Criticality Score					15%	0.83
			SCADA System	1					
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	1.00	2.25	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	4.00	6.00	N/A	
СНІ	IECK	100%	Criticality Weighting Factor (0 - 100%)		N/A	60%	30%	N/A	
			Factored Score		N/A	2.40	1.80	N/A	5.00
			Criticality Score					10%	0.50
								verall Total Factored Score (Out of 25) =	8.76

	South Tahoe PUD	Location Description:	Access Road from Sherman Way, 1696 Sherman Way	K/J Project Number: 12700	004*00
	Water System Optimization Plan	Tank Facility ID #:	ктк1	Date:	3/14/2012
				Condition Assessment	
		Tank Facility Name:	Keller Tank #1	Inspectors:	Peter Lavallee and Jeremy Rutherdale
		Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	Middle Keller and Upper Saddle zones
		_			
	Importance		CONDITION ASSESSMENT CHECKLIST		

,		Importance		CONDITION ASSESSMENT CHECKLIST
Failure Mode Type	Score	•	Weighted Score	CONDITION ASSESSMENT CHECKLIST
				Calif. Waterworks Standards
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, _{Ves}
Fn	1	5	5.00	rodents, or other animals)? Yes
-		2	2.00	sample tap(s) provided to measure water quality into, out of and inside tank and protected
Fn Fn	1	3 5	3.00 5.00	from freezing? Yes tank designed to minimize dead zones (separate inlet/outlet or mixer)? Separate inlet and outlet
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes
Fn	3	3	9.00	tank draining removes residual sediments? No
Fn	1	1	1.00	staff gage provided to manually check level? There is a staff gage at this location but it has been disconnected and no a DP cell is used
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? No vandalism has occurred at this site already and there is no fencing
Fn	3 1	3	9.00	adequate lighting & access to interior for inspections, cleaning and repair? No adequate isolation valves and bypass to take tank offline and maintain water service? Yes
Fn INFORMATION	N/A	5 N/A	5.00 N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Tank not used for CT compliance
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? I ves the tank was constructed to prevent external water from entering the tank
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Yes
				Tank Site
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? No the site is inaccessible during the winter time
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	5	5	25.00	is site vulnerable to wildfires? Ves open wooded space adjacent to tank
R R	5	5	25.00	any unstable site conditions (if yes, describe)? There is a large boulder that is perched above the tank that has been strapped back with cables to prevent the boulder from rolling down hill into the tanks. Also the tanks sit above a private residence and if the tanks fail they will flood the home. There are
К	4	3	12.00	is site close to known active seismic faults? 4,595 ft. to the nearest fault site drainage adequate to prevent flooding of tank foundation, buildings and critical
R	1	3	3.00	There are no site drainage issues equipment?
II.		3	3.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized
Fn			0.00	access/vandalism? There are issues with unauthorized access to these tanks
INFORMATION	N/A	N/A	N/A	other known problems? None
				Tank Structure
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed)
INFORMATION	N/A N/A	N/A N/A	N/A N/A	concrete, etc.) what is tank volume? 208,000
INFORMATION INFORMATION	N/A	N/A N/A	N/A N/A	what is operational storage requirement?
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?
INFORMATION	N/A	N/A	N/A	what is emergency storage available?
С	5	5	25.00	overall tank volume to meet District sizing requirements?
INFORMATION	N/A	N/A	N/A	date tank was constructed? 1963
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? None
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes
Fn	3	4	12.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? 0.75 ft. and it is adequate
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Met the loadings at the time of installation and it does not create a safety issue
PM	3	5	15.00	condition of exterior coatings adequate to protect structure? The coatings are worn off in locations
Fn	1	4	4.00	adequate openings for ingress/egress? There are two manways and one roof hatch
INFORMATION	N/A	N/A	N/A	date of last interior inspection? unknown
				packing or acting cathedic protection in place (was or no) and is it maintained and adequated. Active cathodic protection
PM	1	3	3.00	passive of active cathodic protection in place (yes of no) and is it maintained and adequate:
R R	5 4	1 2	5.00 8.00	space available to add solar panels? No known fire or haz-mat conditions that could be mitigated? None other than proximity to forested land
R R	5	3	15.00	tank foundation type? Metal Ring
R	5	4	20.00	tank foundation condition? The tank foundation is undermined in locations and in poor condition
R	5	5	25.00	has seismic stability been evaluated by a qualified engineer? No
R	5	4	20.00	concern with tank compliance with seismic requirements? Yes
Fn	4	4	16.00	other known problems (e.g. adequate freeboard, stagnant water)? Stagnant water can be a minor issue at this tank
PM	4	4	16.00	estimated service life remaining? 1 year according to AWU Useful Life
]		

				South Tahoe PUD Location Description:	Access Road from Sherman Way, 1696 Sherman Way	K/J Project Number: 1270004*00				
				Water System Optimization Plan Tank Facility ID #:	KTK1	Date:	3/14/2012			
				water system optimization rian	INIX		3/ 14/ 2012			
				Toul Facility Name		Condition Assessment				
				Tank Facility Name:	Keller Tank #1	Inspectors:	Peter Lavallee and Jeremy Rutherdale			
						Adianast Danasasas Zamas				
				Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	Middle Keller and Upper Saddle zones			
				Piping & Valves						
PM	5	5	25.00	coatings adequate to protect piping and valves? Piping coatings need to be replaced						
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?						
Fn	3	3	9.00	tank-piping connections designed to accommodate settlement or movement? Unknown						
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Yes there are no problems with the valving at the	is location					
INFORMATION	N/A	N/A	N/A	other known problems? None						
PM	2	4	8.00	estimated service life remaining? 11 years according to AWU Useful Life						
				SCADA system						
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is only done when a prol	blem is identified					
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operati	ons					
Fn	1	4	4.00	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewe	ed on an annual basis					
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio						
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the	last year					
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?						
R	2	3	6.00	spare parts/service support readily available? Parts are readily available at the plant and throu	ugh the manufacturer					
INFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site						
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.						
				Administra						
				Additional Data						
				Legend						
	·			PM Physical Mortality						
	<u> </u>			F _n Functionality						
				R Reliability						
				FE Financial Efficiency						
				C Capacity						

South Tahoe PUD	Location Description:	Access Road from Sherman Way, 1696 Sherman Way	K/J Project Number:	1270004*00
Water System Optimization Plan	Tank Facility ID #:	KTK1	Date:	3/14/2012
	Tank Facility Name:		Condition Assessment Inspectors:	
				Peter Lavallee and Jeremy Rutherdale
	Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	Middle Keller and Upper Saddle zones
Photo Evidence for PM, Fn, R, Fi	E Is the downslope portion of the tank construct	ted on fill? Yes Does tank overflow drain adequately to protect tank foundation? Yes	Any bacterilogical exceedance at this tank?	Will Verify
		PHOTOS		
20 NO 3 V 23 61 - 29 (1)	201	1/05/23 On SECTION 2011	1/05/25 01:40 PM	2011/05/25 @1:67 PM

T								
		South Tahoe PUD	Location Description	Access Road from Sherman Way	, 1696 Sherman Way	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Tank Facility ID #	t: KTK2		Date:	3/13/201	2
				N/A2		Condition Assessment	5,15,251	· <u>·</u>
			Tank Facility Name	Keller Tank #	‡ 2	Inspectors:	Peter Lavallee and Jere	emy Rutherdale
			Pressure Zones Served	l: Keller Zone		Adjacent Pressure Zones:	Middle Keller and Upp	or Saddla zapas
			Pressure Zones Serveu	keller zone	:	Adjucent ressure zones.	ivildale keller and oppi	er Saudie zories
		Notes:		Failu	re Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Level	of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records		,	functionality	reliability		
		3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	-	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	-
			4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standards	s					
		Is Failure Mode Score Calculated or Assigned?	? Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5		N/A	1.73	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	7.00	N/A	N/A	
CHECK	100%			N/A	80%	N/A	N/A	
		Factored Score	,	N/A	5.60	N/A	N/A	6.60
		Criticality Score				.4	20%	1.32
		Tank Site						
				N1/A			21/2	
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Score
		Unweighted Failure Mode Score (1-5)		N/A	2.00	3.40	N/A	Total Factoreu Score
		Weighted Final Score (1-25)		N/A	8.00	14.20	N/A	
CHECK	100%	, , ,		N/A	70%	30%	N/A	
		Factored Score		N/A	5.60	4.26	N/A	9.86
		Criticality Score					40%	3.94
		Tank Structure	•					
		Is Failure Mode Score Calculated or Assigned?	? Calculated	Calculated	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	2.67	5.00	2.50	4.29	N/A	Total Factored Score
		Weighted Final Score (1-25)	11.33	25.00	9.75	14.00	N/A	
CHECK	100%	, , ,		30%	50%	10%	N/A	
		Factored Score		7.50	4.88	1.40	N/A	14.91
		Criticality Score	e				15%	2.24
		Piping & Valves	s					
		Is Failure Mode Score Calculated or Assigned?	? Calculated	Calculated	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5		N/A	2.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	6.50	N/A	N/A	
CHECK	100%		•	30%	60%	N/A	N/A	
		Factored Score		N/A	3.90	N/A	N/A	5.55
		Criticality Score					15%	0.83
		SCADA System						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	5.00	N/A N/A	1.00	2.25	N/A N/A	Total Factored Score
		Weighted Final Score (1-5)		N/A N/A	4.00	6.00	N/A N/A	
 CHECK	100%			N/A N/A	4.00	30%	N/A N/A	
	100%			,	2.40	1.80	N/A N/A	6.20
CHECK		Fastaural Causa	2.00					
CHECK		Factored Score		N/A	2.40	1.80	·	
CHECK		Factored Score Criticality Score		N/A	2.40		10% verall Total Factored Score (Out of 25) =	0.62 8.95

				South Tahoe PUD Location Description:	Access Road from Sherman Way, 1696 Sherman Way	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #:	ктк2	Date:	3/13/2012
						Condition Assessment	
				Tank Facility Name:	Keller Tank #2	Inspectors:	Peter Lavallee and Jeremy Rutherdale
				Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	Middle Keller and Upper Saddle zones
ilure Mode Type	Score	Importance Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKLIST		

		Importance			CONDITION ASSESSMENT CHECKLIST
Failure Mode Type	Score	Weighting (1-5)	Weighted Score		CONDITION ASSESSMENT CHECKEST
				Calif. Waterworks Standards	
				tank openings designed to prevent contamination (e.g. rainwater runoff insects hirds	
Fn	1	5	5.00	rodents, or other animals)?	Yes
				sample tap(s) provided to measure water quality into, out of and inside tank and protected	
Fn	1	3	3.00	from freezing?	
Fn	1	5	5.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)?	Separate inlet and outlet
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping?	
Fn	3	3	9.00	tank draining removes residual sediments?	
Fn	1	1	1.00		There is a staff gage at this location but it has been disconnected and no a DP cell is used
Fn Fn	1 5	5	5.00	tank level transmitter provides real-time level feedback to SCADA master?	
Fn Fn	3	5	25.00 9.00	adequate security measures and monitoring to prevent unauthorized access? adequate lighting & access to interior for inspections, cleaning and repair?	
Fn	1	5	5.00	adequate igniting & access to interior for inspections, cleaning and repair adequate isolation valves and bypass to take tank offline and maintain water service?	
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged?	
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank?	Yes the tank was constructed to prevent external water from entering the tank
PM	1	5	5.00	condition of interior coatings adequate to protect structure?	Yes
				Tank Site	
Fn	4	4	16.00	adequate vehicle access for year-round maintenance?	No the site is inaccessible during the winter time
R	2	3	6.00	is site within 100-yr flood plain?	No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	5	5	25.00		Yes open wooded space adjacent to tank
R	5	5	25.00		There is a large boulder that is perched above the tank that has been strapped back with cables to prevent the boulder from rolling down hill into the tanks. Also the tanks sit above a private residence and if the tanks fail they will flood the home. There are
R	4	3	12.00	is site close to known active seismic faults?	
				site drainage adequate to prevent flooding of tank foundation, buildings and critical	There are no site drainage issues
R	1	3	3.00		
Fn			0.00	site lighting, fencing, and security monitoring adequate to discourage unauthorized	There are issues with unauthorized access to these tanks
INFORMATION	N/A	N/A	N/A	other known problems?	None
	.,,,,	,/.	11,71		
				Tank Structure	
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed	
INFORMATION	N/A	N/A	N/A	describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed concrete, etc.)	Welded Steel
INFORMATION	N/A	N/A	N/A	what is tank volume?	123,000
INFORMATION	N/A	5	N/A	what is operational storage requirement?	
INFORMATION	N/A	5	N/A	what is fire storage requirement?	
INFORMATION	N/A	5	N/A	what is emergency storage available?	
С	5	5	25.00	overall tank volume to meet District sizing requirements?	
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade task and task facilities?	
Fn	N/A 1	3	N/A 3.00	date and describe work done to renew or upgrade tank and tank facilities? adequate perimeter clearance to facilitate routine O&M?	
rii	1	3			
Fn	4	4	16.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate:	0.75 ft. and it is not adequate, does not comply with standard at time of construction
R	1	5	5.00	tank designed to withstand snow load and not create safety issue?	Met the loadings at the time of installation and it does not create a safety issue
PM	3	5	15.00	condition of exterior coatings adequate to protect structure?	The coatings are worn off in locations
Fn	1	4	4.00	adequate openings for ingress/egress?	There are two manways and one roof hatch
INFORMATION	N/A	N/A	N/A	date of last interior inspection?	
					Active cathodic protection
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate?	
R	5	1	5.00	space available to add solar panels?	
R	<u>4</u>	2	8.00 15.00	known fire or haz-mat conditions that could be mitigated?	
R	5	3	20.00	tank foundation type?	Metal King The tank foundation is undermined in locations and in poor condition
R R	5	5	25.00	has seismic stability been evaluated by a qualified engineer?	
R	5	4	20.00	concern with tank compliance with seismic requirements?	
Fn	4	4	16.00	other known problems (e.g. adequate freeboard, stagnant water)?	
PM	4	4	16.00		1 year according to AWU Useful Life
					· · · · · · ·

				South Tahoe PUD Location Description:	Access Road from Sherman Way, 1696 Sherman Way	K/J Project Number: 1270004*00				
				Water System Optimization Plan Tank Facility ID #:	KTK2	Date:	3/13/2012			
						Condition Assessment				
				Tank Facility Name:	Keller Tank #2	Inspectors:	Peter Lavallee and Jeremy Rutherdale			
				B		Adiacont Duocessus Zonos				
				Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	Middle Keller and Upper Saddle zones			
				Piping & Valves						
PM	5	5	25.00	coatings adequate to protect piping and valves? Piping coatings need to be replaced						
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	s adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? Yes					
Fn	3	3	9.00	tank-piping connections designed to accommodate settlement or movement? Unknown	tank-piping connections designed to accommodate settlement or movement? Unknown					
Fn	1	4	4.00		valves are suitable for efficient and reliable service? Yes there are no problems with the valving at this location					
INFORMATION	N/A	N/A	N/A	other known problems? None						
PM	2	4	8.00	estimated service life remaining? 11 years according to AWU Useful Life						
				SCADA system No SCADA on Keller #2						
R	5	2	10.00	frequency of level transmitter calibration? NA						
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? NA						
Fn	1	4	4.00	alarm log maintained and reviewed annually? NA						
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? NA						
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? NA						
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure? NA						
R	2	3	6.00	spare parts/service support readily available? NA						
INFORMATION	N/A	N/A	N/A	other known problems? NA						
PM	5	4	20.00	estimated service life remaining? NA						
				Additional Data						
				Legend						
				PM Physical Mortality						
				Fn Functionality						
				R Reliability						
				FE Financial Efficiency						
				C Capacity						

South Tahoe PUD	Location Description:	Access Road from Sherman Way, 1696 Sherman Way	K/J Project Number:	1270004*00
Water System Optimization Plan	Tank Facility ID #:	ктк2	Date:	3/13/2012
	Tank Facility Name:	Keller Tank #2	Condition Assessment Inspectors:	Peter Lavallee and Jeremy Rutherdale
	Pressure Zones Served:	Keller Zone	Adjacent Pressure Zones:	
	Tressure zones serveu.	Kellel Zolle		winder Keiler and Opper Saddle Zones
Photo Evidence for PM, Fn, R, FE Is the d	lownslope portion of the tank constructed on fill	? Yes Does tank overflow drain adequately to protect tank foundation? Yes Any PHOTOS	bacterilogical exceedance at this tank?	Will Verify
20 BUG (23 C) SE (2)		2011/05/25 01:45 PM	201 (*/COB/V.): \$1193 CM	2011:06/25 OT 46 PM
2011/705/2/5 01/3/8		2011 / (c.b./25 01:43 PM	2011/05/875 OTHIS PM	2011/05/26 01:44 PM
2.011./UE-WE 61:889		201 1/CE/228 C1 M39 RM	2011/05/25 01:4€PM	ZEST 1 AGENZES CT1:00 PM

		South Tahoe PUD	Location Descript	ion: Access road off of Park Ave throug	th Van Sickle Bi-State Park	K/J Project Number:	1270004*00	
		Water System Optimization Plan	Tank Facility	D#: STLTK1		Date:	3/7/2012	2
		water system optimization Plan	Tank racinty	SILIKI			3/7/2012	2
			Tank Facility Na			Condition Assessment		
			rank racility Na	Stateline Tan	ık #1	Inspectors:	Peter Lavallee and I	Phill Torney
			Pressure Zones Ser	ved: Stateline Zo	one	Adjacent Pressure Zones:	Twin Peaks and Gardner	r Mountain Zone
		Notes:		Failu	ure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Leve	l of Service	Financial Efficiency	
		2. For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
		3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
			2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
			3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
			4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)	1.00	N/A	2.18	N/A	N/A	Total Factored Sco
		Weighted Final Score (1-25)	5.00	N/A	9.09	N/A	N/A	
CHECK	100%			N/A	80%	N/A	N/A	
CITECK	10070	Factored Score		N/A	7.27	N/A	N/A	8.27
		Criticality Score		.,,	1127	,	20%	1.65
		Tank Site						=
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
			N/A	N/A N/A	2.00	2.60	N/A N/A	Total Factored Sco
		Unweighted Failure Mode Score (1-5)		N/A N/A	8.00	10.20		Total Tactorea Sco
SUESY.	4000/	Weighted Final Score (1-25)	N/A N/A	N/A N/A	70%	30%	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score	•	N/A N/A	5.60	3.06	N/A	8.66
		Criticality Score		N/A	5.60	3.06	N/A 40%	3.46
		·					4070	3.40
		Tank Structure	61.11.1	61.1	6.1-11	Calledon	N/A	
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	Total Factored Sco
		Unweighted Failure Mode Score (1-5)		1.00	1.75	2.14	N/A	Total Factored Sco
CHECK	100%	Weighted Final Score (1-25)	4.00	5.00 30%	6.75 50%	5.14 10%	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		1.50	3.38	0.51	N/A N/A	5.79
+		Criticality Score		1.50	3.30	0.51	N/A 15%	0.87
		·					1370	0.07
		Piping & Valves	Colonidated	Calandara	Coloniated	D1/A	N/A	
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	N/A N/A	N/A N/A	Total Factored Sco
		Unweighted Failure Mode Score (1-5) Weighted Final Score (1-25)	1.00 4.50	N/A N/A	1.00 3.50	N/A N/A	N/A N/A	Total Pactored 300
CHECK	100%		4.50 10%	N/A 30%	60%	N/A N/A	N/A N/A	
CHECK	100%	Criticality Weighting Factor (0 - 100%) Factored Score		N/A	2.10	N/A N/A	N/A N/A	2.55
+		Criticality Score		IV/A	2.10	N/A	N/A 15%	0.38
+		,					13/0	0.30
		SCADA System		21/2	6.1-1-1	Coll. 1	N/A	
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	Total Factored Sco
		Unweighted Failure Mode Score (1-5)		N/A	1.00	2.25	N/A	Total Pactored Sco
		Weighted Final Score (1-25)		N/A	4.00	6.00	N/A	
CHECK	100%			N/A	60%	30%	N/A	
		Factored Score		N/A	2.40	1.80	N/A 10%	5.00 0.50
		Criticality Score						

	South Tahoe PUD	Location Description:	Access road off of Park Ave through Van Sickle Bi-State Park	K/J Project Number: 1270004*0	0
	Water System Optimization Plan	Tank Facility ID #:	STLTK1	Date:	3/7/2012
		Tank Facility Name:	Stateline Tank #1	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks and Gardner Mountain Zone
		-			

		Importance		CONDITION ASSESSMENT CHECKLIST
Failure Mode Type	Score	Weighting (1-5)	Weighted Score	CONDITION ASSESSMENT CITEDREST
				Calif. Waterworks Standards
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,
Fn	1	5	5.00	rodents, or other animals)?
				sample tap(s) provided to measure water quality into, out of and inside tank and protected
Fn	1	3	3.00	from freezing? Yes
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? No mixing system and dead zones have been identified
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes
Fn	3	3	9.00	tank draining removes residual sediments? No
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA tank level transmitter provides real-time level feedback to SCADA master? Yes
Fn Fn	1 5	5	5.00 25.00	adequate security measures and monitoring to prevent unauthorized access? No, vandalism has occurred at this site already
Fn	4	3	12.00	adequate lighting & access to interior for inspections, cleaning and repair? No
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Tank not used for CT compliance
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes the tank was constructed to prevent external water from entering the tank
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Yes
	<u> </u>		5.00	
				Tank Site
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? Yes if the road is plowed
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	5	5	25.00	is site vulnerable to wildfires? Site is vulnerable to wildfires
R	1	5	5.00	any unstable site conditions (if yes, describe)? No
R	4	3	12.00	is site close to known active sessimic faults? 4,563 ft. to the nearest fault
		3	12.00	site drainage adequate to prevent flooding of tank foundation, buildings and critical
R	1	3	3.00	equipment? Yes
.,	<u> </u>	3	5.00	cita lighting fancing and cocurity manitaring adequate to discourage unauthorized
Fn			0.00	access/vandalism? No site security
INFORMATION	N/A	N/A	N/A	other known problems? None
	·	,	,	
				Tank Structure
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed
INFORMATION	N/A	N/A	N/A	concrete, etc.) Welded Steel
INFORMATION	N/A	N/A	N/A	what is tank volume? 2.25 MG
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?
INFORMATION	N/A	N/A	N/A	what is emergency storage available?
С	1	5	5.00	overall tank volume to meet District sizing requirements?
INFORMATION	N/A	N/A	N/A	date tank was constructed? 1994
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? None since construction
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes
	·			3 ft of freehoard which is adequate
Fn	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? 3 ft. of freeboard which is adequate
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Yes
PM	1	5	5.00	condition of exterior coatings adequate to protect structure? Exterior coatings are in good condition with no visible defects
Fn	1	4	4.00	adequate openings for ingress/egress? Yes two manways and a roof hatch
INFORMATION	N/A	N/A	N/A	date of last interior inspection? 2011
		_		Impressed current cathodic protection
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate?
K	5	1	5.00	space available to add so lar panels? No
R R	5 1	2	10.00	known fire or haz-mat conditions that could be mitigated? Potential for wild fire based on proximity to forest
	-	3	3.00	tank foundation condition? Excellent condition with an excelling
R	1	4	4.00	tank foundation condition? Excellent condition with no cracking or spalling
R R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? Not since construction
	<u>1</u> 4	4	4.00	concern with tank compliance with seismic requirements? No
Fn PM	1		16.00 4.00	other known problems (e.g. adequate freeboard, stagnant water)? Stagnant Water issues when tied to Gardner Mountain Zone. The tanks "flat line" a lot. Crews turn off the wells occasionally to allow for turnover. estimated service life remaining? 32 years according to AWU Useful Life
FIVI	1	4	4.00	estimated service me remaining: 122 years according to Award oserul tile
			l	

				South Tahoe PUD Location Description:	Access road off of Park Ave through Van Sickle Bi-State Park	K/J Project Number: 1270004*00			
				Water System Optimization Plan Tank Facility ID #:	STLTK1	Date:	3/7/2012		
						Condition Assessment			
				Tank Facility Name:	Stateline Tank #1	Inspectors:	Peter Lavallee and Phill Torney		
				Tunki demey realite.	Statellile Fallk #1	пізрессої з.	Peter Lavallee and Phili Torney		
				Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks and Gardner Mountain Zone		
				11000	Statemic 2010	.,	TWITT COILS AND GOVERNMENT MOUNTAIN ZONE		
				Dining 9 Value					
214			5.00	Piping & Valves					
PM	1	5	5.00	coatings adequate to protect piping and valves? Yes					
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)? Yes					
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement? Yes					
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Yes	valves are suitable for efficient and reliable service? Yes				
NFORMATION	N/A	N/A	N/A	other known problems? Building in between tank with valving inside a vault	t. Altitude valve at the tanks and it is not currently being used				
PM	1	4	4.00	estimated service life remaining? 42 years according to AWU Useful Life					
				SCADA system					
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is only done when a problem is identified					
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operations					
Fn	1	4	4.00	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewed on an annual basis					
NFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio					
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the last	st year				
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure? There is adequate power to the site					
R	2	3	6.00	spare parts/service support readily available? Parts are readily available at the plant and through	the manufacturer				
INFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site					
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.					
				Additional Date with the second secon					
				Additional Data Valve House photos are in Stateline Tank #2					
				Legend					
				PM Physical Mortality					
				Fin Frunctionality Fin Executionality					
				R Reliability					
				FE Financial Efficiency					
				C Capacity					
		l		Supporty					

Water System Optimization Plan Tank Facility Name: Tank Facility Name: Sundine Fank #1 Date: Adjacent Pressure Zones: Peter Lundles and Phil Turney Pressure Zones Served: Stateline Zone Adjacent Pressure Zones: Two Peaks and Gardent Monthain Zone Photos Photos Photos Photos Photos Photos Photos Photos Photos Photos Photos Photos Photos Photos Photos Photos Photos	Tank Facility Name: Stateline Tank #1 Condition Assessment Inspectors: Peter Lavallee and Hall Torney		South Tahoe PUD	Location Description:	Access road off of Park Ave through Van Sickle Bi-State Park	K/J Project Number: 1270004*00	
Tank Facility Name: Stateline Tank #1 Inspectors: Peter Lavallee and Phill Torney Pressure Zones Served: Stateline Zone Adjacent Pressure Zones: Twin Peaks and Gardner Mountain Zone Photo Evidence for PM, Fn, R, FE is the downlope portion of the tank constructed on III.2 Does tank overflow cann adequately to protect tank foundation. Any bacteriogical exceedance at this tank 2 PHOTOS PHOTOS	Tank Facility Name: Stateline Tank #1 Inspectors: Peter Lavallee and Phill Torney Pressure Zones Served: Stateline Zone Adjacent Pressure Zones: Twin Peaks and Gardner Mountain Zone Photo Evidence for PM, Fn, R, FE Atthetionnalings portion of the tank constructed on #12. Does tank overflow dram adequately to protect tank foundation? Any hadrentogical exceedance at this tank? PHOTOS		Water System Optimization Plan	Tank Facility ID #:	STLTK1		3/7/2012
Pressure Zones Served: Stateline Zone Adjacent Pressure Zones: Twin Peaks and Gardner Mountain Zone Photo Evidence for PM, Fin, R, FE The downlope portion of the tank constructed on fill* Does tank overflow dram adequately to protect tank foundation? PHOTOS PHOTOS	Pressure Zones Served: Stateline Zone Adjacent Pressure Zones: Twin Peaks and Gardner Mountain Zone Photo Evidence for PM, Fn, R, FE is the downstope portion of the tank constructed on fill? Does tank overflow drain adequately to protect tank foundation? Any bacterilogical exceedance at this tank? PHOTOS						
Photo Evidence for PM, Fn, R, FE at the downslope portion of the tank constructed on fill? Does tank overflow drain adequately to protect tank foundation? Any bacterilogical exceedance at this tank?	Photo Evidence for PM, Fn, R, FE at the downslops portion of the tank constructed on fill? Does tank overflow drain adequately, to protect tank foundation? Any bacterilogical exceedance at this tank?			Tank Facility Name:	Stateline Tank #1	Inspectors:	Peter Lavallee and Phill Torney
PHOTOS PHOTOS	PHOTOS PHOTOS			Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Twin Peaks and Gardner Mountain Zone
			Photo Evidence for PM, F	Fn, R, FE Is the downslope portion of the tank constructed o		s Any bacterilogical exceedance at this tank? Will Verify	
					PHOTOS		
							Ť
		+					

			South Tahoe PUD		Location Description	Access road off of Park Ave through	h Van Sickle Bi-State Park	K/J Project Number:	1270004*00	
			Water System Optimization Plan		Tank Facility ID) #: STLTK2		Date:	3/7/20:	012
					<u> </u>			Condition Assessment		
					Tank Facility Nan	ne: Stateline Tani	k #2	Inspectors:	Peter Lavallee and	d Phill Torney
					Pressure Zones Serve	ed: Stateline Zo	ne	Adjacent Pressure Zones:	Gardner Mountain and	ł Twin Peaks Zones
			Notes:			Failu	re Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model		Physical Mortality	Capacity		of Service	Financial Efficiency	
			For Reliabilty to be determined based on CMMS maintenance records				functionality	reliability		
			For Criticality Weighting Factors to be determined at District Workshop		new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements		1: best available technology	
					ninor defects only	2: greater than 95% of design requirements	2: exceeds some requirements		2: financial efficiency is high	
					noderate deterioration ignificant deterioration	3: greater than 90% of design requirements	meets all requirements fails some requirements	3: failure every 11 to 15 yrs	financial efficiency is average financial efficiency is low	
					ignificant deterioration irtually unserviceable	4: greater than 85% of design requirements 5: less than 85% of design requirements	4: fails some requirements 5: Fails all requirements		5: asset should be replaced	
				3. VI	irtuany unserviceable	5. 1635 than 6576 of design requirements	J. Tails all requirements	J. Tanule < 3 yrs	5. asset should be replaced	
			California Waterwor	ks Standards						
					Calculated	NI/A	Calculated	NI/A	N/A	
			Is Failure Mode Score Calculate		Calculated	N/A	Calculated	N/A	N/A	Total Factored Scor
			Unweighted Failure Mo		1.00	N/A	2.18	N/A	N/A	Total Pactoreu Scor
				nal Score (1-25)	5.00	N/A	9.09	N/A	N/A	
	CHEC	CK	100% Criticality Weighting Fa		20%	N/A	80%	N/A	N/A	
				Factored Score	1.00	N/A	7.27	N/A	N/A	8.27
				Criticality Score					20%	1.65
				Tank Site						
			Is Failure Mode Score Calculate	ed or Assigned?	N/A	N/A	Calculated	Calculated	N/A	
			Unweighted Failure M	ode Score (1-5)	N/A	N/A	2.00	2.60	N/A	Total Factored Score
			Weighted Fir	nal Score (1-25)	N/A	N/A	8.00	10.20	N/A	
	CHEC	CK	100% Criticality Weighting Fa	actor (0 - 100%)	N/A	N/A	70%	30%	N/A	
				Factored Score	N/A	N/A	5.60	3.06	N/A	8.66
				Criticality Score					40%	3.46
			Ta	ank Structure						
			Is Failure Mode Score Calculate		Calculated	Calculated	Calculated	Calculated	N/A	
			Unweighted Failure M		1.00	1.00	1.75	2.14	N/A	Total Factored Scor
				nal Score (1-25)	4.00	5.00	6.75	5.14	N/A	
	CHEC	rk	100% Criticality Weighting Fa		10%	30%	50%	10%	N/A	
	CHEC			Factored Score	0.40	1.50	3.38	0.51	N/A	5.79
				Criticality Score	5.40	1.50	3.30	3.31	15%	0.87
				oing & Valves					==::	J.U.
					Calardeted	Caladaad	Calminand	N1/0	N/2	
			Is Failure Mode Score Calculate		Calculated	Calculated	Calculated	N/A N/A	N/A N/A	Total Factored Scor
			Unweighted Failure M		1.00	N/A N/A	1.00	-	·	Total Factorea Stor
	c::==			nal Score (1-25)	4.50	•	3.50	N/A	N/A	
	CHEC	-N	100% Criticality Weighting Fa		10%	30%	60%	N/A	N/A	2.55
				Factored Score	0.45	N/A	2.10	N/A	N/A	2.55
				Criticality Score					15%	0.38
				CADA System						
			Is Failure Mode Score Calculate		Calculated	N/A	Calculated	Calculated	N/A	
			Unweighted Failure Mo		2.00	N/A	1.00	2.25	N/A	Total Factored Scor
			Weighted Fir	nal Score (1-25)	8.00	N/A	4.00	6.00	N/A	
	CHEC	CK	100% Criticality Weighting Fa		10%	N/A	60%	30%	N/A	
				Factored Score	0.80	N/A	2.40	1.80	N/A	5.00
				Criticality Score					10%	0.50
l l										

	South Tahoe PUD	Location Description:	Access road off of Park Ave through Van Sickle Bi-State Park	K/J Project Number:	1270004*00
	Water System Optimization Plan	Tank Facility ID #:	STLTK2	Date:	3/7/2012
				Condition Assessment	
		Tank Facility Name:	Stateline Tank #2	Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Stateline Zone	Adjacent Pressure Zones:	Gardner Mountain and Twin Peaks Zones
•	Importance				

<u> </u>		Importance					
Failure Mode Type	Score	•	Weighted Score	CONDITION ASSESSMENT CHECKLIST			
randre mode Type	300.0	110.8.118 (2 3)	Treignieu deore	Calif. Waterworks Standards			
				tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds,			
Fn	1	5	5.00	rodents, or other animals)? Yes			
rii	1	3	3.00	sample tap(s) provided to measure water quality into, out of and inside tank and protected			
Fn	1	3	3.00	from freezing? Yes			
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? No mixing system and dead zones have been identified			
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes			
Fn	3	3	9.00	tank draining removes residual sediments? No			
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA			
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes			
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? No, vandalism has occurred at this site already			
Fn	4	3	12.00	adequate lighting & access to interior for inspections, cleaning and repair? No			
Fn	1	5	5.00	adequate isolation valves and bypass to take tank offline and maintain water service? Yes			
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Tank not used for CT compliance			
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes the tank was constructed to prevent external water from entering the tank			
PM	1	5	5.00	condition of interior coatings adequate to protect structure? Yes			
				Tank Site			
Fn	4	4	16.00	adequate vehicle access for year-round maintenance? Yes if the road is plowed			
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.			
R	5	5	25.00	is site vulnerable to wildfires? Site is vulnerable to wildfires			
R	1	5	5.00	any unstable site conditions (if yes, describe)? No			
R	4	3	12.00	is site close to known active seismic faults? 4,563 ft. to the nearest fault			
				site drainage adequate to prevent flooding of tank foundation, buildings and critical			
R	1	3	3.00	equipment? ¹ res			
				site lighting, fencing, and security monitoring adequate to discourage unauthorized			
Fn			0.00	access/vandalism? No site security			
INFORMATION	N/A	N/A	N/A	other known problems? None			
				Tank Structure			
				describe tank structure type (e.g., welded steel, bolted steel, reinforced concrete, prestressed Welded Steel			
INFORMATION	N/A	N/A	N/A	concrete, etc.) Welueu steel			
INFORMATION	N/A	N/A	N/A	what is tank volume? 1.25 MG			
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?			
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?			
INFORMATION	N/A	N/A	N/A	what is emergency storage available?			
С	1	5	5.00	overall tank volume to meet District sizing requirements?			
INFORMATION	N/A	N/A	N/A	date tank was constructed? 1994			
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? None			
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes			
-	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? 3 ft. of freeboard which is adequate			
Fn R	-	· · · · · · · · · · · · · · · · · · ·	4.00	tank designed to withstand snow load and not create safety issue? Yes			
11	1	5	5.00				
PM Fn	1 1	5	5.00 4.00	condition of exterior coatings adequate to protect structure? Exterior coatings are in good condition with no visible defects adequate openings for ingress/egress? Yes two manways and a roof hatch			
INFORMATION	N/A	N/A	4.00 N/A	date of last interior inspection? 2011			
INFORMATION	IN/A	IN/A	IN/A				
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate? Impressed current cathodic protection			
R	5	1	5.00	space available to add solar panels? No			
R	5	2	10.00	known fire or haz-mat conditions that could be mitigated? Potential for wild fire based on proximity to forest			
R	1	3	3.00	tank foundation type? Concrete ring with anchor bolts			
 R	1	4	4.00	tank foundation condition? Excellent condition with no cracking or spalling			
 R	1	5	5.00	has seismic stability been evaluated by a qualified engineer? Not since construction			
R	1	4	4.00	concern with tank compliance with seismic requirements? No			
Fn	4	4	16.00	other known problems (e.g. adequate freeboard, stagnant water)? Stagnant Water issues when tied to Gardner Mountain Zone. The tanks "flat line" a lot. Turning off the wells occasionally to allow for turnover.			
PM	1	4	4.00	estimated service life remaining? 32 years based on AWU Useful Life			
	-			v			

				Courth Tohan DUD	La sakion Danasinkian			K/J Project Number: 127000	
				South Tahoe PUD	Location Description:	Access road off of Park Ave through Va	n Sickle Bi-State Park	K/J Project Number. 12/000	4*00
				Water System Optimization Plan	Tank Facility ID #:	STLTK2		Date:	3/7/2012
								Condition Assessment	
					Tank Facility Name:				
					rank raciity Name:	Stateline Tank #2		Inspectors:	Peter Lavallee and Phill Torney
					Pressure Zones Served:	Stateline Zone	Ad	ljacent Pressure Zones:	Gardner Mountain and Twin Peaks Zones
				Piping & Valves					
PM	1	5	5.00	coatings adequate to protect piping and valves?					
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?	Yes				
Fn	1	3	3.00	tank-piping connections designed to accommodate settlement or movement?					
Fn	1	4	4.00	valves are suitable for efficient and reliable service?					
INFORMATION	N/A	N/A	N/A	other known problems?	Building in between tank with valving inside a	vault. Altitude valve at the tanks and it is not currently	y being used		
PM	1	4	4.00	estimated service life remaining?	42 years based on AWU Useful life				
				SCADA system					
R	5	2	10.00		Transmitter calibration is only done when a pr				
Fn	1	4	4.00	automated alarm callout for critical failures and reliability?					
Fn	1	4	4.00	alarm log maintained and reviewed annually?	The alarm log is maintained but it is not review	ved on an annual basis			
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)?	Radio				
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)?		e last year			
R R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure?					
INFORMATION	2 N/A	N/A	6.00 N/A	spare parts/service support readily available?	No other known electrical problems at this site				
PM	2	N/A 4	8.00		Estimated 10 year service life remaining.	:			
FIVI	2	4	8.00	estinated service me remaining:	Estimated 10 year service life remaining.				
				Additional Data					
				Additional Data					
				Legend					
					Physical Mortality				
					Functionality				
					Reliability				
					Financial Efficiency				
					Capacity				
				7					

South Tahoe PUD	Location Description:	Access road off of Park Ave through Van Sickle Bi-State Park	K/J Project Number: 1270004*	°00
Water System Optimization Plan	Tank Facility ID #:	STLTK2	Date:	3/7/2012
	Tank Facility Name:	Stateline Tank #2	Condition Assessment Inspectors:	Peter Lavallee and Phill Torney
			Adjacent Pressure Zones:	
	Pressure Zones Served:	Stateline Zone	Aujacent Pressure Zones.	Gardner Mountain and Twin Peaks Zones
Photo Evider	nce for PM, Fn, R, FE is the downslope portion of the tank constructed	on fill? Yes Does tank overflow drain adequately to protect tank foundation? Yes Ar	ny bacterilogical exceedance at this tank? Will Verify	у
		PHOTOS		

				T					
			South Tahoe PUD	Location Description	: Access Road from Cold	l Creek Drive	K/J Project Number:	1270004*00	
			Water System Optimization Plan	Tank Facility ID #	: ССКТК		Date:	3/7/2012	2
			water system optimization rian	rank radincy is in	CCKIK		Condition Assessment		2
				Tank Facility Name	Cold Creek Ta	ank	Inspectors:	Peter Lavallee and I	Phill Torney
				,			•		· · · · · · · · · · · · · · · · · · ·
				Pressure Zones Served	: Montgomery Estates and Upper	Montgomery Estates	Adjacent Pressure Zones:	Stateline Zo	one
			Notes:		Failu	re Mode Scoring (1 - 5)			
			Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
			2. For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
			3. For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: meets or exceeds design requirements	1: exceeds all requirements	1: failure every > 25 years	1: best available technology	
				2: minor defects only	2: greater than 95% of design requirements	2: exceeds some requirements	2: failure every 16 to 25 yrs	2: financial efficiency is high	
				3: moderate deterioration	3: greater than 90% of design requirements	3: meets all requirements	3: failure every 11 to 15 yrs	3: financial efficiency is average	
				4: significant deterioration	4: greater than 85% of design requirements	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	
		+		5: virtually unserviceable	5: less than 85% of design requirements	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
			California Waterworks Standards						
			Is Failure Mode Score Calculated or Assigned?	Calculated	N/A	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	2.09	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	9.18	N/A	N/A	
	CHECK	100%		20%	N/A	80%	N/A	N/A	
	CHECK	100/0	Factored Score		N/A	7.35	N/A	N/A	12.35
			Criticality Score		N/A	7.33	1975	20%	2.47
			Tank Site					2070	
					N/A	Calculated	Calculated	NI/A	
			Is Failure Mode Score Calculated or Assigned?		·		2.40	N/A	Total Factored Score
			Unweighted Failure Mode Score (1-5)		N/A N/A	0.50 2.00	9.60	N/A N/A	Total Factored Score
			Weighted Final Score (1-25)	·	·			,	
	CHECK	100%	, , , ,	N/A	N/A	70%	30%	N/A	
			Factored Score		N/A	1.40	2.88	N/A	4.28
			Criticality Score					40%	1.71
			Tank Structure	1					
			Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	
			Unweighted Failure Mode Score (1-5)		1.00	1.75	3.86	N/A	Total Factored Score
			Weighted Final Score (1-25)		5.00	6.75	12.00	N/A	
	CHECK	100%	, , , ,	10%	30%	50%	10%	N/A	
			Factored Score		1.50	3.38	1.20	N/A	7.41
			Criticality Score					15%	1.11
			Piping & Valves						
			Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	Calculated	N/A	N/A	
			Unweighted Failure Mode Score (1-5)		N/A	3.00	N/A	N/A	Total Factored Score
			Weighted Final Score (1-25)	13.50	N/A	9.50	N/A	N/A	
	CHECK	100%	Criticality Weighting Factor (0 - 100%)	10%	30%	60%	N/A	N/A	
			Factored Score	1.35	N/A	5.70	N/A	N/A	7.05
			Criticality Score					15%	1.06
			SCADA System						
			Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		1	Unweighted Failure Mode Score (1-5)	2.00	N/A	1.00	2.25	N/A	Total Factored Score
			Weighted Final Score (1-25)		N/A	4.00	6.00	N/A	
	CHECK	100%			N/A N/A	60%	30%	N/A N/A	
	CHECK	100%	Factored Score		N/A N/A	2.40	1.80	N/A N/A	5.00
		+	Criticality Score		IN/A	2.40	1.00	10%	0.50
l l								10/0	0.30
							^	verall Total Factored Score (Out of 25) =	6.85

	South Tahoe PUD	Location Description:	Access Road from Cold Creek Drive	K/J Project Number: 1	270004*00
	Water System Optimization Plan	Tank Facility ID #:	ссктк	Date:	3/7/2012
				Condition Assessment	
		Tank Facility Name:	Cold Creek Tank	Inspectors:	Peter Lavallee and Phill Torney
		Pressure Zones Served:	Montgomery Estates and Upper Montgomery Estates	Adjacent Pressure Zones:	Stateline Zone

Failure Made Tune	Feana	Importance	Maighted Coore	CONDITION ASSESSMENT CHECKLIST
Failure Mode Type	Score	weighting (1-5)	Weighted Score	Collé Metamorale Canadarda
				Calif. Waterworks Standards
r.,	1	-	5.00	tank openings designed to prevent contamination (e.g., rainwater, runoff, insects, birds, rodents, or other animals)?
Fn	1	5	5.00	sample tap(s) provided to measure water quality into, out of and inside tank and protected
Fn	1	3	3.00	from freezing?
Fn	5	5	25.00	tank designed to minimize dead zones (separate inlet/outlet or mixer)? No mixer and single main in and out
Fn	1	5	5.00	air-gap provided for tank drain and overflow piping? Yes
Fn	3	3	9.00	tank draining removes residual sediments? This tank has not been cleaned. Probably not though
Fn	1	1	1.00	staff gage provided to manually check level? No CDPH has indicate a dislike for staff gages and the District utilizes a DP Cell attached to SCADA
Fn	1	5	5.00	tank level transmitter provides real-time level feedback to SCADA master? Yes
Fn	5	5	25.00	adequate security measures and monitoring to prevent unauthorized access? No, vandalism has occurred at this site already. There is no fencing or lighting at this tank, but there has not been any issuues with unauthorized access.
Fn	1	3	3.00	adequate lighting & access to interior for inspections, cleaning and repair? Yes
Fn	3	5	15.00	adequate isolation valves and bypass to take tank offline and maintain water service? This tank can not be bypassed easily but it can be valved off
INFORMATION	N/A	N/A	N/A	tank used for CT compliance? yes - bypass pipes blind flanged? Tank not used for CT compliance
Fn	1	5	5.00	tank prevent entry of runoff, subsurface flow, or drainage into the tank? Yes the tank was constructed to prevent external water from entering the tank
PM	5	5	25.00	condition of interior coatings adequate to protect structure? No planned recoating in 2012
				Tank Site
Fn	1	4	4.00	adequate vehicle access for year-round maintenance? Yes
R	2	3	6.00	is site within 100-yr flood plain? No. This site is indicated as other areas Zone D on the FEMA flood map. Which means flood hazards are undetermined but possible.
R	5	5	25.00	is site vulnerable to wildfires? Yes at urban wildland interface on edge of residential neighborhood
R	1	5	5.00	any unstable site conditions (if yes, describe)? None
R	3	3	9.00	is site close to known active seismic faults? 3,872 ft. to nearest fault
	1	2	2.00	site drainage adequate to prevent flooding of tank foundation, buildings and critical No issues with site drainage
R	1	3	3.00	equipment? site lighting, fencing, and security monitoring adequate to discourage unauthorized
Fo.			0.00	No there is no fencing or lighting at this tank but we have not had any issues with unauthorized access
Fn INFORMATION	N/A	N/A	0.00 N/A	accessy variousismit other known problems? None
INTORNATION	NA	N/A	IV/A	other wording robotics in the
				Tank Structure
				describe tank structure type (e.g. welded steel, holted steel, reinforced concrete, prestressed
INFORMATION	N/A	N/A	N/A	concrete, etc.)
INFORMATION	N/A	N/A	N/A	what is tank volume? 500,000
INFORMATION	N/A	N/A	N/A	what is operational storage requirement?
INFORMATION	N/A	N/A	N/A	what is fire storage requirement?
INFORMATION	N/A	N/A	N/A	what is emergency storage available?
С	1	5	5.00	overall tank volume to meet District sizing requirements?
INFORMATION	N/A	N/A	N/A	date tank was constructed? 1980
INFORMATION	N/A	N/A	N/A	date and describe work done to renew or upgrade tank and tank facilities? Planned recoating internal and external to occur in 2012
Fn	1	3	3.00	adequate perimeter clearance to facilitate routine O&M? Yes
				3 ft. of freeboard which is adequate
Fn	1	4	4.00	tank freeboard dimension from operating high water level to top of tank overflow? adequate? 3 ft. of freeboard which is adequate
R	1	5	5.00	tank designed to withstand snow load and not create safety issue? Yes
PM	5	5	25.00	condition of exterior coatings adequate to protect structure? No
Fn INFORMATION	1 N/A	4 N/A	4.00 N/A	adequate openings for ingress/egress? 2 manways and 1 roof hatch date of last interior inspection? 2011
INFORIVIATION	IN/A	IN/A	N/A	
PM	1	3	3.00	passive or active cathodic protection in place (yes or no) and is it maintained and adequate? Hanging passive cathodic protection has been removed new anodes will be installed after one year coating inspection in 2013.
R	5	1	5.00	space available to add solar panels? No
R	5	2	10.00	known fire or haz-mat conditions that could be mitigated? Proximity to forest
R	4	3	12.00	tank foundation type? concrete foundation with no anchoring
R	4	4	16.00	tank foundation condition? Adequate condition where I could see it
R	4	5	20.00	has seismic stability been evaluated by a qualified engineer? No
R	4	4	16.00	concern with tank compliance with seismic requirements? Yes
Fn	4	4	16.00	other known problems (e.g. adequate freeboard, stagnant water)? There is expected stagnant water concerns
PM	3	4	12.00	estimated service life remaining? 18 years according to AWU Useful life
<u>'</u>				·

				South Tahoe PUD Location Description:	Access Road from Cold Creek Drive	K/J Project Number: 1270004*00	
				Water System Optimization Plan Tank Facility ID #:	ССКТК	Date:	3/7/2012
						Condition Assessment	
				Tank Facility Name:	Cold Creek Tank	Inspectors:	Peter Lavallee and Phill Torney
				Pressure Zones Served:	Montgomery Estates and Upper Montgomery Estates	Adjacent Pressure Zones:	Stateline Zone
				Piping & Valves			
PM	3	5	15.00	coatings adequate to protect piping and valves? Coating on piping could no be seen. Internal piping to	vill be recoated in 2012		
INFORMATION		3	0.00	pipes adequately sized to prevent excessive noise (e.g. rattling) or headloss (velocity > 10 fps)?			
Fn	5	3	15.00	tank-piping connections designed to accommodate settlement or movement? No			
Fn	1	4	4.00	valves are suitable for efficient and reliable service? Yes			
INFORMATION	N/A	N/A	N/A	other known problems? None			
PM	3	4	12.00	estimated service life remaining? 28 years according to AWU Useful life			
				SCADA system			
R	5	2	10.00	frequency of level transmitter calibration? Transmitter calibration is only done when a problem	is identified		
Fn	1	4	4.00	automated alarm callout for critical failures and reliability? Yes all alarms are monitored by District Operations			
Fn	1	4	4.00	alarm log maintained and reviewed annually? The alarm log is maintained but it is not reviewed or	an annual basis		
INFORMATION	N/A	N/A	N/A	type of telemetry used (radio, fiber optic, leased line, cell modem, etc.)? Radio			
R	1	4	4.00	communication system is reliable (approximate no. of comm. failures in last year)? There are no communication failures within the last	year		
R	1	4	4.00	adequate power available to run all telemetry and instrumentation on main power failure? There is adequate power to the site			
R	2	3	6.00	spare parts/service support readily available? Parts are readily available at the plant and through	he manufacturer		
INFORMATION	N/A	N/A	N/A	other known problems? No other known electrical problems at this site			
PM	2	4	8.00	estimated service life remaining? Estimated 10 year service life remaining.			
				Additional Data			
				Legend			
				PM Physical Mortality			
				Fn Functionality			
				R Reliability			
				FE Financial Efficiency			
				C Capacity			

South Tahoe PUD	Lo	cation Description:	Access Road from Cold Creek Drive	K/J Project Number: 1270004*00	
Water System Optimiz	ation Plan	Tank Facility ID #:	ССКТК	Date:	3/7/2012
		Tank Facility Name:	Cold Cooply Tools	Condition Assessment Inspectors:	
			Cold Creek Tank		Peter Lavallee and Phill Torney
	Pres	sure Zones Served:	Montgomery Estates and Upper Montgomery Estates	Adjacent Pressure Zones:	Stateline Zone
	Photo Evidence for PM, Fn, R, FE Is the downslope po	ortion of the tank constructed on fill? Yes D	es tank overflow drain adequately to protect tank foundation? **es Any b	pacterilogical exceedance at this tank? Will Verify	
			PHOTOS		

Appendix A2

Critical Pipelines

South Tahoe PUD

Water System Optimization Plan
Summary of Pipeline Condition and Capacity Evaluation

Failure Mode Scoring Summary - Criticality Scores

			California	Pipeline	Piping	Overall Total
		Zone Served	Waterworks	Route/Align	and	Factored Score
Pipeline Facility Name:	Pipeline Facility ID #:		Standards	ment	Valves	(Out of 25) =
10" AC Upper Truckee River Waterline Crossing (UTR Crossing)	J38-052-J38-022	Flagpole/ Arrowhead	0.20	7.05	4.51	11.76
12" Lake Tahoe Boulevard Waterline (UTR Bridge Crossing Hwy 50)	M26-047-M26-071	Main/Gardner Mountain	0.20	3.38	4.49	8.07
8" Steel line through meadow (Airport Runway Crossing)	L32-005-M32-004	Country Club/ Stateline	0.20	6.23	3.68	10.10
6" dedicated Keller tank steel line (6" High Pressure Line)	Multiple facility ids due to length: Q21-048-CP0911, B0119-CP0911, B0068-B0119, B0068-B0114,	Keller	0.80	5.70	4.69	11.19

		Pipe	Pipe				%	
		Size	Area	MDD	Velocity	Capacity	Capacity	
Pipeline Facility Name:	Pipeline Facility ID #:	(in)	(in2)	(gpm)	(ft/s)	(gpm)	> MDD	Score
10" AC Upper Truckee River Waterline Crossing (UTR Crossing)	J38-052-J38-022	10	0.545	260	1.06	1224	371%	1
12" Lake Tahoe Boulevard Waterline (UTR Bridge Crossing Hwy 50)	M26-047-M26-071	12	0.785	2450	6.95	1762	-28%	5
8" Steel line through meadow (Airport Runway Crossing)	L32-005-M32-004	8	0.349	90	0.57	783	770%	1
	Multiple facility ids due to							
	length: Q21-048-CP0911,							
	B0119-CP0911, B0068-							
6" dedicated Keller tank steel line (6" High Pressure Line)	B0119, B0068-B0114,	6	0.196	390	4.43	441	13%	1

Notes: MDD provided by Brenda Estrada of West Yost

			1	I		1	1	
		South Tahoe PUD	Location Description:	Waterline under Upper Truckee Ri	ver at San Bernadino in Meyers	K/J Project Num	ber: 1270004*00	
		Water System Optimization Plan	Pipeline Facility ID #:	J38-052-J	38-022	D	ate: 2/23/2	012
						Condition Assessm		
			Pipeline Facility Name:	Upper Truckee River Waterlii	ne Crossing (UTR Crossing)	Inspect	Ors: Peter Lavallee an	nd Phill Torney
			Pressure Zones Served:	Flagpole and Arro	owhead Zones	Adjacent Pressure Zo	nes:	
				En	ilure Mode Scoring (1 - 5)			
		Notes:						
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity		of Service	Financial Efficiency	
		For Reliability to be determined based on CMMS maintenance records			functionality	reliability		
		For Criticality Weighting Factors to be determined at District Workshop	new or excellent condition minor defects only	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >50 yrs 2: failure every 26 to 50 yrs	best available technology financial efficiency is high	
			3: moderate deterioration	2: exceeds design requirement 3: meets design requirement	exceeds some requirements meets all requirements	3: failure every 11 to 25 yrs	3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
			,,					
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	4.00	N/A	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		0%	100%	0%	0%	
	200/3	Factored Score		N/A	4	N/A	N/A	4.00
		Criticality Score		,			5%	0.20
		Pipeline Route/Alignment						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	5.00	3.67	N/A	Total Factored Score
		Weighted Final Score (1-25)	· · · · · · · · · · · · · · · · · · ·	N/A	15.00	16.33	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)	-	0%	50%	50%	0%	
		Factored Score		N/A	7.5	8.17	N/A	15.67
		Criticality Score		·		<u> </u>	45%	7.05
		Pipeline and Valves						
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		2.00	4.00	1.50	N/A	Total Factored Score
		Weighted Final Score (1-25)		9.50	20.00	6.00	N/A	
HECK	100%	Criticality Weighting Factor (0 - 100%)		30%	15%	15%	0%	
	13573	Factored Score	111	2.85	3	0.9	N/A	9.02
		Criticality Score					50%	4.51
							Overall Total Factored Score (Out of 25) =	11.76

				Cough Takes BUD	Lasatian Dasseintian		V/I Duciost Number, 1979991109	
				South Tahoe PUD	Location Description:	Waterline under Upper Truckee River at San Bernadino in Meyers	K/J Project Number: 1270004*00	
				Water System Optimization Plan	Pipeline Facility ID #:	J38-052-J38-022	Date:	2/23/2012
							Condition Assessment	
					Pipeline Facility Name:	Upper Truckee River Waterline Crossing (UTR Crossing)	Inspectors:	Peter Lavallee and Phill Torney
						opper trackee tiver watering crossing (or trackee tiver watering	pectorol	reter Edvance and rinn formey
					Pressure Zones Served:	Flagpole and Arrowhead Zones	Adjacent Pressure Zones:	
Failure Mode		Importance						
Туре	Score (1 - 5)	Weighting (1-5)	Final Score			CONDITION ASSESSMENT CHECKLIST		
				California Waterworks Standards				
Fn	1	4	4	adequate spacing of isolation valves?				
				Pipeline Route/Alignment				
Fn	5	3	15			th this river crossing. This line will be included in the USFS Master Use Permit which is in	negotiations currently. This permit will allow for a 25 foot te	emporary easement to do regular maintenance and to respond
R	4	5	20	pipeline route/alignment crosses known seismic fault or other natural hazard (e.g. creek	peline is in the Upper Truckee River and is c	urrently exposed with concrete encasement.		
К	4	5	20	nino providos solo source of water for critical customers (o.g. commercial or				
INFORMATION	N/A	N/A	N/A	pipe provides sole source of water for critical customers (e.g. commercial or institutional) and how many connections?	eds residential areas within the Flagpole Zo	ne		
R	3	3	9			ter to the Flagpole Zone. The completion of the Grizzly Mountain Booster Station in Ap	ril 2012 will make this crossing a redundant feed to the flagpo	ole zone.
R	4	5	20			rs excessive erosion could expose the line within the river	5	
				other known problems?				
				Piping and Valves				
INFORMATION	N/A	N/A	N/A	pipe material? As				
С	1	4	4	nominal size? 10				
С	3	5	15	test pressure and pressure rating? Ur	nknown what the pipe was tested to or wha	t the material is rated at. Currently operates at approximately 65 psi. Blow out in 1986	was caused by consistent high pressures near 165 psi.	
	_	_	_	pipelines protected from external corrosion (coatings, inert pipe material, rathodic	ert pipe material			
PM PM	3 1	3	9 4	protection)? pipelines known internal corrosion condition?				
INFORMATION	N/A	N/A	N/A		rly 70's by the Tahoe Paradise Water Comp	anv		
R	2	4	8		repairs on this portion of line in the last 5			
R	1	4	4	air release valves properly located/protected from flooding? NA				
PM	1	4	4	estimated service life remaining? 43				
Fn	4	5	20			ntraceable due to materials from isolation valve to isolation valve.		
				Additional Data In	order to protect the waterline in 1986 a co	ffer dam was installed downstream of the line.		
				Legend				
					nysical Mortality			
					inctionality			
				R Re	eliability			
				FE Fi	nancial Efficiency			
				C Ca	apacity			

Court Tales BUD	Learning D. C. C.		V/I Dunio de Niverto	
South Tahoe PUD	Location Description:	Waterline under Upper Truckee River at San Bernadino in Meyers	K/J Project Number: 1270004*00	
Water System Optimization Plan	Pipeline Facility ID #:	J38-052-J38-022	Date:	2/23/2012
, ,			Condition Assessment	• •
	Pipeline Facility Name:	Upper Truckee River Waterline Crossing (UTR Crossing)	Inspectors:	Peter Lavallee and Phill Torney
	Pressure Zones Served:	Flagpole and Arrowhead Zones	Adjacent Pressure Zones:	
Photo Evidence for PM, Fn, R, FE				
		PHOTOS		
	No photos due to sno	w cover. Will take photos when the snow melts in t	his location.	

		South Tahoe PUD	Location Description:	Bridge over Upper	Truckee River	K/J Project Number	1270004*00	
		Water System Optimization Plan	Pipeline Facility ID #	M26-047-M	26-071	Date	3/8/20	12
			, , , , , , , , , , , , , , , , , , ,			Condition Assessment	-, -, -	==
			Pipeline Facility Name:	12" Lake Tahoe Boulevard Waterline	e (UTR Bridge Crossing Hwy 50)	Inspectors	Peter Lavallee an	d Mark Gray
			Pressure Zones Served:	Stateline Zone and all Zones deper	ident on the Twin Peaks Zone	Adjacent Pressure Zones	Twin Peaks	s Zone
		Notes:		Fai	lure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Leve	el of Service	Financial Efficiency	
		For Reliabilty to be determined based on CMMS maintenance records	i ilysical wortancy	Capacity	functionality	reliability		
		·	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements		1: best available technology	
				2: exceeds design requirement	2: exceeds some requirements		2: financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	3: meets all requirements		3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	4: fails some requirements		4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	Tatal Fastanad Casna
		Unweighted Failure Mode Score (1-5)		N/A	1.00	N/A	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	4.00	N/A	N/A	
(100%	Criticality Weighting Factor (0 - 100%)		0%	100%	0%	0%	
		Factored Score		N/A	4	N/A	N/A	4.00
		Criticality Score					5%	0.20
		Pipeline Route/Alignment		,				
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	1.00	2.67	N/A	Total Factored Score
		Weighted Final Score (1-25)		N/A	3.00	12.00	N/A	
	100%	Criticality Weighting Factor (0 - 100%)		0%	50%	50%	0%	
		Factored Score	*	N/A	1.5	6	N/A	7.50
		Criticality Score					45%	3.38
		Pipeline and Valves						
		Is Failure Mode Score Calculated or Assigned?		Calculated	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		1.00	4.00	1.50	N/A	Total Factored Score
		Weighted Final Score (1-25)		4.50	20.00	6.00	N/A	
K	100%	Criticality Weighting Factor (0 - 100%)		30%	15%	15%	0%	
		Factored Score		1.35	3	0.9	N/A	8.98
		Criticality Score					50%	4.49
							Overall Total Factored Score (Out of 25) =	8.07

			South Tahoe PUD	Location Description:	Bridge over Upper Truckee River	K/J Project Number: 1270004*00				
			Water System Optimization Plan	Pipeline Facility ID #:	M26-047-M26-071	Date:	3/8/2012			
			Tracer System Spannization Flan	i ipeline i delitoj is in	WEG 047 WEG 071	Condition Assessment	3,0,2012			
				Divoline Facility Name			Peter Lavallee and Mark Gray			
				Pipeline Facility Name:	12" Lake Tahoe Boulevard Waterline (UTR Bridge Crossing Hwy 50)	Inspectors:				
				Pressure Zones Served:	Stateline Zone and all Zones dependent on the Twin Peaks Zone	Adjacent Pressure Zones:	Twin Peaks Zone			
Failure Mode		Importance								
Туре	Score (1 - 5)	Weighting (1-5)	Final Score		CONDITION ASSESSMENT CHECKLIST					
			California Waterworks	Standards						
Fn	1	4		ation valves? Yes on either side of the bridge						
			Pipeline Route/A							
Fn	1	3	3 easement and/or right-of-way adequate for routine maintenance and repairs? The line is within CalTrans right of Way and access to the facility is easy with use of a crane for supporting the pipe							
D.	5	5	pipeline route/alignment crosses known seismic fault or other natural hazard (e.g. creek crossing, major highway)? Line crosses the Upper Truckee River							
ĸ	5	5	pipe provides sole source of water for critical customers (e.g. commercial or							
INFORMATION	N/A	N/A	pipe provides sole source of water for critical customers (e.g. commercial or nstitutional) and how many connections? This line is the main connection between large areas of production on the east side of the bridge and water supply to multiple zones west of the bridge							
R	2	3	6 pipe provides sole source of water for a pressure zone? No but loss of source to the west side of the town would require switching the current pumping from Twin Peaks Booster to meet demands in the Flagpole Zone							
R	1	5	5 any unstable site conditions (if yes, describe)? No							
R	4	5	20 other know	n problems? Pipeline failed at a victaulic coupling due to a susp	ected freeze cycle					
			Divine	ad Values						
INICORNALTION	21/2	N1/A	. •	nd Valves						
INFORMATION C	N/A 1	N/A 4		pe material? Steel ominal size? 12"						
С	1	5	5 test pressure and pre							
					handle and the bare of the bare					
PM	4	3	12	protection)?	nan the coatings that are on the steel					
PM	3	4	12 pipelines known internal corrosic							
INFORMATION	N/A	N/A	,	te installed? 2002						
R R	1	4	8 frequence 4 air release valves properly located/protected fr	y of repairs? None except the failure						
PM	1	4		e remaining? 50 years based on AWU Useful Life						
Fn	4	5		n problems? Potential freeze thaw in this location						
			· · · · · · · · · · · · · · · · · · ·							
			Additi	onal Data One option for the Water to the Y issue is to install	a check valve at this location. In the photos below there are two red victaulic cou	plings. This is where the line failed in 2005.				
				Legend	<u>l</u>		1			
				PM Physical Mortality						
				Fn Functionality						
				R Reliability						
				FE Financial Efficiency						
				C Capacity						

		South Tahoe PUD	Location Description:	Bridge over Upper Truckee River	K/J Project Number: 13	270004*00
		Water System Optimization Plan	Pipeline Facility ID #:	M26-047-M26-071	Date:	3/8/2012
					Condition Assessment	Peter Lavallee and Mark Gray
			Pipeline Facility Name:	12" Lake Tahoe Boulevard Waterline (UTR Bridge Crossing Hwy 50)	Inspectors:	Peter Lavallee and Ivial K Gray
			Pressure Zones Served:	Stateline Zone and all Zones dependent on the Twin Peaks Zone	Adjacent Pressure Zones:	Twin Peaks Zone
					===	
		Photo Evidence for PM, Fn, R, FE				

PHOTOS













	South Tahoe Pl	JD	Location Description:	Crossing under air	port runway	K/J Project Numbe	r: 1270004*00	
	Water System	Optimization Plan	Pipeline Facility ID #:	L32-005-M3	32-004	Dat	e:	
	Trute: System			E52 003 Wis	2 00+	Condition Assessmen		
			Pipeline Facility Name:					
			ripellile racility Name.	8" Steel line through meadow (Airport Runway Crossing)	Inspector	S: Peter Lav	/allee
			Pressure Zones Served:	Country Clu	b Zone	Adjacent Pressure Zone	Stateline	Zone
	Notes:			Fai	lure Mode Scoring (1 - 5)			
		ill be based on hydraulic model	Physical Mortality	Capacity	Level	of Service	Financial Efficiency	
		be determined based on CMMS maintenance records	,	,	functionality	reliability	_	
	3. For Criticality We	ighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement	1: exceeds all requirements	1: failure >50 yrs	1: best available technology	
			2: minor defects only	2: exceeds design requirement	2: exceeds some requirements	2: failure every 26 to 50 yrs	2: financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	3: meets all requirements	3: failure every 11 to 25 yrs	3: financial efficiency is average	
			-	4: less than design requirement	4: fails some requirements	4: failure every 5 to 10 yrs	4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	1.00	N/A	N/A	Total Factored Sco
		Weighted Final Score (1-25)	N/A	N/A	4.00	N/A	N/A	
	100%	Criticality Weighting Factor (0 - 100%)	0%	0%	100%	0%	0%	
		Factored Score	N/A	N/A	4	N/A	N/A	4.00
		Criticality Score	·	·		,	5%	0.20
		Pipeline Route/Alignment						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	5.00	2.67	N/A	Total Factored Sco
		Weighted Final Score (1-25)	N/A	N/A	15.00	12.67	N/A	
(100%	Criticality Weighting Factor (0 - 100%)	0%	0%	50%	50%	0%	
		Factored Score	N/A	N/A	7.5	6.33	N/A	13.83
		Criticality Score	·	-			45%	6.23
		Pipeline and Valves						
		Is Failure Mode Score Calculated or Assigned?	Calculated	Calculated	N/A	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)	3.33	1.00	N/A	1.00	N/A	Total Factored Sco
		Weighted Final Score (1-25)	12.00	4.50	N/A	4.00	N/A	
	100%	Criticality Weighting Factor (0 - 100%)	40%	30%	0%	30%	0%	
		Factored Score	4.8	1.35	N/A	1.2	N/A	7.35
		Criticality Score					50%	3.68
		,					Overall Total Factored Score (Out of 25) =	10.10

			South Tahoe PUD	Location Description:	Crossing under airport runway	K/J Project Number: 1270004*00				
			Water System Optimization Plan	Pipeline Facility ID #:	L32-005-M32-004	Date:				
						Condition Assessment				
				Pipeline Facility Name:	8" Steel line through meadow (Airport Runway Crossing)	Inspectors:	Peter Lavallee			
				Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Stateline Zone			
Failure Mode Type	Score (1 - 5)	Importance Weighting (1-5)	Final Score CONDITION ASSESSMENT CHECKLIST							
			California Waterworks St	andards						
Fn	1	4								
				Pipeline Route/Alignment						
Fn	5	3		15 easement and/or right-of-way adequate for routine maintenance and repairs? There is currently no easement granted from the forest service for this line through the meadow and should be included in the USFS Master Use Water Permit						
D	5	5	pipeline route/alignment crosses known seismic fault or other natural hazard (e.g. creek 25 crossing, major highway)? Crosses the Upper Truckee River and underneath the Airport Runway							
N.	3	3	nine provides sale source of water for critical customers (e.g. commercial or							
INFORMATION	N/A	N/A	N/A institutional) and how many connections? This is a redundant source for the Country Club Zone							
R	1	3	3 pipe provides sole source of water for a pressure zone? No							
R	2	5	any unstable site conditions (if yes, describe)? The river has exposed other water and sewer line crossings and this site could have the same issue.							
R	5	5	25 other known	problems? The Forest Service is also planning to relocate the riv	ver over top of this water main as part of a larger project					
			Piping an							
INFORMATION	N/A	N/A		e material? Steel						
С	1	4		minal size? 8"						
С	1	5	5 test pressure and press							
	_		pipelines protected from external corrosion (coatings, inert pipe materia	rotection)?						
PM PM	4	3		condition? Net line						
INFORMATION	4 N/A	4 N/A		e installed? 1978						
R	1	4		of repairs? None						
R	1	4	4 air release valves properly located/protected from							
PM	2	4		remaining? 26 years based on AWU Useful life						
INFORMATION	N/A	5		problems? None						
			Additio	nal Data						
				Legend	1	, <u> </u>				
				PM Physical Mortality						
				Fn Functionality						
				R Reliability						
				FE Financial Efficiency						
				C Capacity						

South Tahoe PUD	Location Description:	Crossing under airport runway	K/J Project Number: 1270004*00	
Water System Optimization Plan	Pipeline Facility ID #:	L32-005-M32-004	Date:	
ı	Pipeline Facility Name:	8" Steel line through meadow (Airport Runway Crossing)	Condition Assessment Inspectors:	Peter Lavallee
P	Pressure Zones Served:	Country Club Zone	Adjacent Pressure Zones:	Stateline Zone
Photo Evidence for PM, Fn, R, FE				
		PHOTOS		
				

		South Tahoe PUD	Location Description:	6" Line from Keller Booster to K	eller Tanks along Keller Rd	K/J Project Num	Der: 1270004*00	
		Water System Optimization Plan	Pipeline Facility ID #:	Multiple facility ids due to length: Q21-048-CP0		D	ate:	
						Condition Assessm	ient	
			Pipeline Facility Name:	6: dedicated Keller tank steel li	ne (6" High Pressure Line)	Inspect		/allee
					,	·		<u></u>
			Pressure Zones Served:	Stateline but it is a dedicat	ed line to Keller Tanks	Adjacent Pressure Zo	nes:	
							_	
		Notes:		Fai	lure Mode Scoring (1 - 5)			
		Capacity score will be based on hydraulic model	Physical Mortality	Capacity	Level of	Service	Financial Efficiency	-
		2. For Reliabilty to be determined based on CMMS maintenance records			functionality	reliability		
		For Criticality Weighting Factors to be determined at District Workshop	1: new or excellent condition	1: significantly exceeds design requirement		1: failure >50 yrs	1: best available technology	
			2: minor defects only	2: exceeds design requirement	·	2: failure every 26 to 50 yrs	2: financial efficiency is high	
			3: moderate deterioration	3: meets design requirement	·	3: failure every 11 to 25 yrs	3: financial efficiency is average	
			4: significant deterioration	4: less than design requirement	·	4: failure every 5 to 10 yrs	4: financial efficiency is low	
			5: virtually unserviceable	5: significantly less than design requirement	5: Fails all requirements	5: failure < 5 yrs	5: asset should be replaced	
		California Waterworks Standards						
		Is Failure Mode Score Calculated or Assigned?	N/A	N/A	Calculated	N/A	N/A	
		Unweighted Failure Mode Score (1-5)	N/A	N/A	4.00	N/A	N/A	Total Factored Sco
		Weighted Final Score (1-25)	N/A	N/A	16.00	N/A	N/A	
	100%	Criticality Weighting Factor (0 - 100%)		0%	100%	0%	0%	
		Factored Score	N/A	N/A	16	N/A	N/A	16.00
		Criticality Score					5%	0.80
		Pipeline Route/Alignment						
		Is Failure Mode Score Calculated or Assigned?		N/A	Calculated	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		N/A	5.00	2.33	N/A	Total Factored Sco
		Weighted Final Score (1-25)	-	N/A	15.00	10.33	N/A	
(100%	Criticality Weighting Factor (0 - 100%)	-	0%	50%	50%	0%	
		Factored Score		N/A	7.5	5.17	N/A	12.67
		Criticality Score					45%	5.70
		Pipeline and Valves						
		Is Failure Mode Score Calculated or Assigned?		Calculated	N/A	Calculated	N/A	
		Unweighted Failure Mode Score (1-5)		2.00	N/A	1.00	N/A	Total Factored Sco
		Weighted Final Score (1-25)		9.50	N/A	4.00	N/A	
	100%	Criticality Weighting Factor (0 - 100%)	+	30%	0%	30%	0%	
		Factored Score		2.85	N/A	1.2	N/A	9.38
		Criticality Score					50%	4.69
							Overall Total Factored Score (Out of 25) =	11.19

I										
			South Tahoe PUD	Location Description:	6" Line from Keller Booster to Keller Tanks along Keller Rd	K/J Project Number: 1270004*00				
				Multi	iple facility ids due to length: Q21-048-CP0911, B0119-CP0911, B0068-B0119, B0068-					
			Water System Optimization Plan	Pipeline Facility ID #:	B0114,	Date:				
						Condition Assessment				
				Pipeline Facility Name:	6: dedicated Keller tank steel line (6" High Pressure Line)	Inspectors:	Peter Lavallee			
					o. dealeated keller talik steer line (o Tright Tessare Ellie)		Teter Edvance			
				Pressure Zones Served: Stateline but it is a dedicated line to Keller Tanks Adjacent Pressure Zones:						
				r ressure zones serveu.	Stateline but it is a dedicated line to Relief Taliks	Adjustent ressure zones.				
Failure Mode	Same (1 5)	Importance	Final Cases		CONDITION ASSESSMENT CHECKLIST					
Туре	Score (1 - 5)	Weighting (1-5)	Final Score							
F.,			California Waterworks Standa	rds ves? Single isolation valve at the Keller Booster Discharg						
Fn	4	4	16 adequate spacing of isolation val	ves? Single isolation valve at the Keller Booster Discharg	ge					
			Pipeline Route/Alignm	ent						
Fn	5	3	15 easement and/or right-of-way adequate for routine maintenance and repairs? Line runs through the public right of way on Keller Rd and Sherman Way. A short run of line is across a private parcel between Sherman Way and the Tanks							
	-		pipeline route/alignment crosses known seismic fault or other natural hazard (e.g. creek							
R	1	5	5 crossing, major highway)? No							
			pipe provides sole source of water for critical customers (e.g. commercial or pipe is a dedicated line to Keller Tanks with no services off of it							
INFORMATION	N/A	N/A								
R R	4	3 5	6 pipe provides sole source of water for a pressure zone? No but sole source to Keller Tanks 20 any unstable site conditions (if yes, describe)? Soils have not been tested but have the potential to be corrosive to the steel pipe							
K	-	3	20 any unstable site coloritions (ii yes, describe): Soils have not been tested but have the potential to be corrosive to the steel pipe other known problems? None							
			·							
			Piping and Val	ves						
INFORMATION	N/A	N/A	N/A pipe mate							
С	1	4	4 nominal s	, and a second s						
С	3	5	15 test pressure and pressure rat pipelines protected from external corrosion (coatings, inert pipe material, cath	ing? Unknown test pressure or material rating						
PM	4	3	12 protectial form external corrosion (coatings, mert pipe material, carri	on)? No						
PM	4	4	16 pipelines known internal corrosion condit	ion? Not known						
INFORMATION	N/A	N/A		lled? 1963 or 1966						
R	1	4	4 frequency of repa							
R	1	4	4 air release valves properly located/protected from flood							
PM INFORMATION	3 N/A	4 5	12 estimated service life remain N/A other known proble	ning? 11 or 14 years depending on construction date base	ed on AWU Useful Life					
INFURIVIATION	N/A	5	N/A Other known proble	ens: None						
			Additional D	ata There is a large concern that this pipe could have co	orrosion problems due to its age and high pressure					
			Additional		orrosion prosicino dae to to age una mgn pressure.					
			Les	gend						
				PM Physical Mortality						
				Fn Functionality						
				R Reliability						
				FE Financial Efficiency						
			C Capacity							

	South Tahoe PUD	Location Description:	6" Line from Keller Booster to Keller Tanks along Keller Rd	K/J Project Number: 1270004*00	
	South range res		Multiple facility ids due to length: Q21-048-CP0911, B0119-CP0911, B0068-B0119, B0068-	1,70110,1001100111001111001110011001	
	Water System Optimization Plan	Pipeline Facility ID #:	B0114,	Date:	
				Condition Assessment	
		Pipeline Facility Name:	6: dedicated Keller tank steel line (6" High Pressure Line)	Inspectors:	Peter Lavallee
		Pressure Zones Served:	Stateline but it is a dedicated line to Keller Tanks	Adjacent Pressure Zones:	
	Photo Evidence for PM, Fn, R, FE				
	-		PHOTOS		
	-				
	-				
	+				
	-				
	†				

Appendix B for Section 3 (TM 2)

Water System Optimization Plan LOS Workshop Meeting Notes

Meeting Notes

SOUTH TAHOE PUBLIC UTILITY DISTRICT

Water System Optimization Project

Level of Service Workshop

Wednesday, April 25, 2012

10 am to 2:30 pm

KJ Project No. 1270004*00

A. Introductions (5 min.)

Name	Title	Email
Paul Sciuto	Assistant General Manager,	psciuto@stpud.dst.ca.us
	STPUD	
Julie Ryan	Senior Engineer, STPUD	jryan@stpud.dst.ca.us
John Thiel	Engineer, STPUD	jthiel@stpud.dst.ca.us
Randy Curtis	Manager of Field Operations,	rcurtis@stpud.dst.ca.us
	STPUD	
Phil Torney	Pump Station Supervisor, STPUD	ptorney@stpud.dst.ca.us
Pete Lavallee	Assistant Engineer, STPUD	plavallee@stpud.dst.ca.us
James (Cuz) Cullen	Inspection Supervisor, STPUD	jcullen@stpud.dst.ca.us
Michele Pinkel	Preventative Maintenance	mpinkel@stpud.dst.ca.us
	Coordinator, STPUD	
Chris Stanley	URW Supervisor, STPUD	cstanley@stpud.dst.ca.us
Ivo Bergsohn	Hyrdro-geologist, STPUD	ibergsohn@stpud.dst.ca.us
Tim Williams	Project Manager, Kennedy/Jenks	timwilliams@kennedyjenks.com
Tom Keown	Project Engineer, Kennedy/Jenks	thomaskeown@kennedyjenks.com
Charles Duncan	Project Manager, West Yost	cduncan@westyost.com

B. Level of Service Introduction by Tom Keown

- a. How Does LOS fit with Asset Management?
 - i. An integrative optimization process that enables a utility to determine how to minimize the life cycle cost of owning and operating infrastructure assets while continuously delivering *service levels* demanded by customers.
 - ii. Asset management is a structured approach to delivering desired *service levels* at lowest life cycle costs.
 - iii. How does the District see LOS fit into your Asset Management program?
- b. What are Levels of Service?
 - i. Characteristics or attributes of a service that describe its required level of performance;
 - ii. These characteristics typically describe "how much", "of what nature" and "how frequently" about the service.
 - iii. What our customers expect:
 - 1. Examples High quality water, reliable water service, low cost
 - iv. Are their LOS areas that are not currently covered or too many covered in the current table?
- c. The development of the Levels of Service for the water system will drive the Water System Optimization Plan and ultimately result in what Capital Improvement Projects are recommended.

- C. Overview of Current Level of Service Tables
 - a. Why are we using these tables?
 - b. How were they developed?
 - c. Review and definition of each item.
 - d. All individuals share their comments and input to the tables
 - i. P Torney requested LOS focus on practical goals as LOS statements are developed.
 - ii. P. Torney & P. Sciuto Break occurred in Montgomery Estates Zone and out of service a couple of hours. Customer Service received 20 calls on dirty water. District needs to review its standard procedures to see if there are changes to address how STPUD responds to a break and minimize customer responses.
 - iii. P. Sciuto do not want to repeat what occurred with Wastewater Collection System Master Plan in which the District Board did not adopt the developed LOS.
 - iv. T. Keown LOS is a living document and can and will be changed over time.
 - v. J. Thiel Important when presenting LOS to District Board also present level of cost.
 - vi. P. Sciuto Provide High Quality Water Goal example, currently District in compliance with Lead and Copper Rule, but if regulators change to compliance by pressure zone, then the District would have to address this issue.
 - vii. P. Sciuto District has used aeration treatment instead of chemical treatment for pH control due to cost differences.
 - viii. P. Torney & P. Sciuto Seven tanks last year had bact samples that came back positive. District addressed this issue using several approaches resampled, added intermediate chlorine addition at booster pump stations, provided Tideflex mixing systems for tanks with single inlet and outlet pipelines. Also currently modify tank operation to force tank water turn-over as part of the standard operating procedure. The District asked if using more Tideflex mixing units, more booster pump station intermediate chlorine stations, and changing the tank operating levels by season another option to address water quality issues in tanks?
 - ix. P. Sciuto Strategic Plan goals were updated in 2005. This is an asset driven Level of Service Study, not safety, which continues to be very important to the District and addressed separately.
 - x. Group flushing justified by LOS quantifiable goals:
 - T. Keown shared District could combine flushing with valve exercise program, and meet two goals at once
 - 2. Add more intermediate chlorine injection at booster pump stations
 - 3. Flushing is restricted in some areas to less than ideal velocities because sewer capacity is not adequate. Possibly consider dechlorinating and flushing to storm drain if can get regulatory permission.
 - xi. Group typically water maintenance crews record response to a customer service request by noting time of call, time arrive, and time work order completed. P. Sciuto wants sewer maintenance crews to do the same.
 - xii. J. Cullen & P. Sciuto A number of the condominiums at Lakeland Village have single check backflow preventers (BFPs), which is not compliant with current backflow prevention code. Not sure how to address this in these economically challenge times. T. Williams shared City of Davis added backflow preventers at point of service for commercial establishments when they added water meters, but he was not familiar with if the City or the business was responsible for paying for the BFP devices.
- D. Lunch Break (30 min)
- E. Get to Gemba!
 - a. Refine Engineering LOS Statements (55 minutes) comments were received and the District and Kennedy/Jenks will work together to update the tables. A conference call will be held on 5-1-12 to complete review of the elements of the table that were not completed.
 - b. Refine O&M LOS Statements (55 minutes) comments were received and the District and Kennedy/Jenks will work together to update the tables.

F. Action Items

- 1. District (Julie Ryan) to review customer complaint data on levels of chlorine residuals (taste and odor) to determine the minimum and maximum chlorine residuals for Water Quality quantifiable goal.
- 2. District (Peter Lavallee and Michele Pinkel) will look at monthly customer complaints for taste, color, and odor over the last 10 years.
- 3. District (Paul Sciuto) to evaluate policy of backflow and how to require commercial businesses to update out of compliance backflow protection conditions.
- 4. District (Paul Sciuto) will update the Risk Assessment Methodology for Water (RAMW) for the existing Vulnerability Assessment.
- 5. District (Michele Pinkel) will determine what percent of maintenance hours are spent in overtime.
- 6. District (Michele Pinkel) will determine the number of unscheduled service repairs and main breaks to compare with the Quantifiable Goal listed.
- District (Michele Pinkel) will determine based on maintenance department hours the percent of
 preventative vs. percent of reactive maintenance for the Underground Department and the
 Pump Station Department.
- 8. District (Paul Sciuto) will determine the policy for level of fire protection.
- 9. District (Paul Sciuto) will determine the cost per million gallons to deliver water from Tahoe City PUD and Incline Village GID to compare with the District's current cost per million gallons (over \$10K/mg), which will be a better mark to compare with than Qual Serve.
- 10. Julie Ryan to send updated tables in Excel format and pdf of notes on the LOS worksheet tables that she took at the workshop (done 4-26-12).

G. Next Steps

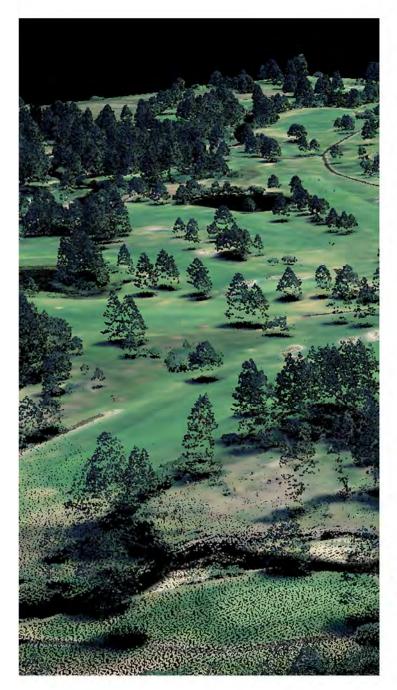
- a. K/J to update LOS Tables based on group feedback Conference call 5-1-12 to complete review and final update du 5-4-12
- b. District Staff Review/Approval Final LOS statements due 5-11-12
- c. LOS Board Workshop 5-17-12
- d. LOS Study outline Kennedy/Jenks provided copies of the draft outline to P. Sciuto, J. Ryan, and P. Lavallee.

Appendix C for Section 4 (TM 3) Appendix C1

LiDAR Remote Sensing Data Collection

LIDAR REMOTE SENSING LAKE TAHOE WATERSHED • CALIFORNIA / NEVADA

January 31, 2011







TAHOE REGIONAL PLANNING AGENCY

J. SHANE ROMSOS - PO Box 5310 - Stateline, NV 89449

LIDAR REMOTE SENSING DATA COLLECTION: LAKE TAHOE

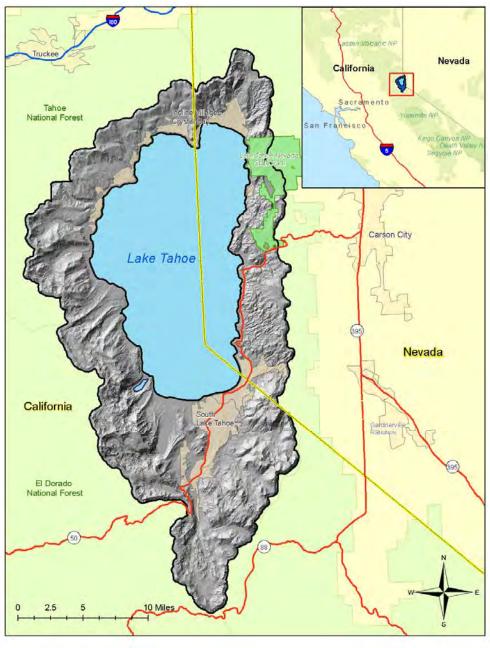
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1. Overview

Watershed Sciences, Inc. (WSI) collected Light Detection and Ranging (LiDAR) data of land surrounding Lake Tahoe from August 11th to August 24th, 2010. This report documents the data acquisition, processing methods, accuracy assessment, and deliverables of that data. The requested area of interest (AOI), excluding the actual lake, was 224,725 acres. The area was expanded to include a 100m buffer to ensure complete coverage and adequate point densities around survey area boundaries, resulting in 232,536 acres of delivered LiDAR data. (Figure 1).

Figure 1. Lake Tahoe Area of Interest (AOI)



LiDAR Data Acquisition and Processing: Lake Tahoe

2. Acquisition

2.1 Airborne Survey - Instrumentation and Methods

The LiDAR survey used two Leica ALS50 Phase II laser systems mounted in a Cessna Caravan 208B. The Leica systems were set to acquire $\geq 83,000$ – 105,900 laser pulses per second (i.e., 83 – 105.9 kHz pulse rate) and flown at 900 - 1300 meters above ground level (AGL) depending on weather and terrain, capturing a scan angle of $\pm 14^{\circ}$ from nadir. These settings were developed to yield points with an average native pulse density of ≥ 8 pulses per square meter over terrestrial surfaces. It is not uncommon for some types of surfaces (e.g. dense vegetation or water) to return fewer pulses than the laser originally emitted. These discrepancies between 'native' and 'delivered' density will vary depending on terrain, land cover, and the prevalence of water bodies.



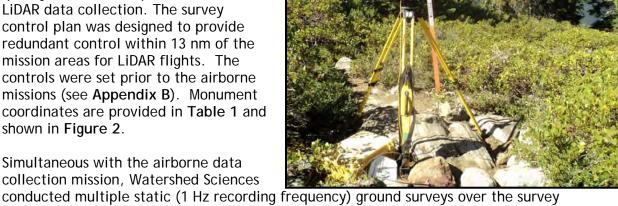
The Cessna Caravan is a stable platform, ideal for flying slow and low for high density projects. The Leica ALS50 sensor head installed in the Caravan is shown on the left.

All areas were surveyed with an opposing flight line side-lap of ≥50% (≥100% overlap) to reduce laser shadowing and increase surface laser painting. The Leica laser systems allow up to four range measurements (returns) per pulse, and all discernable laser returns were processed for the output dataset.

To accurately solve for laser point position (geographic coordinates x, y, z), the positional coordinates of the airborne sensor and the attitude of the aircraft were recorded continuously throughout the LiDAR data collection mission. Aircraft position was measured twice per second (2 Hz) by an onboard differential GPS unit. Aircraft attitude was measured 200 times per second (200 Hz) as pitch, roll and yaw (heading) from an onboard inertial measurement unit (IMU). To allow for post-processing correction and calibration, aircraft/sensor position and attitude data are indexed by GPS time.

2.2 Ground Survey - Instrumentation and Methods

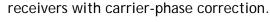
Andregg Geomatics, Auburn, CA (CA PLS 4567) located and certified all survey monuments and collected independent quality control checkpoints used for the LiDAR data collection. The survey control plan was designed to provide redundant control within 13 nm of the mission areas for LiDAR flights. The controls were set prior to the airborne missions (see Appendix B). Monument coordinates are provided in Table 1 and



conducted multiple static (1 Hz recording frequency) ground surveys over the survey monuments. Indexed by time, these GPS data are used to correct the continuous onboard measurements of aircraft position recorded throughout the mission. After the airborne survey, the static GPS data are processed using triangulation with Continuously Operating Reference Stations (CORS) and checked using the Online Positioning User Service (OPUS¹) to quantify daily variance. Multiple sessions are processed over the same monument to confirm antenna height measurements and reported position accuracy.

2.2.1 Instrumentation

For this project area, a Trimble GPS receiver model R7 with Zephyr Geodetic antenna with ground plane was deployed for all static control A Trimble model R8 GNSS unit was used for collecting check points using real time kinematic (RTK) survey techniques. For RTK data, the collector begins recording after remaining stationary for 5 seconds then calculating the pseudo range position from at least three epochs with the relative error under 1.5 cm horizontal and 2 cm vertical. All GPS measurements are made with dual frequency L1-L2





2.2.2 Monumentation

Watershed Sciences incorporated 16 control monuments that were set and certified by Andregg Geomatics, Inc (see Andregg Geomatics' 13910 Report found in Appendix B). Monuments selected were found to have good visibility and optimal location to support a LiDAR Acquisition flight. (Table 1)

LiDAR Data Acquisition and Processing: Lake Tahoe

Prepared by Watershed Sciences, Inc.

¹ Online Positioning User Service (OPUS) is run by the National Geodetic Survey to process corrected monument positions.

Table 1. Base Station control coordinates for the Lake Tahoe LiDAR Project. Controls were selected and certified by Andregg Geomatics (CA PLS 4567), see **Appendix C**

Base Station ID	Datum: NAD8	3 (CORS96)	GRS80
base station in	Latitude	Longitude	Ellipsoid Z (meters)
ARP	38°53'38.467561"N	119°59'45.348090"W	1883.108
BROCKWAY	39°16'11.925401"N	120°05'07.603597"W	2020.251
D836	39°20'50.420265"N	120°07'39.964029"W	1754.035
DOT1	39°09'22.298820"N	119°45'48.327370"W	1416.321
EMERALD	38°57'50.378787"N	120°04'46.794268"W	1924.275
HPGN03FS	38°55'54.067100"N	119°58'43.741166"W	1880.323
MEEKS	39°02'12.183033"N	120°07'41.593703"W	1878.370
Q208	39°05'59.726160"N	119°54'37.633096"W	2120.177
RNO1	39°32'16.451590"N	119°53'08.880400"W	1531.169
ROSE 1	39°18'06.070485"N	119°55'06.476538"W	2580.882
ROSE 2	39°18'05.124461"N	119°55'02.339995"W	2577.916
SPOONER	39°06'02.964665"N	119°54'35.637736"W	2123.353
STAA	38°54'18.944475"N	119°59'29.784238"W	1881.291
TAHOE	39°10'03.168465"N	120°08'48.062822"W	1879.144
V1201	39°19'02.066917"N	120°19'03.604739"W	2046.179
ZOLE	39°25'17.998300"N	119°45'12.033760"W	1357.826

2.2.3 Methodology

Each aircraft is assigned a ground crew member with two Trimble R7 receivers and an R8 receiver. The ground crew vehicles are equipped with standard field survey supplies and equipment including safety materials. All control monuments are observed for a minimum of two survey sessions lasting no fewer than 6 hours. At the beginning of every session the tripod and antenna are reset, resulting in two independent instrument heights and data files.



Data is collected at a rate of 1Hz using a 10 degree mask on the antenna.

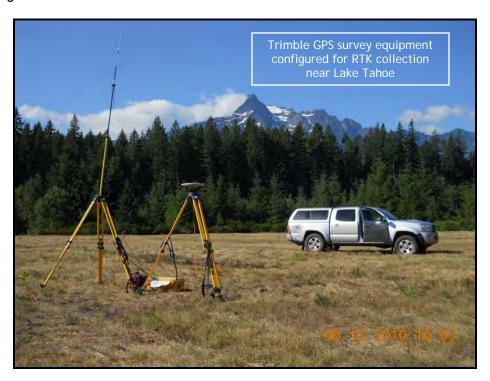
The ground crew uploads the static GPS data collected during the flight to our FTP site on a daily basis to be returned to the office for Professional Land Surveyor (PLS) oversight, QA/QC review and processing. OPUS processing triangulates the monument position using 3 CORS stations resulting in a fully adjusted position. After multiple days of data have been collected at each monument, accuracy and error ellipses are calculated from the OPUS reports. This information

leads to a rating of the monument based on FGDC-STD-007.2-1998² Part 2 table 2.1 at the 95% confidence level. When a statistical stable position is found CORPSCON³ 6.0.1 software is used to convert the UTM positions to geodetic positions. Simultaneously to Watershed Sciences' internal review, all data was sent to Andregg Geomatics to include in their official analysis and certification. This geodetic position is used for processing the LiDAR data (see **Appendix C**).

RTK and aircraft mounted GPS measurements are made during periods with PDOP⁴ less than or equal to 3.0 and with at least 6 satellites in view of both a stationary reference receiver and the roving receiver. Static GPS data collected in a continuous session average the high PDOP into the final solution in the method used by CORS stations. RTK positions are collected on bare earth locations such as paved, gravel or stable dirt roads, and other locations where the ground is clearly visible (and is likely to remain visible) from the sky during the data acquisition and RTK measurement period(s).

In order to facilitate comparisons with LiDAR measurements, RTK measurements are not taken on highly reflective surfaces such as center line stripes or lane markings on roads. RTK points were taken no closer than one meter to any nearby terrain breaks such as road edges or drop offs.

Andregg Geomatics, Inc. collected additional fast static check points within the Lake Tahoe study area. The locations of these points can be seen along with Watershed Sciences RTK points in Figure 2.

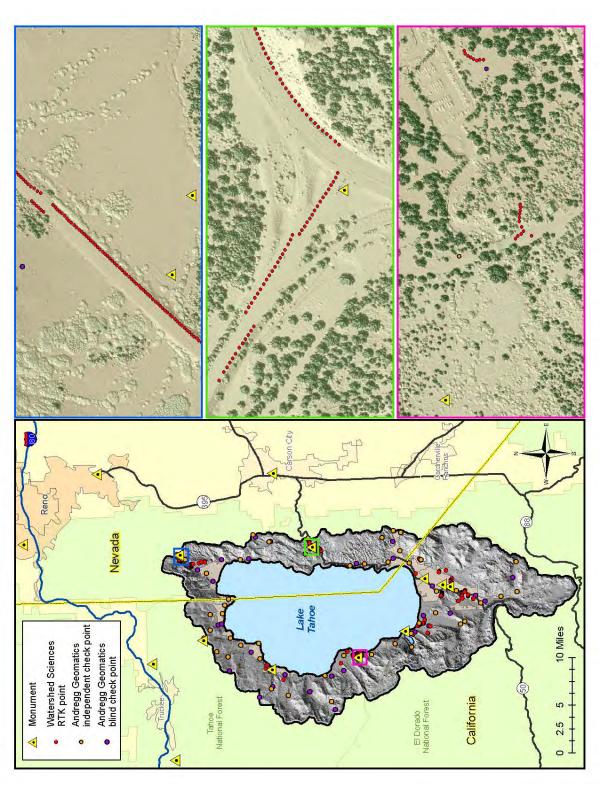


² Federal Geographic Data Committee Draft Geospatial Positioning Accuracy Standards

³ U.S. Army Corps of Engineers, Engineer Research and Development Center Topographic Engineering Center software

⁴PDOP: Point Dilution of Precision is a measure of satellite geometry, the smaller the number the better the geometry between the point and the satellites.

Figure 2. RTK and fast static check point and control monument locations used for Lake Tahoe data acquisition, processing, and accuracy checks



LiDAR Data Acquisition and Processing: Lake Tahoe

Prepared by Watershed Sciences, Inc.

3. LiDAR Data Processing

3.1 Applications and Work Flow Overview

- 1. Resolved kinematic corrections for aircraft position data using kinematic aircraft GPS and static ground GPS data.
 - Software: Waypoint GPS v.8.10, Trimble Geomatics Office v.1.62
- 2. Developed a smoothed best estimate of trajectory (SBET) file that blends postprocessed aircraft position with attitude data. Sensor head position and attitude were calculated throughout the survey. The SBET data were used extensively for laser point processing.

Software: IPAS v.1.35

3. Calculated laser point position by associating SBET position to each laser point return time, scan angle, intensity, etc. Created raw laser point cloud data for the entire survey in *.las (ASPRS v. 1.2) format. Data were converted to orthometric elevations (NAVD88) by applying a Geoid09 correction.

Software: ALS Post Processing Software v.2.70, Corpscon 6

4. Imported raw laser points into manageable blocks (less than 500 MB) to perform manual relative accuracy calibration and filter for pits/birds. Ground points were then classified for individual flight lines (to be used for relative accuracy testing and calibration).

Software: TerraScan v.10.009

5. Using ground classified points per each flight line, the relative accuracy was tested. Automated line-to-line calibrations were then performed for system attitude parameters (pitch, roll, heading), mirror flex (scale) and GPS/IMU drift. Calibrations were performed on ground classified points from paired flight lines. Every flight line was used for relative accuracy calibration.

Software: TerraMatch v.10.006

- Position and attitude data were imported. Resulting data were classified as ground and non-ground points. Statistical absolute accuracy was assessed via direct comparisons of ground classified points to ground RTK survey data. Software: TerraScan v.10.009, TerraModeler v.10.004
- 7. Bare Earth models were created as a triangulated surface and exported as ERDAS Imagine grids at a .5-meter pixel resolution. Highest Hit models were created for any class at .5-meter grid spacing and exported as ERDAS Imagine grids.

Software: TerraScan v.10.009, ArcMap v. 9.3.1, TerraModeler v.10.004

3.2 Aircraft Kinematic GPS and IMU Data

LiDAR survey datasets were referenced to the 1 Hz static ground GPS data collected over presurveyed monuments with known coordinates. While surveying, the aircraft collected 2 Hz kinematic GPS data, and the onboard inertial measurement unit (IMU) collected 200 Hz

aircraft attitude data. Waypoint GPS v.8.10 was used to process the kinematic corrections for the aircraft. The static and kinematic GPS data were then post-processed after the survey to obtain an accurate GPS solution and aircraft positions. IPAS v.1.35 was used to develop a trajectory file that includes corrected aircraft position and attitude information. The trajectory data for the entire flight survey session were incorporated into a final smoothed best estimated trajectory (SBET) file that contains accurate and continuous aircraft positions and attitudes.

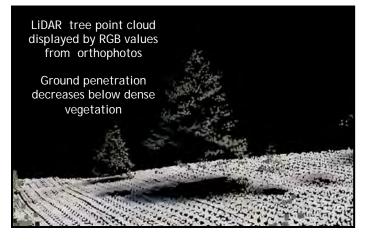
3.3 Laser Point Processing

Laser point coordinates were computed using the IPAS and ALS Post Processor software suites based on independent data from the LiDAR system (pulse time, scan angle), and aircraft trajectory data (SBET). Laser point returns (first through fourth) were assigned an associated (x, y, z) coordinate along with unique intensity values (0-255). The data were output into large LAS v. 1.2 files with each point maintaining the corresponding scan angle, return number (echo), intensity, and x, y, z (easting, northing, and elevation) information.

These initial laser point files were too large for subsequent processing. To facilitate laser point processing, bins (polygons) were created to divide the dataset into manageable sizes (< 500 MB). Flightlines and LiDAR data were then reviewed to ensure complete coverage of the survey area and positional accuracy of the laser points.

Laser point data were imported into processing bins in TerraScan, and manual calibration was performed to assess the system offsets for pitch, roll, heading and scale (mirror flex). Using a geometric relationship developed by Watershed Sciences, each of these offsets was resolved and corrected if necessary.

LiDAR points were then filtered for noise, pits (artificial low points), and birds (true birds as well as erroneously high points) by screening for absolute elevation limits, isolated points and height above ground. Each bin was then manually inspected for remaining pits and birds and spurious points were removed. In a bin containing approximately 7.5-9.0 million points, an average of 50-100 points are typically found to be artificially low or high. Common sources of non-terrestrial returns are clouds, birds, vapor, haze, decks, brush piles, etc.



Internal calibration was refined using TerraMatch. Points from overlapping lines were tested for internal consistency and final adjustments were made for system misalignments (i.e., pitch, roll, heading offsets and scale). Automated sensor attitude and scale corrections yielded 3-5 cm improvements in the relative accuracy. Once system misalignments were corrected, vertical GPS drift was then resolved and removed per flight line, yielding a slight improvement (<1 cm) in relative accuracy.

The TerraScan software suite is designed specifically for classifying near-ground points (Soininen, 2004). The processing sequence began by 'removing' all points that were not 'near' the earth based on geometric constraints used to evaluate multi-return points. The resulting bare earth (ground) model was visually inspected and additional ground point modeling was performed in site-specific areas to improve ground detail. This manual editing of ground often occurs in areas with known ground modeling deficiencies, such as: bedrock outcrops, cliffs, deeply incised stream banks, and dense vegetation. In some cases, automated ground point classification erroneously included known vegetation (i.e., understory, low/dense shrubs, etc.). These points were manually reclassified as default. Ground surface rasters were then developed from triangulated irregular networks (TINs) of ground points.

Once the points were finalized, GPS week was incorporated into the ASCII format of LiDAR points.

4. LiDAR Accuracy Assessment

4.1 Laser Noise and Relative Accuracy

Laser point absolute accuracy is largely a function of laser noise and relative accuracy. To minimize these contributions to absolute error, we first performed a number of noise filtering and calibration procedures prior to evaluating absolute accuracy.

Laser Noise

For any given target, laser noise is the breadth of the data cloud per laser return (i.e., last, first, etc.). Lower intensity surfaces (roads, rooftops, still/calm water) experience higher laser noise. The laser noise range for this survey was approximately 0.02 meters.

Relative Accuracy

Relative accuracy refers to the internal consistency of the data set - the ability to place a laser point in the same location over multiple flight lines, GPS conditions, and aircraft attitudes. Affected by system attitude offsets, scale, and GPS/IMU drift, internal consistency is measured as the divergence between points from different flight lines within an overlapping area. Divergence is most apparent when flight lines are opposing. When the LiDAR system is well calibrated, the line-to-line divergence is low (<10 cm). See Appendix A for further information on sources of error and operational measures that can be taken to improve relative accuracy.

Relative Accuracy Calibration Methodology

1. <u>Manual System Calibration</u>: Calibration procedures for each mission require solving geometric relationships that relate measured swath-to-swath deviations to misalignments of system attitude parameters. Corrected scale, pitch, roll and heading offsets were calculated and applied to resolve misalignments. The raw divergence between lines was computed after the manual calibration was completed and reported for each survey area.

- 2. <u>Automated Attitude Calibration</u>: All data were tested and calibrated using TerraMatch automated sampling routines. Ground points were classified for each individual flight line and used for line-to-line testing. System misalignment offsets (pitch, roll and heading) and scale were solved for each individual mission and applied to respective mission datasets. The data from each mission were then blended when imported together to form the entire area of interest.
- 3. <u>Automated Z Calibration</u>: Ground points per line were used to calculate the vertical divergence between lines caused by vertical GPS drift. Automated Z calibration was the final step employed for relative accuracy calibration.

4.2 Absolute Accuracy

To minimize the contributions of laser noise and relative accuracy to absolute error, a number of noise filtering and calibration procedures were performed prior to evaluating absolute accuracy. The LiDAR quality assurance process uses the data from the real-time kinematic (RTK) ground survey conducted in the AOI. For this project a total of 1912 RTK GPS measurements were collected by Watershed Sciences, Inc. on hard surfaces distributed among multiple flight swaths. Andregg Geomatics, Inc. also independently collected 48 fast static check points within the study area on hard surfaces with varying degrees of slope. To assess absolute accuracy, the location coordinates of these known ground points were compared to those calculated for the closest ground-classified laser points.

The vertical accuracy of the LiDAR data is described as the mean and standard deviation (sigma $\sim \sigma$) of divergence of LiDAR point coordinates from RTK ground survey point coordinates. To provide a sense of the model predictive power of the dataset, the root mean square error (RMSE) for vertical accuracy is also provided. These statistics assume the error distributions for x, y, and z are normally distributed, thus we also consider the skew and kurtosis of distributions when evaluating error statistics.

Statements of statistical accuracy apply to fixed terrestrial surfaces only and may not be applied to areas of dense vegetation or steep terrain (See Appendix A).

In addition to the 48 fast static check points, Andregg Geomatics, Inc. also collected 31 blind checkpoints on hard surfaces with varying degrees of slope. Watershed Sciences was given the x and y coordinates of these points and calculated the z value from the LiDAR data. Andregg Geomatics was then given the LiDAR derived z for a comparison with the known z value. (Table 5, Figure 2, Appendix B)

6. Study Area Results

Summary statistics for point resolution and accuracy (relative and absolute) of the LiDAR data collected in the Lake Tahoe survey area are presented below in terms of central tendency, variation around the mean, and the spatial distribution of the data (for point resolution by tile).

6.1 Data Summary

Table 2. LiDAR Resolution and Accuracy - Specifications and Achieved Values

	Targeted	Achieved
Resolution:	≥ 8 points/m ²	11.82 points/m ²
Vertical Accuracy (1 σ):	<15 cm	3.5 cm

6.2 Data Density/Resolution

The average first-return density of delivered dataset is 11.82 points per square meter (Table 2). The initial dataset, acquired to be ≥8 points per square meter, was filtered as described previously to remove spurious or inaccurate points. Additionally, some types of surfaces (i.e., dense vegetation, breaks in terrain, water, steep slopes) may return fewer pulses (delivered density) than the laser originally emitted (native density).

Ground classifications were derived from automated ground surface modeling and manual, supervised classifications where it was determined that the automated model had failed. Ground return densities will be lower in areas of dense vegetation, water, or buildings. Figures 5 and 6 show the distribution of average native and ground point densities for each 1/100th USGS quad tile.

Cumulative LiDAR data resolution for the Lake Tahoe AOI:

- Average Point (First Return) Density = 11.82 points/m²
- Average Ground Point Density = 2.26 points/m²

Figure 3. Density distribution for first return laser points

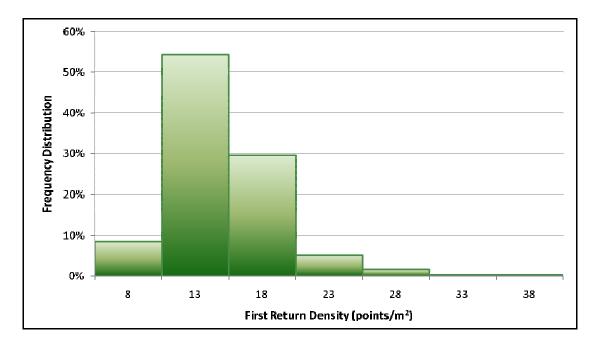


Figure 4. Density distribution for ground classified laser points

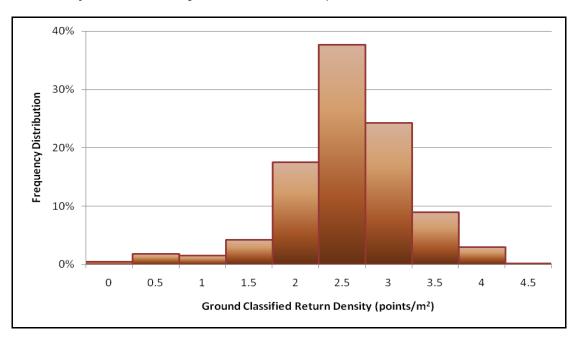


Figure 5. Density distribution map for first return points by 1/100th USGS Quad

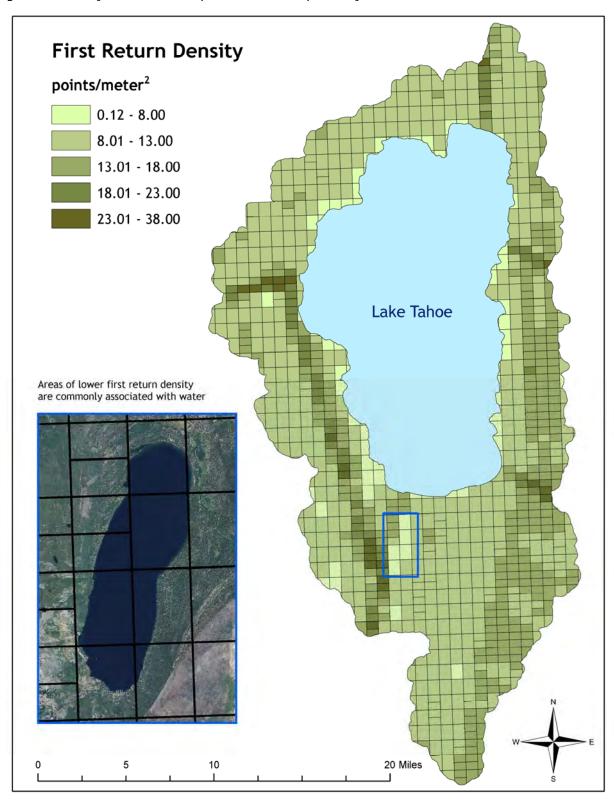
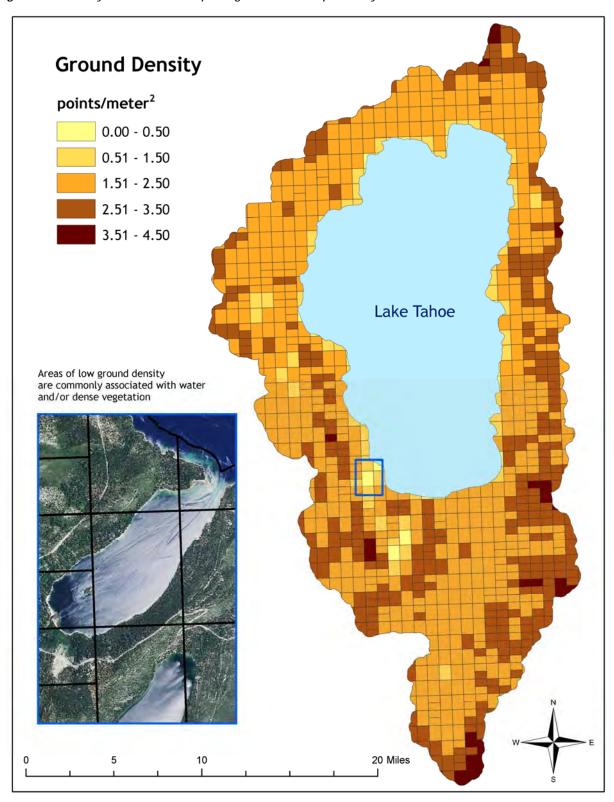


Figure 6. Density distribution map for ground return points by 1/100th USGS Quad

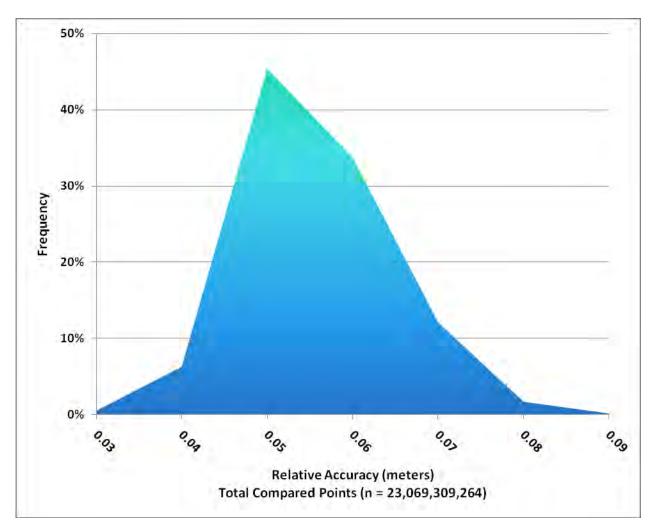


6.3 Relative Accuracy Calibration Results

Relative accuracy statistics for the Lake Tahoe dataset measure the full survey calibration including areas outside the delivered boundary:

- o Project Average = 0.053 m
- o Median Relative Accuracy = 0.050 m
- o 1σ Relative Accuracy = 0.008 m
- o 1.96σ Relative Accuracy = 0.016 m

Figure 7. Distribution of relative accuracies per flight line, non slope-adjusted



6.4 Absolute Accuracy

Absolute accuracies for the Lake Tahoe survey area:

Table 3. Watershed Sciences Absolute Accuracy - Deviation between laser points and RTK hard surface survey points

Watersh	ned Sciences, Inc. Absolute	Accuracy Assessment
	RTK Survey Sample Size	(n): 1912
Root Mean Square E	Error (RMSE) = 0.036 m	Minimum $\Delta z = -0.113 \text{ m}$
Standard	l Deviations	Maximum Δz = 0.093 m
1 sigma (σ): 0.035 m	1.96 sigma (σ): 0.068 m	Average Δz = -0.008 m

Figure 8. Absolute Accuracy - Histogram Statistics

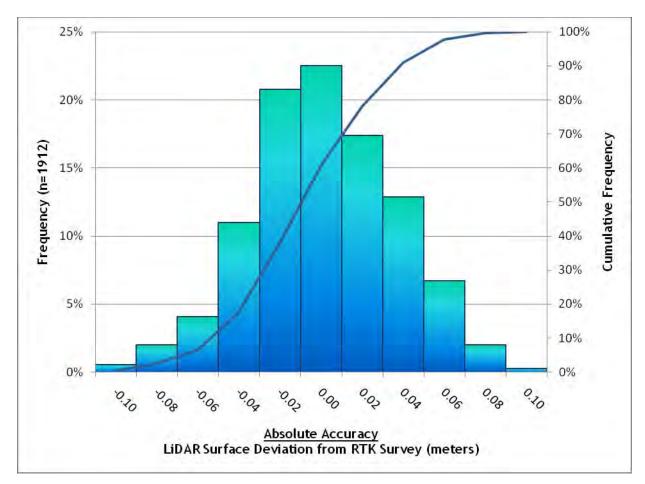


Table 4. Andregg Geomatics Absolute Accuracy - Deviation between laser points and RTK fast static check points

onook points		
Andregg Geo	omatics, Inc. Independen	t Accuracy Assessment
	Sample Size (n):	48
Root Mean Square Erro	or (RMSE) = 0.057 m	Minimum $\Delta z = -0.120 \text{ m}$
Standard De	eviations	Maximum $\Delta z = 0.130 \text{ m}$
1 sigma (σ): 0.057 m	1.96 sigma (σ): 0.111 m	Average $\Delta z = -0.012 \text{ m}$

Figure 9. Absolute Accuracy - Histogram Statistics

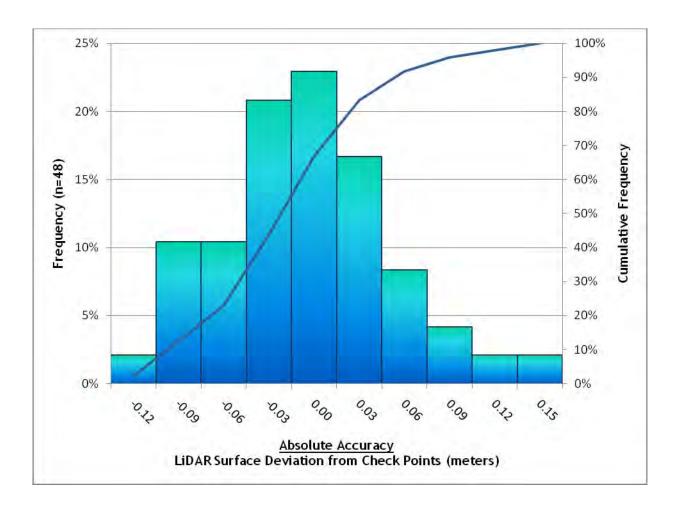


Table 5. Andregg Geomatic blind check point elevations compared with Watershed Science's LiDAR-derived elevations (see Appendix B)

		Andregg	Watershed		
Northing	Easting	Geomatics	Sciences	Elevation	Slope
(m)	(m) Š	Elevation	Elevation	Difference	(degrees)
, ,	,	(m)	(m)	(m)	(***3****)
4341217.456	741910.542	1908.35	1908.36	-0.01	18.96
4329068.691	745496.960	2028.48	2028.45	0.03	15.77
4315106.077	752984.795	1970.29	1970.28	0.01	4.52
4309141.692	756112.695	2116.53	2116.53	0.00	23.84
4332411.342	767114.222	2149.18	2149.24	-0.06	4.62
4354971.457	765734.385	2616.27	2616.34	-0.07	8.84
4351669.767	763430.525	2184.00	2183.97	0.03	3.8
4348221.356	754169.466	1954.60	1954.64	-0.04	2.13
4342659.288	749549.896	2019.46	2019.58	-0.12	2.15
4339010.970	743763.546	1895.73	1895.73	0.00	5.39
4336956.483	745714.562	2003.25	2003.28	-0.03	4.12
4332737.575	742916.643	1940.29	1940.26	0.03	0.84
4313668.431	755726.440	1911.65	1911.67	-0.02	0.45
4312673.541	753986.546	1955.90	1955.92	-0.03	2.19
4312164.137	760706.880	1901.83	1901.93	-0.10	1.46
4303297.157	758153.229	1939.43	1939.51	-0.08	0.61
4298580.135	762147.591	2341.19	2341.40	-0.21	19.04
4318744.155	765371.059	1926.69	1926.81	-0.12	2.87
4318809.772	768236.427	2158.64	2158.64	0.00	19.52
4341933.718	768956.079	2520.95	2521.07	-0.12	1.91
4339417.893	768253.576	2433.43	2433.62	-0.19	16.61
4349090.236	761469.845	1955.78	1955.85	-0.07	27.46
4324714.073	749059.612	1901.46	1901.48	-0.02	0.29
4327019.010	746478.525	1965.80	1965.73	0.07	1.29
4328457.629	739899.058	2337.73	2337.70	0.03	8.49
4346275.471	746360.302	2403.99	2403.99	0.00	3.77
4343063.191	765324.516	1903.30	1903.33	-0.03	3.2
4304879.781	759109.667	1933.04	1933.12	-0.08	1.42
4324872.024	764540.643	1985.39	1985.58	-0.19	14.37
4347667.943	765171.283	1929.72	1929.68	0.04	2.66
4347617.901	754274.762	1902.06	1902.08	-0.02	1.21

		ACCURACYz					
		(m)					
100% of	RMSEz	1.96xRMSEz	Mean	Std Dev	# of		
Points	(m)	Spec=0.20m	(m)	(m)	Points	Min (m)	Max (m)
	0.08	0.16	0.01	0.01	31	0.0	0.04

7. Model Development

7.1 Hydro Flattened & Breakline Enforced Terrain Models

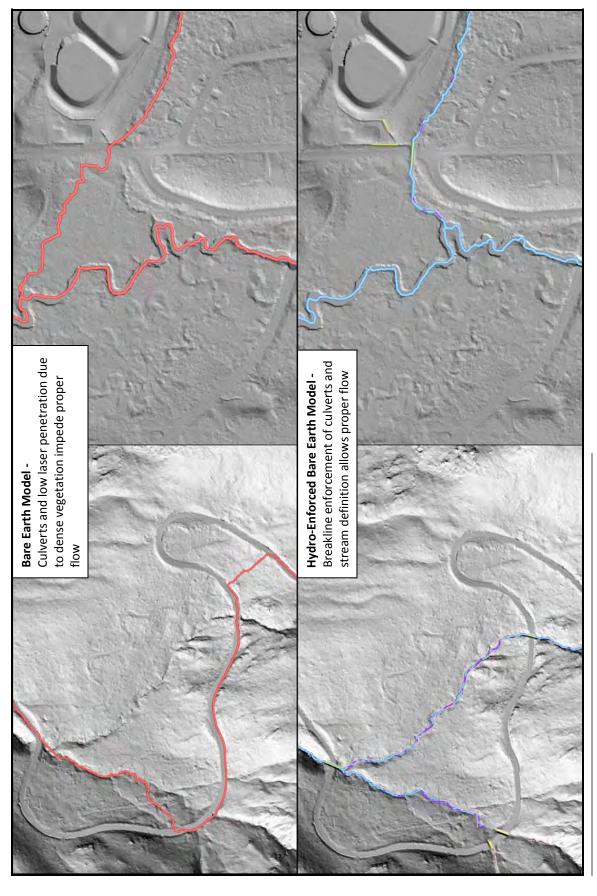
David C. Smith and Associates (DSA), Portland, OR created breaklines for the Lake Tahoe study area using LiDAR-grammetry. **Table 6** describes the type and definition of each breakline collected. The breaklines were used to supplement the LiDAR data in creation of a hydro-flattened and hydro-enforced ground model.

- Water boundaries were enforced using hard breaklines and water surfaces were flattened based on the elevation from the breaklines. The breakline boundaries were also used to reassign any ground classified points within the water delineated areas to a water class.
- Hard breaklines (lake edges, islands, etc.) were incorporated into the TIN by enforcing triangle edges (adjacent to the breakline) to the elevation values derived from the LiDAR-grammetric breakline. This implementation corrected interpolation along the hard edge.
- Culverts and artificial impediments to drainage flow were identified with hard breaklines. LiDAR data points within three meters of a culvert breakline were ignored from the ground classification, giving precedence to breakline Z values. This enforces proper drainage flow in development of the ground model.
- ArcHydro Tools 9 was run on resulting ground models as a quality inspection of stream definition. (Figure 15) In areas where stream definition deviated from bare earth ground model and breaklines, LiDAR data was reexamined to provide increased detail (adding or subtracting appropriate ground classified points).

Table 6. Breaklines collected for the Lake Tahoe study area.

Feature	Implementation	Description
Water_Lake	Hard Breakline	Lake Bodies
Water_Stream	Hard Breakline	Streams wider than ~3 meters
Water_Island	Hard Breakline	Islands
Hydro_Breakline	Hard Breakline	High Confidence breakline to enforce flow
Hydro_Connector	Hard Breakline	Low Confidence breakline to enforced flow
Culvert_Breakline	Hard Breakline	High Confidence breakline through culvert
Culvert Connector	Hard Breakline	Low Confidence breakline through culvert
Breakline	Hard Breakline	High Confidence breakline to supplement LiDAR data
Breakline_Obscured	Hard Breakline	Low confidence breakline to supplement LiDAR data

Figure 10. ArcHydro Tools 9 Stream Direction laid over LiDAR bare earth and hydro-enforced bare earth hillshaded models



LiDAR Data Acquisition and Processing: Lake Tahoe

Prepared by Watershed Sciences, Inc.

Projection/Datum and Units

	Projection:	UTM Zone 10, NAD 83
Datum	Vertical:	NAVD88 Geoid09
Datum	Horizontal:	NAD83 (CORS 96)
	Units:	meters

8. Deliverables

	LAS 1.2 format
Point Data:	All Returns
Fullit Data.	ASCII format
	All Returns
	Tile Index of LiDAR Points (1/100 USGS quad, shapefile format) Tile Index of DEMs (1/4 USGS quad, shapefile format)
Vector Data:	Tile Index of DEMs (1/4 USGS quad, shapefile format)SBETs (shapefile format)
	Ground points (ESRI file geodatabase format)
	Lake Edge Boundaries (ESRI file geodatabase format)
	Hydrologic Breaklines (ESRI file geodatabase format)
	Elevation Models (0.5 m resolution)
	 Hydro-Flattened Bare Earth Model (IMG format)
Raster Data:	 Hydro-flattened/Hydro-Enforced Bare Earth Model (IMG format)
	Highest Hit Model (IMG format)
	 Intensity Images (0.5 m resolution, IMG format)
Data Report:	Full report containing introduction, methodology, and accuracy

9. Selected Images

Figure 11. 3D point cloud of Lake Tahoe Airport (colored by 2009 NAIP)

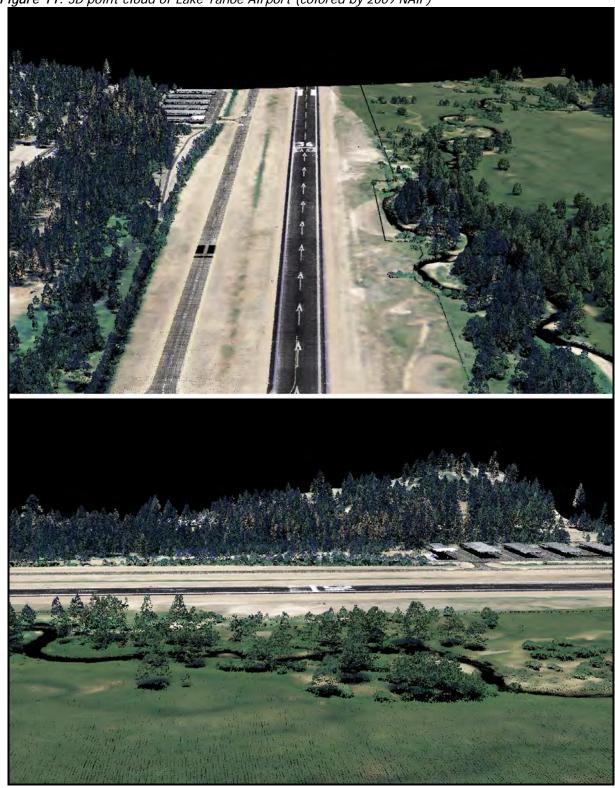


Figure 12. 3D LiDAR point cloud looking southwest from the marina at Tahoe Keys Resort (colored by 2009 NAIP)



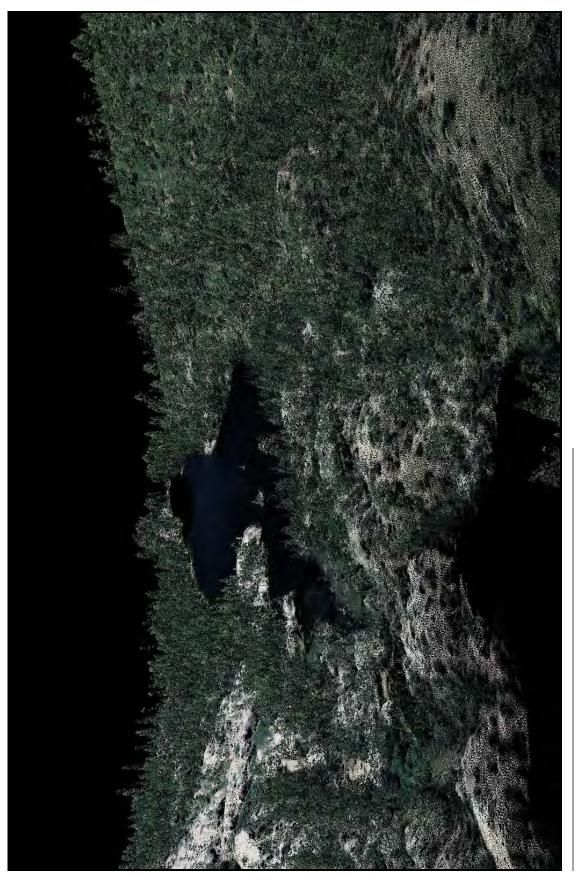
LiDAR Data Acquisition and Processing: Lake Tahoe

Figure 13. 3D LiDAR point cloud looking west over Lake Tahoe Dam (colored by 2009 NAIP)



LiDAR Data Acquisition and Processing: Lake Tahoe

Prepared by Watershed Sciences, Inc.



LiDAR Data Acquisition and Processing: Lake Tahoe

Prepared by Watershed Sciences, Inc.

Figure 15. 3D LiDAR point cloud looking at Heavenly Ski Resort slopes (colored by 2009 NAIP)

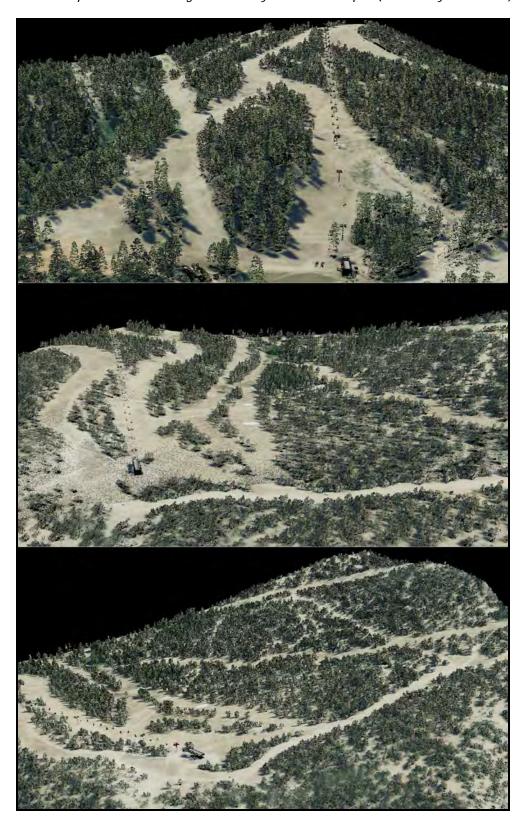


Figure 16. 3D LiDAR point cloud looking northeast over the golf course at Lake Valley State Recreation Area (colored by 2009 NAIP)

LiDAR Data Acquisition and Processing: Lake Tahoe

Prepared by Watershed Sciences, Inc.

10. Glossary

- <u>1-sigma (σ) Absolute Deviation</u>: Value for which the data are within one standard deviation (approximately 68th percentile) of a normally distributed data set.
- 1.96-sigma (σ) Absolute Deviation: Value for which the data are within two standard deviations (approximately 95th percentile) of a normally distributed data set.
- Root Mean Square Error (RMSE): A statistic used to approximate the difference between real-world points and the LiDAR points. It is calculated by squaring all the values, then taking the average of the squares and taking the square root of the average.
- <u>Pulse Rate (PR)</u>: The rate at which laser pulses are emitted from the sensor; typically measured as thousands of pulses per second (kHz).
- <u>Pulse Returns</u>: For every laser pulse emitted, the Leica ALS 50 Phase II system can record *up to four* wave forms reflected back to the sensor. Portions of the wave form that return earliest are the highest element in multi-tiered surfaces such as vegetation. Portions of the wave form that return last are the lowest element in multi-tiered surfaces.
- <u>Accuracy</u>: The statistical comparison between known (surveyed) points and laser points. Typically measured as the standard deviation (sigma, σ) and root mean square error (RMSE).
- <u>Intensity Values</u>: The peak power ratio of the laser return to the emitted laser. It is a function of surface reflectivity.
- <u>Data Density</u>: A common measure of LiDAR resolution, measured as points per square meter.
- <u>Spot Spacing</u>: Also a measure of LiDAR resolution, measured as the average distance between laser points.
- <u>Nadir</u>: A single point or locus of points on the surface of the earth directly below a sensor as it progresses along its flight line.
- <u>Scan Angle</u>: The angle from nadir to the edge of the scan, measured in degrees. Laser point accuracy typically decreases as scan angles increase.
- <u>Overlap</u>: The area shared between flight lines, typically measured in percents; 100% overlap is essential to ensure complete coverage and reduce laser shadows.
- <u>DTM / DEM</u>: These often-interchanged terms refer to models made from laser points. The digital elevation model (DEM) refers to all surfaces, including bare ground and vegetation, while the digital terrain model (DTM) refers only to those points classified as ground.
- <u>Real-Time Kinematic (RTK) Survey</u>: GPS surveying is conducted with a GPS base station deployed over a known monument with a radio connection to a GPS rover. Both the base station and rover receive differential GPS data and the baseline correction is solved between the two. This type of ground survey is accurate to 1.5 cm or less.

11. Citat	ions		
Soininen, A.	2004.	TerraScan User's Guide.	TerraSolid.

Appendix A

LiDAR accuracy error sources and solutions:

Type of Error	Source	Post Processing Solution
GPS	Long Base Lines	None
(Static/Kinematic)	Poor Satellite Constellation	None
(Static/Killelliatic)	Poor Antenna Visibility	Reduce Visibility Mask
Relative Accuracy	Poor System Calibration	Recalibrate IMU and sensor offsets/settings
	Inaccurate System	None
	Poor Laser Timing	None
Laser Noise	Poor Laser Reception	None
Laser Noise	Poor Laser Power	None
	Irregular Laser Shape	None

Operational measures taken to improve relative accuracy:

- 1. <u>Low Flight Altitude</u>: Terrain following is employed to maintain a constant above ground level (AGL). Laser horizontal errors are a function of flight altitude above ground (i.e., ~ 1/3000th AGL flight altitude).
- 2. Focus Laser Power at narrow beam footprint: A laser return must be received by the system above a power threshold to accurately record a measurement. The strength of the laser return is a function of laser emission power, laser footprint, flight altitude and the reflectivity of the target. While surface reflectivity cannot be controlled, laser power can be increased and low flight altitudes can be maintained.
- 3. Reduced Scan Angle: Edge-of-scan data can become inaccurate. The scan angle was reduced to a maximum of $\pm 15^{\circ}$ from nadir, creating a narrow swath width and greatly reducing laser shadows from trees and buildings.
- 4. <u>Quality GPS</u>: Flights took place during optimal GPS conditions (e.g., 6 or more satellites and PDOP [Position Dilution of Precision] less than 3.0). Before each flight, the PDOP was determined for the survey day. During all flight times, a dual frequency DGPS base station recording at 1-second epochs was utilized and a maximum baseline length between the aircraft and the control points was less than 19 km (11.5 miles) at all times.
- 5. <u>Ground Survey</u>: Ground survey point accuracy (i.e. <1.5 cm RMSE) occurs during optimal PDOP ranges and targets a minimal baseline distance of 4 miles between GPS rover and base. Robust statistics are, in part, a function of sample size (n) and distribution. Ground survey RTK points are distributed to the extent possible throughout multiple flight lines and across the survey area.
- 6. <u>50% Side-Lap (100% Overlap)</u>: Overlapping areas are optimized for relative accuracy testing. Laser shadowing is minimized to help increase target acquisition from multiple scan angles. Ideally, with a 50% side-lap, the most nadir portion of one flight line coincides with the edge (least nadir) portion of overlapping flight lines. A minimum of 50% side-lap with terrain-followed acquisition prevents data gaps.
- 7. Opposing Flight Lines: All overlapping flight lines are opposing. Pitch, roll and heading errors are amplified by a factor of two relative to the adjacent flight line(s), making misalignments easier to detect and resolve.

Appendix B



Tahoe Regional Planning Agency High-Resolution LiDAR Data for the Lake Tahoe Watershed

REPORT BY: Michael Farrauto, LSIT Sr. PROJECT MANAGER: Mark J. Bardakjian, PLS

I. Project Background:

The Tahoe Regional Planning Agency (TRPA) in coordination with the US Geological Survey was interested in acquiring a terrestrial LiDAR dataset for the entire Lake Tahoe Watershed (~1,100km²), California, Nevada, including a 1km buffer surrounding the watershed boundary. Post-processed LiDAR data will be used to derive thematic derivative products necessary for planning, monitoring and research.

II. Overview:

ANDREGG Geomatics conducted office and field work for this project to develop and certify a survey control network within the study region to be used in airborne LiDAR data acquisition and the collection/processing of ground check points (GCPs). These efforts were conducted between the months of June 2010 – January 2011 under contract with Watershed Sciences through the direction of Russell Faux.

Horizontal Datum:

The horizontal datum is based on the North American Datum of 1983 (NAD83) UTM Zone 10, Meters.

Vertical Datum:

The vertical datum is based on the North American Vertical Datum of 1988 (NAVD88), Meters and derived from Geoid09.

<u>Task 1: Develop and Certify a Survey Control Network:</u>

Network Design and Reconnaissance:

This task required initial research of all NGS published stations, county & local agencies benchmarks or other stations that could be incorporated into a Primary Control Network. This process involved searching the National Geodetic Survey's Database, contacting County Surveyors, and other local agencies for information of all stations within project.

Once the initial research was completed and flightlines were received from Watershed Sciences, a preliminary Primary Control Network of "ideal" locations was prepared in order to determine areas for reconnaissance. In discussions with Watershed Sciences, it was decided that in order to reach all project accuracy specifications these Primary Control Network stations would need to be located within 13 nautical miles (24km) of all flightlines.

As part of the reconnaissance effort, any stations that existed within the approximated "ideal" area it was then necessary to determine each station's condition and assess the station based on the criteria listed below. To encourage its future use and to perpetuate the network, the stations should be situated in easy access locations, preferably near highways and road systems. The actual site location for all stations must meet the following conditions in order to be incorporated into the network.

Ease of access by vehicle, personnel and equipment without disturbing property owners. The site must be safe to occupy by personnel, vehicles, and equipment.

Permanence and security of the site for protection and preservation of the monument. Preferably within public rights of way or improved areas.

GPS visibility, that the site is visible to the majority of GPS satellites.

As part of the reconnaissance, all stations were visited to confirm their existence and suitability to support the airborne LiDAR data acquisition requirements. Sketches of the stations were prepared with drive-to directions and photographs, (see Attachment 1). This reconnaissance was necessary in finalizing the Primary Control Network design.

After completion of the reconnaissance efforts, the Primary Network Design was finalized (see Attachment 2). The network included eight National Geodetic Surveys (NGS) published stations, three NGS CORS stations and five newly established stations.

NGS Published Stations:

TION T WOIISHOU NEWLIG		
Designation	PID	
AP 1967 STA A	JR1334	
ARP	JR0864	
BROCKWAY	DH6447	
D836	KS0133	
HPGH D CA 03 FS	AE9848	
EMERALD	DH6450	
Q 208 RESET	AI3453	
V 1201	KS0107	

NGS CORS Stations:

CORS ID	PID

DOT1	DH8860
RNO1	DE6254
ZOLE	DE6252

New Stations:

Station Name
MEEKS
ROSE 1
ROSE 2
SPOONER
TAHOE CITY

GPS Observations and Data Collection

All receivers are owned and operated by ANDREGG GEOMATICS. The equipment used included 4 Trimble 4000SSi dual-frequency, full-wavelength GPS receivers with Compact L1/L2 geodetic-quality antennas with ground planes. Different makes and models of antennas have different phase patterns and if not accounted for could result in vertical discrepancies up to 10cm. A 2-meter fixed-height, force centered tripods were used to minimize station occupation errors. The fixed height tripods are checked and calibrated weekly. The equipment models, both receivers and antennas, have been tested and approved on the Federal Geodetic Control Subcommittee test network.

GPS observations of the Primary Control Network stations were conducted in accordance to the project specifications. Existing (published) stations were observed with a minimum of one session of at least two hours and newly established stations were observed with a minimum of two sessions of at least two hours. Three NGS CORS stations were incorporated in the post processing; all of these NGS CORS stations were located with 80 km of the Primary Control Network. Additional observation data of the Primary Network Control collected by Watershed Sciences were incorporated into the processing and adjustment, adding redundancy to the network.

Each baseline was observed at least twice on 2 different days at 2 different times of day. Satellite coverage and positional dilution of precision (PDOP) charts were reviewed to insure a difference in satellite geometry and atmospheric conditions between the multiple observations. All GPS measurements were made during periods with PDOP less than or equal to 3.0 and with at least six common satellites. Observation log sheets were created at each station setup and occupation. The log sheets contain station names, PID (if applicable), session number, operator name, Julian date, date & time (local and UTC), monument description and receiver/antenna make and model information. Each station setup included a pre- and post-observation checklist to insure proper antenna height, magnetic north orientation, tripod plumb and eccentricity. Data Processing

Trimble's GPSurvey software (Version 2.35a) was used in reviewing, analyzing and processing of the GPS data. GPSurvey was used for baseline vector processing of the data to optimal double differenced fixed integer ionosphere free solutions for all observed vectors. Station and vector

solutions were reviewed to insure station naming and occupations were consistent. Redundant vectors were reviewed for consistency and discrepancies and analyzed for errors and blunders.

Minimally Constrained Network Adjustment:

A minimally constrained least squares adjustment was performed to determine the integrity of the baseline observations. For this adjustment only one NGS CORS station was constrained to its published NAD83 (CORS96) geodetic latitude, longitude and ellipsoid height. All statistics were evaluated at the 95% confidence level.

The final network consisted of 154 accepted GPS vectors between 16 stations. The observational standard error of each vector component was used as the initial, or a priori, weighting of the vector observation. The average a priori standard errors for each vector component were 0.02009 seconds of arc for azimuth, 0.01397 meters for ellipsoid height difference, and 0.00256 meters for distance.

The standard error of unit weight (Reference Variance Factor) for the minimally constrained network was determined at 1.00 by applying a priori station weighting and scaling of the observational standard errors with 492 degrees of freedom. Using an a priori error scalar of 5.92 for adjusted weighting of the GPS observational errors and a station occupation error of 0.01 ft in both antenna height and centering the Chi Square statistical test passed indicating good agreement between a priori error weighting estimation and the a posteriori adjusted values. The average standard error, at 95% confidence, was 0.0042 m (0.013 ft) in latitude, 0.0036 m (0.011 ft) in longitude and 0.0141 m (0.043 ft) in ellipsoid height. The average precision on all possible lines was 0.391 PPM. These statistics indicate the network observations are of high quality and the network integrity is very strong. With the network fitting well within itself, indicating no blunders or other unreasonable errors, a final fully constrained adjustment was undertaken, (see Attachment 3).

Fully Constrained Network Adjustment:

The final fully constrained least squares adjustment consisted of constraining to the NGS NAD83 (CORS96) published horizontal of 3 NGS CORS Stations. In addition, 1 NAVD88 First Order Vertical Control station (V 1201) was constrained to its published orthometric height (elevations) and with 6 other Height Modernization and NGS CORS Stations. The orthometric values for these six were computed from the published high order ellipsoid height and applying the Geoid separation. All observations were adjusted in the network by least squares to fit these constraints.

Before proceeding with the horizontal and vertical adjustment, however, another set of observations, i.e. geoid heights, were introduced into the network. The geoid height is the difference between the orthometric height (elevation) and ellipsoid height (mathematical surface) and is a non-linear relationship. These modeled estimated values for separation obtained from Geoid09 typically have standard errors larger than those of GPS observations. Using the standard error as the initial *a priori* weighting in the observation network adjustment the Geoid09 correlated separation values will be subjected to the least squares adjustment for best fit. Using the published high order values as constraints for ellipsoid heights and values of separation for the published stations, all of the orthometric heights for the stations in the network were adjusted

to fit. Therefore the adjusted Geoid09 modeled estimated geoid heights, constrained to the higher order values for ellipsoid and separation values, were subjected to a least squares adjustment in order to derive the best value for orthometric heights of the stations that were not constrained.

In an iterative manner, beginning with the minimally constrained adjustment, individual station constraints were added to the network adjustment. Following each adjustment, the adjusted values for horizontal and vertical positions were compared to their published values. If those values agreed within 0.05m then they were held as constraints in the next adjustment. And so on, until all available constraints had been considered and those that fell within the acceptable range were used. Using the same station weighting and an a priori error scalar of 7.19 the fully constrained Network Reference Variance Factor (Standard Error of Unit Weight) was found to be 1.00 with the Chi Square test passing. The fully constrained average standard error in horizontal position, at the 95% confidence level, for both latitude and longitude in the fully constrained adjustment were 0.0492m (0.015 ft) and 0.0427m (0.013 ft) respectively. The fully constrained average standard error, again at 95% confidence, for the ellipsoid height and orthometric height was 0.157m (0.048 ft) and 0.174m (0.053 ft) respectively. The average precision over all possible baselines was 0.067 PPM. The average adjusted geoid height for the network was –78.315 meters, (see Attachment 4).

Adjustment Conclusion:

The procedures, methodology and techniques implemented through the acquisition and processing of the data, introducing reasonable error weighting and a logical progression of the least squares adjustment process, along with the statistical results of the minimally and fully constrained adjustments all lead to the conclusion that the data collected is sound, the errors are reasonable, small and random, the weighting schemes are judicious, the constraints are good within their own published positional standard errors and the resultant values for horizontal and vertical positions of the new unconstrained stations are precise and accurate for the intended purposes. With these indications of precision and accuracy there is a high expectation that the actual directly observed measurements and resulting positional and height values should fall within the project specifications.

The final fully constrained adjustment results, in both US Survey feet and meters, geodetic positions with ellipsoid and orthometric heights along with their associated standard errors and NAD83 (CORS96) UTM Zone 10, grid coordinates in meters are shown in Attachment 5.

Task 2: Collection and Processing of Ground Check Points (GCPs):

The intent of the GCPs survey was to provide a minimum of 50 LiDAR Calibration points to Watershed Resources to use to register and calibrate the LiDAR data sets to bare earth and a minimum of 30 'blind' points for an internal vertical accuracy assessment. The horizontal values for the 'blind' points would be sent to Watershed Sciences and the LiDAR elevation values would be returned and compared to the actual surveyed vertical value as an internal quality control check. Elevation residuals of the 'blind' points would be reviewed and analyzed to determine if there were any problems to correct or adjustments to be made to the LiDAR data sets.

Initial locations for the GCPs were provided to Watershed Sciences for review of their geographic location in comparison to the proposed acquisition flight lines, (see Attachment 6). The locations of the GCPs were evenly distributed throughout the limits of airborne LiDAR data acquisition to obtain a wide area assessment of the LiDAR dataset and to obtain internal checks of data in the different terrain types. The 'blind' points were also positioned outside of the vicinity of the LiDAR calibration points to avoid any bias. Using available imagery and local knowledge of the project area, GCP locations were approximated. Both the LiDAR calibration and 'blind' points were field adjusted to conform to the required terrain types and to accommodate any rights of entry issues. Public outreach efforts were conducted to gain access to private property in remote areas where the point could not be established within public access. Continual communications between office and field personal assisted in proper placement of all GCPs and overall work flow progress. Each location was selected on flat or uniformly sloping terrain within 5 meters in all directions and marked by a survey marker set flush with surface. A lath was set at each location with a station ID number written on it. Photographs were taken at all locations to verify the terrain type. All field materials were collected and processed weekly to insure that all the data was being collected and recorded in compliance with specifications.

Standard GPS data collection methods were followed for all GCPs. These procedures and methodologies included the use of Fast Static techniques and incorporation of Primary Control Network stations that had recently been adjusted to final network values. This was accomplished using a 3-person crew with dual frequency geodetic GPS receivers together with geodetic antenna with ground planes. To eliminate instrument height errors, 2 meter fixed height, force center antenna tripods were used. The field survey data collection was designed and coordinated so that there were always 2 known base stations occupied while 3 roving receivers occupied the desired GCPs. Vector observations were designed so that nearest adjacent stations were directly observed promoting the use of short baselines and to obtain ionospheric free solutions tying into previously established control stations. All data collection was at least 20 minutes with 5 satellites. 5 Trimble 4000 SSI dual frequency GPS receivers were used for the GPS observations.

Post Processing

Using the above mentioned procedures and methodology for post processing of the GCPs; it was anticipated that final coordinates and elevations of all of the GCPs would achieve acceptable accuracies and precision. The final GCPs survey consisted of 1101 accepted GPS vectors between 92 stations, including 845 redundant observations.

'Blind' GCP Internal Vertical Accuracy Assessment:

A spreadsheet containing the 'Blind GCP's X and Y values were provided to Watershed Sciences. The spreadsheet was returned with the elevation data of each 'blind' GCPs based on

the LiDAR dataset, (see Attachment 7). The following tables summarize the statistical and residual results of the 'blind' GCP surveys compared to the LiDAR data point readings.

Vertical Accuracy Analysis:

100% of	RMSEz	ACCURACYz (m) 1.96xRMSEz		Std Dev		Min	Max
Points	(m)	Spec=0.20m	Mean (m)	(m)	# of Points	(m)	(m)
	0.08	0.16	0.01	0.01	31	0.0	0.04

The Fundamental Vertical Accuracy_z (FVA) at the 95% confidence level is equal to 1.96 times the RMSE_z. The FVA was calculated for the all 'blind' GCPs and was below the project specification of 0.20m at 0.16m. Any systematic errors or problems with the LiDAR sensor would be exposed if this specification was not met.

It is with confidence that the adjustment values resulting from this effort meet project specifications. I therefore certify that this work was done correctly and professionally by me or under my direct supervision.

Respectfully Submitted;

ANDREGG GEOMATICS

Mart f. Wardy

Mark J. Bardakjian

PLS 4567

Principal, Chief Operations Officer

Appendix C

Andregg Geomatics' Certification of Control Network:

TRPA - LAKE TAHOE LIDAR CONTROL NETWORK NAD83(CORS 2002.0) - NAVD88 BM V1201 EL:2069.513 UTM ZONE 10 METERS

	Comb. Factor	0.999624840	0.999603050	0.999650050	0.999693300	0.999615090	0.999623320	0.999620430	0.999582200	0.999705740	0.999517090	0.999517540	0.999581710	0.999624500	0.999621000	0.999601980	0.999718950
ELLIPSOID	HEIGHTS(m)	1883.108	2020.251	1754.035	1416.321	1924.275	1880.323	1878.370	2120.177	1531.169	2580.882	2577.916	2123.353	1881.291	1879.144	2046.179	1357.826
	Error(m)	0.0158	-	0.0140		-	-	0.0229	0.0140	-	0.0171	0.0174	0.0137	0.0155	0.0152		-
ORTHO	ELEV(m)	1907.011	2043.860	1777.664	1440.721	1948.135	1904.323	1902.217	2144.234	1555.089	2604.623	2601.661	2147.411	1905.225	1902.860	2069.513	1381.986
	Error(m)	0.0040	0.0027	0.0040		0.0052	0.0055	0.0052	0:00:0	1	0.0037	0.0037	0:00:0	0.0040	0.0034	0.0058	-
	EASTING(m)	760540.803	751436.257	747511.586	779673.974	753028.182	761886.685	748565.580	767179.285	767635.582	765724.191	765824.288	767223.827	760874.644	746510.683	731243.895	779486.711
	Error(m)	0.0043	0.0030	0.0049	-	0.0058	0.0058	0.0061	0.0034	1	0.0040	0.0043	0.0034	0.0043	0.0040	0.0070	-
	NORTHING(m)	4309306.581	4350787.042	4359257.508	4339100.655	4316837.865	4313536.707	4324776.329	4332410.867	4381103.722	4354784.432	4354758.640	4332512.358	4310567.006	4339248.229	4355413.169	4368602.454
	Error(m)	0.0040	0.0027	0.0040	-	0.0052	0.0055	0.0052	0:0030	1	0.0037	0.0037	0:0000	0.0040	0.0034	0.0058	-
	LONGITUDE	119º59'45.348090"W	120º05'07.603597"W	120º07'39.964029"W	119º45'48.327370"W	120º04'46.794268"W	119º58'43.741166"W	120º07'41.593703"W	119º54'37.633096"W	119º53'08.880400"W	119º55'06.476538"W	119º55'02.339995"W	119º54'35.637736"W	119º59'29.784238"W	120º08'48.062822"W	120º19'03.604739"W	119º45'12.033760"W
	Error(m)	0.0043	0:0030	0.0049		0.0058	0.0058	0.0061	0.0034		0.0040	0.0043	0.0034	0.0043	0.0040	0.0070	-
	LATITUDE	38º53'38.467561"N	39º16'11.925401"N	39º20'50.420265"N	39º09'22.298820"N	38º57'50.378787"N	38º55'54.067100"N	39º02'12.183033"N	39º05'59.726160"N	39º32'16.451590"N	39º18'06.070485"N	39º18'05.124461"N	39º06'02.964665"N	38º54'18.944475"N	39º10'03.168465"N	39º19'02.066917"N	39º25'17.998300"N
	POINT No.	ARP	BROCKWAY	D836	DOT1	EMERALD	HPGN03FS	MEEKS	0,208	RN01	ROSE 1	ROSE 2	SPOONER	STAA	TAHOE	V1201	ZOLE

Appendix C for Section 4 (TM 3) Appendix C2

Summary of Hydrant (C-factor) Test Results

APPENDIX C2

Summary of Hydrant (C-factor) Test Results

Hydrant Flow Tests

Hydrant flow testing was scheduled and performed for South Tahoe Public Utilities District (District) on Thursday, July 5 and Friday, July 6, 2012. Of the original 19 scheduled hydrant tests, 18 hydrant tests were performed. One hydrant test (Hydrant Test No. 14) was canceled due to constraints identified by District staff. Because the District does not have specific information on individual pipeline age and material type for the entire water distribution system, hydrant tests were developed to collect general pipeline friction loss information in targeted areas, rather than attempt to estimate friction losses for individual pipelines. These hydrant tests were used to "spot-check" the preliminary pipeline friction factors (C-factors) assigned and to calibrate the model to ensure that the hydraulic model closely represents observed pressure conditions in the field.

Hydrant flow tests were simulated using the updated hydraulic model of the District's water system, and estimated C-factor values. Results were compared to the actual field data to verify the C-factors and determine the accuracy of the model. C-factors were then adjusted where necessary to minimize differences between static and residual hydrant pressures observed in the field to pressures simulated with the hydraulic model, (see Tables C2-1 through C2-19). The goal of the calibration effort was to achieve no greater than a 5 pounds per square inch (psi) differential between the field hydrant test data and the model simulated data.

The following sections describe each of the specific hydrant testing locations and discuss a comparison of the predicted model pressures compared to pressures observed in the field. A schematic describing the locations of the flowing and observed fire hydrants is also provided for each hydrant flow test.

Summary of Hydrant Test Results

The results of the simulated hydrant flow tests generally validate the water system pipeline configuration and the assigned C-factors. However, based on the comparison of the collected hydrant flow test data and model simulation results, four of the hydrant flow tests (Test Nos. 6, 12, 13, and 19) required further review and evaluation because they did not meet the ±5 psi tolerance limit established for calibration. The results from the remaining hydrant tests indicate that the hydraulic model accurately simulates the District's water system, and is able to closely replicate field-observed pressures and flows. Further discussions regarding Test Nos. 6, 12, 13, and 19 are provided below.

Test 6: 6-inch AC Pipelines Unknown Construction Date

Initial model simulation results indicate that there may be system configuration issues (e.g., partially closed valve(s), inaccurate representation of pipeline connectivity, etc.) within the area of Test 6. The initial static pressures were in excess of 150 psi and the initial observed pressure differential ranged from 53 to 104 psi. This pressure differential could not be simulated in the model without assuming a partially closed valve east of the intersection of San Bernardino Avenue and Shawnee Street and an increase in the observed flow. West Yost Associates (West Yost) recommends that District operations staff verify the status of the valves at the intersection of San Bernardino Avenue and Shawnee Street.

Appendix C2

Summary of Hydrant (C-factor) Test Results

Test 12: 8-inch STL Pipelines Constructed Approximately in 1960

Initial model simulation results indicate that there may have been an error with the residual pressure reading at the observed hydrants. The hydraulic grade line is not consistent across the hydrants leading to the flowing hydrant. This may have to do with the high turbidity of the water when Hydrant Test No. 11 was run and the residual effects of stirring up the water along this pipeline. Since the C-factor for 8-inch STL pipelines was validated in Test No. 18, West Yost does not recommend re-testing this pipeline.

Test 13: 6-inch STL Pipelines Unknown Construction Date

Initial model simulation results indicate that there may have been an error with the residual pressure reading at observed Hydrant 13A. However, model simulation results from observed Hydrants 13B and 13C were well within the ±5 psi tolerance limit. In addition, the C-factor for 6-inch STL pipelines was previously validated in Test Nos. 7 and 8. Therefore, it is recommended that the data from Hydrant 13A not be used.

Test 19: 8-inch C900 Pipelines Constructed Approximately in 2005

Initial model simulation results indicate that there may be system configuration issues (e.g., partially closed valve(s), inaccurate representation of pipeline connectivity, etc.) within the area of Test 19. West Yost recommends that District staff verify the status of the valves northeast of the intersection of N. Marlette Circle and Johnson Boulevard, and northeast of the intersection of S. Marlette Circle and Johnson Boulevard.

Hydrant Test No. 1

Hydrant Test No. 1 was performed on South Upper Truckee Road, south of Morton Drive. This test was intended to confirm the C-factor (initially assumed to equal 140) assigned to 8-inch diameter, C900 pipelines constructed approximately in 2002.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±3 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-1 and indicates that the use of a C-factor equal to 140 for 8-inch diameter C900 pipelines, constructed after 2000, is valid.

Last Revised: 06-16-15

Table	C2-1.	Hydrant	Test	No.	1
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		Field Data	а		Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	55	NA	NA	54	NA	NA	NA
1A ⁽³⁾	57	14	43	57	16	41	2
1B ⁽⁴⁾	60	21	39	61	25	36	3
1C ⁽⁵⁾	60	24	36	60	23	36	0

Location of fire hydrants can be found on Figure C2-1.

Last Revised: 06-16-15

The "Flowing Hydrant" is located on South Upper Truckee Road, south of Morton Drive.

Hydrant 1A is located on South Upper Truckee Road, north of flowing hydrant. Hydrant 1B is located on South Upper Truckee Road, north of Hydrant 1A.

Hydrant 1C is located on South Upper Truckee Road, north of Hydrant 1B.

NA = Not Applicable

Appendix C2

Summary of Hydrant (C-factor) Test Results

Insert schematic for Test 1

Hydrant Test No. 2

Hydrant Test No. 2 was performed on East River Park Drive, northeast of the south end of Beaver Brae. This test was intended to confirm the C-factor (initially assumed to equal 130) assigned to 6-inch diameter, AC pipelines constructed approximately in 1959.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±4 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-2 and indicates that the use of a C-factor equal to 130 for 6-inch diameter AC pipelines, constructed after 1955, is valid.

Table C2-2. Hydrant Test No. 2

		Field Data	a		Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	62	NA	NA	62	NA	NA	NA
2A ⁽³⁾	63	16	47	64	14	51	-4
2B ⁽⁴⁾	65	27	39	66	28	38	1
2C ⁽⁵⁾	68	38	30	68	40	28	2

⁽¹⁾ Location of fire hydrants can be found on Figure C2-2.

⁽²⁾ The "Flowing Hydrant" is located on East River Park Drive, northeast of the south end of Beaver Brae.

⁽³⁾ Hydrant 2A is located on East River Park, northeast of flowing hydrant.

⁽⁴⁾ Hydrant 2B is located on Beaver Brae, north of East River Park Drive.

⁽⁵⁾ Hydrant 2C is located on Beaver Brae, north of Hydrant 2B.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 3 was performed on South Upper Truckee Road, north of West River Park Road. This test was intended to confirm the C-factor (initially assumed to equal 130) assigned to 8-inch diameter, AC pipelines constructed approximately in 1962.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±2 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-3 and indicates that the use of a C-factor equal to 130 for 8-inch diameter AC pipelines, constructed after 1960, is valid.

Table C2-3. Hydrant Test No. 3

		Field Data			Modeled Data			
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Comparison of Differential Pressures, psi (g = c-f)	
Flowing ⁽²⁾	72	NA	NA	72	NA	NA	NA	
3A ⁽³⁾	72	26	46	73	26	47	-1	
3B ⁽⁴⁾	81	39	42	80	41	40	2	
3C ⁽⁵⁾	80	44	36	81	46	35	1	

⁽¹⁾ Location of fire hydrants can be found on Figure C2-3.

⁽²⁾ The "Flowing Hydrant" is located on South Upper Truckee Road, north of West River Park Road.

⁽³⁾ Hydrant 3A is located on South Upper Truckee Road, north of flowing hydrant.

⁽⁴⁾ Hydrant 3B is located on South Upper Truckee Road, north of Ermine Court.

⁽⁵⁾ Hydrant 3C is located on South Upper Truckee Road, south of Panorama Court.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 4 was performed on Yokut Street, southwest of Henderson Street. This test was intended to confirm the C-factor (initially assumed to equal 130) assigned to 6-inch diameter, AC pipelines constructed approximately in 1968.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±4 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-4 and indicates that the use of a C-factor equal to 130 for 6-inch diameter AC pipelines, constructed after 1965, is valid.

Table C2-4A.	Hydrant	Test No.	4
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		Field Data			Modeled Data			
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Comparison of Differential Pressures, psi (g = c-f)	
Flowing ⁽²⁾	92	NA	NA	90	NA	NA	NA	
4A ⁽³⁾	88	26	62	89	23	65	-3	
4B ⁽⁴⁾	84	26	59	82	25	58	1	
4C ⁽⁵⁾	90	30	60	88	32	56	4	

⁽¹⁾ Location of fire hydrants can be found on Figure C2-4.

⁽²⁾ The "Flowing Hydrant" is located on Yokut Street, southwest of Henderson Street.

⁽³⁾ Hydrant 4A is located on Yokut Street, north of Nahane Drive.

⁽⁴⁾ Hydrant 4B is located on Nahane Drive, northwest of the south end of Yokut Street

⁽⁵⁾ Hydrant 4C is located on Nahane Drive, southwest of Henderson Street

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 5 was performed on Iroquois Circle, northwest of Chippewa Street. This test was intended to confirm the C-factor (initially assumed to equal 130) assigned to 4-inch diameter, AC pipelines constructed approximately in 1960.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±3 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-5 and indicates that the use of a C-factor equal to 130 for 4-inch diameter AC pipelines, constructed after 1960, is valid.

Table C2-5. Hydrant Test No. 5

		Field Data	a		Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	65	NA	NA	73	NA	NA	NA
5A ⁽³⁾	50	13	37	57	17	40	-3
5B ⁽⁴⁾	52	37	16	58	41	17	-1
5C ⁽⁵⁾	64	12	52	68	15	53	-1

⁽¹⁾ Location of fire hydrants can be found on Figure C2-5.

⁽²⁾ The "Flowing Hydrant" is located on Iroquois Circle, northwest of Chippewa Street.

⁽³⁾ Hydrant 5A is located on Iroquois Circle, southwest of Maya Way.

⁽⁴⁾ Hydrant 5B is located in the Middle of Chippewa Street.

⁽⁵⁾ Hydrant 5C is located on Iroquois Circle, northeast of Maya Way.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 6 was performed on Oaxaco Street, northwest of the southeast end. This test was intended to confirm the C-factor (initially assumed to equal 130) assigned to 6-inch diameter, AC pipelines constructed approximately in 1967.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are not within ±5 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-6.

Since the C-factor required for the model to simulate within the ±5 psi pressure differential for Test 5 is unreasonable for this pipeline diameter and material, the results from the hydraulic model simulation indicate that there may be system configuration issues (*e.g.*, partially closed valve(s), inaccurate representation of pipeline connectivity, etc.) within the area of Test No. 6.

As shown in Table C2-6A, Test No. 6 simulates within a 3 psi differential from the field hydrant test data after West Yost assumed a partially closed valve east of the intersection of San Bernardino Avenue and Shawnee Street and an increase in the observed flow. West Yost recommends that District operations staff verify the status of the valves at the intersection of San Bernardino Avenue and Shawnee.

		Field Data	a		Modeled Data			
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Comparison of Differential Pressures, psi (g = c-f)	
Flowing ⁽²⁾	160	NA	NA	162	NA	NA	NA	
6A ⁽³⁾	160	55	105	161	97	64	41	
6B ⁽⁴⁾	164	81	83	164	114	50	33	
6C ⁽⁵⁾	156	103	53	157	123	34	19	

⁽¹⁾ Location of fire hydrants can be found on Figure C2-6.

⁽²⁾ The "Flowing Hydrant" is located on Oaxaco Street, northwest of the southeast end.

⁽³⁾ Hydrant 6A is located on Oaxaco Street, south of Algonquin Court.

⁽⁴⁾ Hydrant 6B is located on Oaxaco Street, southeast of Shawnee Street.

⁽⁵⁾ Hydrant 6C is located on Shawnee Street, east of E. San Bernardino Avenue.

NA = Not Applicable

Table C2-6A. Hydrant Test No. 6

	Field Data				Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	160	NA	NA	157	NA	NA	NA
6A ⁽³⁾	160	55	105	157	50	107	-2
6B ⁽⁴⁾	164	81	83	160	77	83	0
6C ⁽⁵⁾	156	103	53	152	96	56	-3

⁽¹⁾ Location of fire hydrants can be found on Figure C2-6.

The "Flowing Hydrant" is located on Oaxaco Street, northwest of the southeast end.

⁽³⁾ Hydrant 6A is located on Oaxaco Street, south of Algonquin Court.

⁽⁴⁾ Hydrant 6B is located on Oaxaco Street, southeast of Shawnee Street.

⁽⁵⁾ Hydrant 6C is located on Shawnee Street, east of E. San Bernardino Avenue.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 7 was performed on Koru Street, west of North Upper Truckee Road. This test was intended to confirm the C-factor (initially assumed to equal 120) assigned to 6-inch diameter, STL pipelines constructed approximately in 1967.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±5 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-7 and indicates that the use of a C-factor equal to 120 for 6-inch diameter STL pipelines, constructed after 1965, is valid.

Table C2-7. Hydrant Test No. 7

		Field Data	a		Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	71	NA	NA	74	NA	NA	NA
7A ⁽³⁾	64	11	53	65	14	51	2
7B ⁽⁴⁾	66	24	42	67	29	38	5
7C ⁽⁵⁾	72	44	28	75	50	24	4

⁽¹⁾ Location of fire hydrants can be found on Figure C2-7.

The "Flowing Hydrant" is located on Koru Street, west of North Upper Truckee Road.

⁽³⁾ Hydrant 7A is located on Koru Street, west of flowing hydrant.

⁽⁴⁾ Hydrant 7B is located on Kiowa Drive, east of Koru Street.

⁽⁵⁾ Hydrant 7C is located on Kiowa Drive, west of North Upper Truckee Road.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 8 was performed on Southeast end of Chochise Circle, west of North Upper Truckee Road. This test was intended to confirm the C-factor (initially assumed to equal 120) assigned to 6-inch diameter, STL pipelines constructed approximately in 1961.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±3 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-8 and indicates that the use of a C-factor equal to 120 for 6-inch diameter STL pipelines, constructed after 1961, is valid.

Table C2-8A. Hydrant Test No. 8

		Field Data	a		Modeled Data			
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)	
Flowing ⁽²⁾	85	NA	NA	88	NA	NA	NA	
8A ⁽³⁾	80	20	60	81	21	60	0	
8B ⁽⁴⁾	85	41	44	86	42	44	-1	
8C ⁽⁵⁾	87	55	32	90	62	29	3	

⁽¹⁾ Location of fire hydrants can be found on Figure C2-8.

⁽²⁾ The "Flowing Hydrant" is located on Southeast end of Chochise Circle, west of North Upper Truckee Road.

⁽³⁾ Hydrant 8A is located on Cochise Circle, northwest of flowing hydrant.

⁽⁴⁾ Hydrant 8B is located on Cochise Circle, on the northwest curve.

⁽⁵⁾ Hydrant 8C is located on Cochise Circle, northeast end, west of North Upper Truckee Road.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 9 was performed on Grizzly Mountain Drive, northeast of Grizzly Mountain Court. This test was intended to confirm the C-factor (initially assumed to equal 75) assigned to 6-inch diameter, STL pipelines constructed approximately in 1991.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±4 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-9 and indicates that the use of a C-factor equal to 120 for 6-inch diameter STL pipelines, constructed after 1990, is valid.

Table C2-9. Hydrant Test No. 9

		Field Data	a		Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	100	NA	NA	107	NA	NA	NA
9A ⁽³⁾	120	46	74	125	47	78	-4
9B ⁽⁴⁾	137	75	62	138	77	62	0
9C ⁽⁵⁾	129	79	50	129	83	46	4

⁽¹⁾ Location of fire hydrants can be found on Figure C2-9.

⁽²⁾ The "Flowing Hydrant" is located on Grizzly Mountain Drive, northeast of Grizzly Mountain Court.

⁽³⁾ Hydrant 9A is located on Grizzly Mountain Drive, northeast of flowing hydrant.

⁽⁴⁾ Hydrant 9B is located on Grizzly Mountain Drive, northeast of Hydrant 9A.

⁽⁵⁾ Hydrant 9C is located on Grizzly Mountain Drive, south of Zuni Street.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 10 was performed on Grizzly Mountain Drive, northeast of Little Bear Lane. This test was intended to confirm the C-factor (initially assumed to equal 120) assigned to 6-inch diameter, STL pipelines constructed approximately in 1960.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±5 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-10 and indicates that the use of a C-factor equal to 120 for 6-inch diameter STL pipelines, constructed after 1960, is valid.

Table C2-10. Hydrant Test No. 10

	Field Data				Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	72	NA	NA	71	NA	NA	NA
10A ⁽³⁾	77	51	26	73	52	21	5
10B ⁽⁴⁾	88	47	41	88	47	40	1
10C ⁽⁵⁾	79	24	55	80	20	60	-5

⁽¹⁾ Location of fire hydrants can be found on Figure C2-10.

⁽²⁾ The "Flowing Hydrant" is located on Grizzly Mountain Drive, northeast of Little Bear Lane.

⁽³⁾ Hydrant 10A is located on Middle of Little Bear Lane.

⁽⁴⁾ Hydrant 10B is located on Grizzly Mountain Drive, north of Little Bear Lane.

⁽⁵⁾ Hydrant 10C is located on Grizzly Mountain Drive, west of Estate Court.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 11 was performed on Lake Tahoe Boulevard, north of North Upper Truckee Road. This test was intended to confirm the C-factor (initially assumed to equal 150) assigned to 12-inch diameter, PVC pipelines constructed approximately in 2011.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±4 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-11 and indicates that the use of a C-factor equal to 150 for 12-inch diameter PVC pipelines, constructed after 2010, is valid.

Table C2-11. Hydrant Test No. 11

		Field Data	a		Modeled Data			
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)	
Flowing ⁽²⁾	101	NA	NA	111	NA	NA	NA	
11A ⁽³⁾	102	48	54	102	46	56	-2	
11B ⁽⁴⁾	94	36	58	92	36	56	2	
11C ⁽⁵⁾	80	20	60	80	23	56	4	

⁽¹⁾ Location of fire hydrants can be found on Figure C2-11.

⁽²⁾ The "Flowing Hydrant" is located on Lake Tahoe Boulevard, north of North Upper Truckee Road.

⁽³⁾ Hydrant 11A is located on North Upper Truckee Road, southwest of Lake Tahoe Boulevard.

⁽⁴⁾ Hydrant 11B is located on North Upper Truckee Road, southwest of Hydrant 11A.

⁽⁵⁾ Hydrant 11C is located on North Upper Truckee Road, southwest of Hydrant 11B.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 12 was performed on Lake Tahoe Boulevard, northwest of View Circle. This test was intended to confirm the C-factor (initially assumed to equal 120) assigned to 8-inch diameter, STL pipelines constructed approximately in 1960.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are not within ±5 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-12.

Initial model simulation results indicate that there may have been an error with the residual pressure reading at the observed hydrants. The hydraulic grade line is not consistent across the hydrants leading to the flowing hydrant. This may have to do with the high turbidity of the water when Hydrant Test No. 11 (previous test) was run and the residual effects of stirring up the water along this pipeline. Since the C-factor for 8-inch STL pipelines is validated in Test 18, West Yost does not recommend re-testing this pipeline and indicates that the use of a C-factor equal to 120 for 8-inch diameter STL pipelines, constructed after 1960, is valid.

Table C2-12. Hydrant Test No. 12

	Field Data				Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	95	NA	NA	96	NA	NA	NA
12A ⁽³⁾	96	18	78	101	42	59	19
12B ⁽⁴⁾	103	49	54	106	52	54	0
12C ⁽⁵⁾	102	66	36	103	55	48	-12

⁽¹⁾ Location of fire hydrants can be found on Figure C2-12.

⁽²⁾ The "Flowing Hydrant" is located on Lake Tahoe Boulevard, northwest of View Circle.

⁽³⁾ Hydrant 12A is located on Lake Tahoe Boulevard, southeast of View Circle.

⁽⁴⁾ Hydrant 12B is located on Lake Tahoe Boulevard, north of Little Mountain Lane.

Hydrant 12C is located on Lake Tahoe Boulevard, north of North Upper Truckee Road.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 13 was performed on Angora Creek Drive, northeast of Lake Tahoe Boulevard. This test was intended to confirm the C-factor (initially assumed to equal 120) assigned to 6-inch diameter, STL pipelines constructed approximately in 1956.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are not within ±5 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-13.

Initial model simulation results indicate that there may have been an error with the residual pressure reading at observed Hydrant 13A. The difference between field-observed and model-simulated pressures for Hydrant 13A was 9 psi. However, model simulation results from observed Hydrants 13B and 13C were well within the ±5 psi tolerance limit. In addition, the C-factor for 6-inch STL pipelines was previously validated in Test Nos. 7 and 8. Therefore, it is recommended that the data from Hydrant 13A not be used.

Table C2-13. Hydrant Test No. 13

	Field Data				Comparison of					
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)			
Flowing ⁽²⁾	97	NA	NA	98	NA	NA	NA			
13A ⁽³⁾	98	29	69	102	42	60	9			
13B ⁽⁴⁾	104	61	43	110	65	45	-2			
13C ⁽⁵⁾	110	84	26	112	82	30	-4			

⁽¹⁾ Location of fire hydrants can be found on Figure C2-13.

⁽²⁾ The "Flowing Hydrant" is located on Angora Creek Drive, northeast of Lake Tahoe Boulevard.

⁽³⁾ Hydrant 13A is located on Angora Creek Drive, northeast of flowing hydrant.

⁽⁴⁾ Hydrant 13B is located on Angora Creek Drive, east of Hydrant 13A.

⁽⁵⁾ Hydrant 13C is located on Angora Creek Drive, south of View Circle.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 14 was performed on Boulder Mountain Road, northeast of Brush Road. This test was intended to confirm the C-factor (initially assumed to equal 150) assigned to 10-inch diameter, C900 pipelines constructed approximately in 1996.

This test was cancelled in the field due to the difficulty in changing the operating conditions of the pump station.

Field Data				Comparison of			
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	34	NA	NA	44	NA	NA	NA
14A ⁽³⁾		4	26	44	5	. 9	-3
14B ⁽⁴⁾	-1	_1	25	49	2	2)	-1
14C ⁽⁵⁾	45	23	22	ا جِها		24	-2

⁽¹⁾ Location of fire hydrants can be found on Figure C2-14.

⁽²⁾ The "Flowing Hydrant" is located on Boulder Mountain Road, northeast of Brush Road.

⁽³⁾ Hydrant 14A is located on Boulder Mountain Road, north of Cone Road.

⁽⁴⁾ Hydrant 14B is located on Boulder Mountain Road, south of Cone Road.

⁽⁵⁾ Hydrant 14C is located on Boulder Mountain Road, south of Lake Tahoe Boulevard.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 15 was performed on Glenmore Way, southwest of Highlands Drive. This test was intended to confirm the C-factor (initially assumed to equal 120) assigned to 6-inch diameter, STL pipelines constructed approximately in 1972.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±3 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-15 and indicates that the use of a C-factor equal to 120 for 6-inch diameter STL pipelines, constructed after 1970, is valid.

Table C2-15. Hydrant Test No. 15

	Field Data				Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	110	NA	NA	112	NA	NA	NA
15A ⁽³⁾	107	36	71	107	33	74	-3
15B ⁽⁴⁾	98	47	51	98	43	54	-3
15C ⁽⁵⁾	79	45	34	79	44	35	-1

⁽¹⁾ Location of fire hydrants can be found on Figure C2-15.

⁽²⁾ The "Flowing Hydrant" is located on Glenmore Way, southwest of Highlands Drive.

⁽³⁾ Hydrant 15A is located on 234 Glenmore Way.

⁽⁴⁾ Hydrant 15B is located on 274 Glenmore Way.

Hydrant 15C is located on 306 Glenmore Way.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 16 was performed on Sawmill Road, southeast of Lake Tahoe Boulevard. This test was intended to confirm the C-factor (initially assumed to equal 140) assigned to 8-inch diameter, C900 pipelines constructed approximately in 1997.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±5 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-16, and indicates that the use of a C-factor equal to 140 for 8-inch diameter C900 pipelines is valid.

Table C2-16. Hydrant Test No. 16

	Field Data				Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	108	NA	NA	107	NA	NA	NA
16A ⁽³⁾	106	18	88	102	12	90	-2
16B ⁽⁴⁾	110	24	86	111	27	84	2
16C ⁽⁵⁾	96	16	80	98	23	75	5

⁽¹⁾ Location of fire hydrants can be found on Figure C2-16.

⁽²⁾ The "Flowing Hydrant" is located on Sawmill Road, southeast of Lake Tahoe Boulevard.

⁽³⁾ Hydrant 16A is located on Sawmill Road, south of flowing hydrant.

⁽⁴⁾ Hydrant 16B is located on Sawmill Road, south of Hydrant 16A.

⁽⁵⁾ Hydrant 16C is located on Echo View Drive, southeast of Mountain Canary Drive.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 17 was performed on Mountain Canary Drive, northeast of Echo View Drive. This test was intended to confirm the C-factor (initially assumed to equal 120) assigned to 6-inch diameter STL pipelines.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±3 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-17 and indicates that the use of a C-factor equal to 120 for 6-inch diameter STL pipelines is valid.

Table C2-17. Hydrant Test No. 17

	Field Data				Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	82	NA	NA	84	NA	NA	NA
17A ⁽³⁾	73	16	57	76	21	55	2
17B ⁽⁴⁾	54	13	41	56	16	40	1
17C ⁽⁵⁾	33	20	13	31	15	16	-3

⁽¹⁾ Location of fire hydrants can be found on Figure C2-17.

⁽²⁾ The "Flowing Hydrant" is located on Mountain Canary Drive, northeast of Echo View Drive.

⁽³⁾ Hydrant 17A is located on Mountain Canary Drive, north of East Court.

⁽⁴⁾ Hydrant 17B is located on Mountain Canary Drive, southeast of Lamor Court.

⁽⁵⁾ Hydrant 17C is located on Lamor Court, northeast of Summit Drive.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 18 was performed on Industrial Avenue, west of Shop Street. This test was intended to confirm the C-factor (initially assumed to equal 120) assigned to 8-inch diameter, STL pipelines constructed approximately in 1963.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are within ±2 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-18 and indicates that the use of a C-factor equal to 120 for 8-inch diameter STL pipelines, constructed after 1960, is valid.

Table C2-18. Hydrant Test No. 18

Field Data					Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	77	NA	NA	59	NA	NA	NA
18A ⁽³⁾	66	28	38	60	24	37	1
18B ⁽⁴⁾	72	46	26	64	40	24	2
18C ⁽⁵⁾	73	59	14	66	54	12	2

⁽¹⁾ Location of fire hydrants can be found on Figure C2-18.

⁽²⁾ The "Flowing Hydrant" is located on Industrial Avenue, west of Shop Street.

⁽³⁾ Hydrant 18A is located on Industrial Avenue, east of flowing hydrant.

⁽⁴⁾ Hydrant 18B is located on Industrial Avenue, northeast of Hydrant 18A.

⁽⁵⁾ Hydrant 18C is located on Industrial Avenue, south of D Street.

NA = Not Applicable

Summary of Hydrant (C-factor) Test Results

Hydrant Test No. 19 was performed on Treehaven Drive, west of Johnson Boulevard. This test was intended to confirm the C-factor (initially assumed to equal 140) assigned to 8-inch diameter, C900 pipelines constructed approximately in 2005.

A comparison of the differential pressure readings predicted by the hydraulic model, compared to pressures actually measured in the field, demonstrates that the pressures predicted by the model are not within ±5 psi of the measured field value. A comparison between the calibrated model results and the field data is shown in Table C2-19.

Initial model simulation results indicate that there may be system configuration issues (e.g., partially closed valve(s), inaccurate representation of pipeline connectivity, etc.) within the area of Test 19. West Yost recommends that District staff verify the status of the valves northeast of the intersection of N. Marlette Circle and Johnson Boulevard, and northeast of the intersection of S. Marlette Circle and Johnson Boulevard.

As shown in Table C2-19A, Test 19 simulates within a 5 psi differential from the field hydrant test data after West Yost assumed a partially closed valve north of Marlette Circle and Johnson Boulevard, or northeast of the intersection of S. Marlette Circle and Johnson Boulevard.

Table C2-19. Hydrant Test No. 19

	Field Data				Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	100	NA	NA	99	NA	NA	NA
19A ⁽³⁾	98	21	77	97	53	44	33
19B ⁽⁴⁾	94	28	66	98	63	35	31
19C ⁽⁵⁾	100	29	71	96	67	29	42

⁽¹⁾ Location of fire hydrants can be found on Figure C2-19.

⁽²⁾ The "Flowing Hydrant" is located on Treehaven Drive, west of Johnson Boulevard.

⁽³⁾ Hydrant 19A is located on Bijou Street, south of Treehaven Drive.

⁽⁴⁾ Hydrant 19B is located on Johnson Boulevard, south of Freel Street.

⁽⁵⁾ Hydrant 19C is located on Johnson Boulevard, north of the northeast end of Marlette Circle.

NA = Not Applicable

Table C2-19A. Hydrant Test No. 19

	Field Data				Comparison of		
Hydrant ⁽¹⁾	Static Pressure, psi (a)	Residual Pressure, psi (b)	Differential Pressure, psi (c = a-b)	Static Pressure, psi (d)	Residual Pressure, psi (e)	Differential Pressure, psi (f = d-e)	Differential Pressures, psi (g = c-f)
Flowing ⁽²⁾	100	NA	NA	99	NA	NA	NA
19A ⁽³⁾	98	21	77	97	16	81	-4
19B ⁽⁴⁾	94	28	66	98	27	71	-5
19C ⁽⁵⁾	100	29	71	96	31	66	5

⁽¹⁾ Location of fire hydrants can be found on Figure C2-19.

⁽²⁾ The "Flowing Hydrant" is located on Treehaven Drive, west of Johnson Boulevard.

⁽³⁾ Hydrant 19A is located on Bijou Street, south of Treehaven Drive.

⁽⁴⁾ Hydrant 19B is located on Johnson Boulevard, south of Freel Street.

⁽⁵⁾ Hydrant 19C is located on Johnson Boulevard, north of the northeast end of Marlette Circle.

NA = Not Applicable

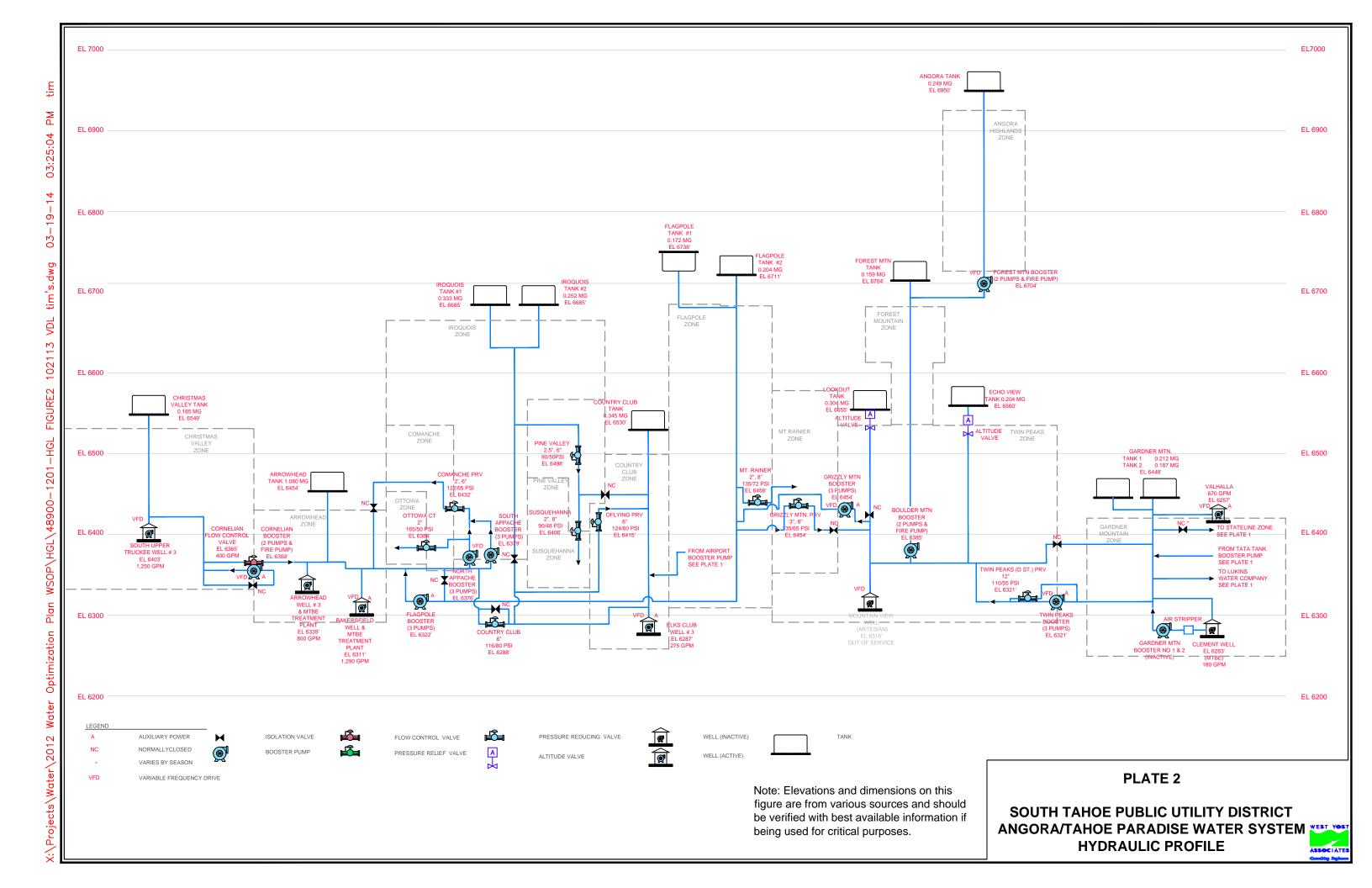
Appendix C2

Summary of Hydrant (C-factor) Test Results

Insert schematic for Test 19

Appendix D for Section 5 (TM 4) Appendix D1

Water System Hydraulic Profile



Appendix D for Section 5 (TM 4) Appendix D2

STPUD Storage and Pumping Capacity Scenario Evaluations

Heavenly to Keller

Storage Zone	Zone	Case 1 Additional Storage Required (gal)	Case 2 Additional Storage Required (gal)	Case 2A Additional Storage Required (gal)	Case 3 Additional Storage Required (gal)	Case 4 Additional Storage Required (gal)	Worst Case Additional Storage Required (gal)
Heavenly	Heavenly Valley						
Storage	Price Road						
Storage	Terrace						
	Keller						
	Four Seasons	_	_	_	_	_	_
	Middle Keller	-	-	_	_	-	_
Keller Storage	Needle Peak						
	Rocky Point						
	Sweeping Turn						
	Upper Saddle						
Iroquois Storage	Iroquois Comanche Ottawa Pine Valley Susquehana	-		-	-	-	-
Country Club	Carratur Clark	_	-	-	-	-	-
Storage	Country Club						
Arrowhead	Arrowhead	-	-	-	-	-	-
Storage Christmas	Arrowneau						
Valley Storage	Christmas Valley	115,000	115,000	115,000	115,000	115,000	115,000
Flagpole Storage	Flagpole Mt. Rainier	-	-	-	-	-	-
Angora Highlands Storage	Angora Highlands	-	-	-	-	-	-
Forest Mountain Storaage	Forest Mountain	-	-	-	-	-	-
Twin Peaks Storage	Twin Peaks	-	-	-	-	-	-
Gardner Mountain Storage	Gardner Mountain	-	-	-	-	-	-
Stateline Storage	Stateline	-	-	-	-	-	-
Montgomery Estates Storage	Montgomery Estates	-	-	-	-	-	-
N/A	H Street	120,000	120,000	125,040	120,000	121,663	125,040
N/A	Upper Montgomery Estates	120,000	120,000	146,262	120,000	124,665	146,262

	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[J]	[K]	[L]	[M]	[N]	[0]
		Dei	mand Summ	nary		Supply Summary		Fir	e Storage Summa	iry				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
Heavenly	Heavenly Valley	244	280	524	-	786	786							
Storage	Price Road	59	-	59	-	92	92							
	Terrace	13	-	13	-	19	19							
	Keller	5	225	231	-	413	413							
	Four Seasons	-	-	-	-	-	-	3,000	3	540,000	-	540,000	1,050,000	-
	Middle Keller	0	210	210	-	382	382							
Keller Storage		59	11	70 16	-	225 183	225							
	Rocky Point	16 220	- 53	273	-	381	183 381							
	Sweeping Turn Upper Saddle	220		21	-	28	28							
	Opper Saudie	21		21		20	20							
	Iroquois	383	333	716	-	945	945							
	Comanche	8	-	8	_	11	11							
Iroquois Storage	Ottawa	2	-	2	-	-	-	2,500	2	300,000	-	300,000	530,000	-
	Pine Valley	192	43	235	_	363	363							
	Susquehana	60	-	60	-	226	226							
Country Club														
Storage	Country Club	207	-	207	275	298	573	2,500	2	300,000	-	300,000	345,000	-
Arrowhead					4 200		1.600					200.000	1 000 000	
Storage	Arrowhead	358	921	1,279	1,290	400	1,690	2,500	2	300,000	-	300,000	1,080,000	-
Christmas Valley					1,250		1,250				_	300,000	185,000	115,000
Storage	Christmas Valley	377	400	777	1,230	-		2,500	2	300,000	-	300,000	183,000	113,000
Flagnole Storage	Flagpole	363	55	418	-	490	490	2,500	2	300,000	_	300,000	376,000	_
Flagpole Storage	Mt. Rainier	77	-	77	-	230	230	2,500		300,000		300,000	370,000	
Angora														
Highlands				40	-	700	780	4 000		420.000	-	120,000	249,000	-
Storage	Angora Highlands	40	-	40		780		1,000	2	120,000				
Forest							270					120.000	450.000	
Mountain	Forest Mountain	21	29	50	-	970	970	1,000	2	120,000	-	120,000	158,000	-
Storaage	rorest Mountain	21	23	30		370		1,000		120,000				
Twin Peaks					-		1,087		_		-	120,000	503,000	-
Storage	Twin Peaks	164	44	208		1,087		1,000	2	120,000				
Gardner					550		1,550				_	540,000	544,440	-
Mountain							,		_			,	,	
) Gardner Mountain	648	161	809		1,000		3,000	3	540,000				
Stateline					9,864		9,864				-	540,000	3,590,000	-
Storage	Stateline	8,374	1,378	9,753	,	-		3,000	3	540,000				
Montgomery		262	_	265	-		804	2	_	200 522	-	300,000	480,000	-
	Montgomery Estates	393	5	398		804		2,500	2	300,000				
N/A	H Street	21	-	21	-	42	42	1,000	2	120,000	-	120,000	-	120,000
N/A	Upper Montgomery Estates	6	-	6	-	523	523	1,000	2	120,000	-	120,000	-	120,000

[C] = PHD or Peak Hour Demand

[D] = "Exported PHD" value represents all of the flow provided to tributary zones as well as flow distributed to other storage areas.

[E] = [C] + [D]

[G] = Sum of wells, boosters, and PRVs (per Case) feeding a combined zone, plus contingency supplies that would be activated during a fire event. References Wells, Tanks, and PRVs worksheets.

[H] = [F] + [G]

[I] = Fire storage required for duration based on Pressure Zone Demand worksheet. The single greatest fire supply requirement for a combined zone (ie., tank zone plus subzones gravity fed by tank) is referenced.

[K] = [I] * [J] * 60

[L] = 4hr x (PHD-Firm Capacity) where PHD = 1.4 x MDD. References Pressure Zone Demand worksheet for PHD.

[M] = [K] + [L]

[O] = ([M] - [N]) > 0

2. For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage.

	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[J]	[K]	[L]	[M]	[N]	[0]
		Dei	mand Summ	ary		Supply Summary		Fir	e Storage Summa	iry				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
Heavenly	Heavenly Valley	244	280	524	-	836	836							
Storage	Price Road	59	-	59	-	99	99							
_	Terrace	13	-	13	-	21	21							
	Keller	5	225	231	-	413	413							
	Four Seasons	-	-	-	-	-	-	3,000	3	540,000	-	540,000	1,050,000	-
	Middle Keller	0	210	210	-	382	382							
Keller Storage		59	11	70	-	225	225							
	Rocky Point	16		16	-	183	183							
	Sweeping Turn	220	53	273	-	381	381							
	Upper Saddle	21	-	21	-	28	28							
	Iroquois	383	333	716	-	530	530							
Iroquois Storage	Comanche	8	-	8	-	4	4	2,500	2	300,000	44,764	344,764	530,000	_
ii oquois Storage	Ottawa	2	-	2	-	-	-	2,300	2	300,000	44,704	344,704	330,000	
	Pine Valley	192	43	235	-	138	138							
	Susquehana	60	-	60	-	1	1							
Country Club Storage	Country Club	207	-	207	275	114	389	2,500	2	300,000	-	300,000	345,000	-
Arrowhead Storage	Arrowhead	358	1,082	1,440	800	400	1,200	2,500	2	300,000	57,528	357,528	1,080,000	-
Christmas Valley Storage	Christmas Valley	377	400	777	1,250	-	1,250	2,500	2	300,000	-	300,000	185,000	115,000
Flagpole	Flagpole	363	216	579	-	415	415		_					
Storage	Mt. Rainier	77	-	77	-	39	39	2,500	2	300,000	39,404	339,404	376,000	-
Angora Highlands					-		101				-	120,000	249,000	-
Storage	Angora Highlands	40	-	40		101		1,000	2	120,000				
Forest Mountain Storaage	Forest Mountain	21	29	50	-	116	116	1,000	2	120,000	-	120,000	158,000	-
I win Peaks Storage	Twin Peaks	164	44	208	-	116	116	1,000	2	120,000	22,064	142,064	503,000	-
Gardner Mountain Storage (Note					550		1,456				-	540,000	544,440	-
2)	Gardner Mountain	648	-	648		906		3,000	3	540,000				
Stateline Storage	Stateline	8,374	1,217	9,592	8,364	-	8,364	3,000	3	540,000	294,672	834,672	3,590,000	-
Montgomery	· Montgomery Estates	393	5	398	-	558	558	2,500	2	300,000	-	300,000	480,000	-
	H Street	21	-	21	-	29	29	1,000	2	120,000	_	120,000	-	120,000
N/A N/A		6	-	6		278	278	1,000	2					
IN/A	Upper Montgomery Estates	ь		ь	-	2/8	2/8	1,000		120,000	-	120,000	-	120,000

[[]C] = PHD or Peak Hour Demand

[[]D] = "Exported PHD" value represents all of the flow provided to tributary zones as well as flow distributed to other storage areas.

[[]E] = [C] + [D]

[[]G] = Sum of wells, boosters, and PRVs (per Case) feeding a combined zone, plus contingency supplies that would be activated during a fire event. References Wells, Tanks, and PRVs worksheets

[[]H] = [F] + [G]

^{[1] =} Fire storage required for duration based on Pressure Zone Demand worksheet. The single greatest fire supply requirement for a combined zone (ie., tank zone plus subzones gravity fed by tank) is referenced

[[]K] = [I] * [J] * 60

[[]L] = 4hr x (PHD-Firm Capacity) where PHD = 1.4 x MDD. References Pressure Zone Demand worksheet for PHD.

[[]M] = [K] + [L]

[[]O] = ([M] - [N]) > 0

^{2.} For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage

_	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[J]	[K]	[L]	[M]	[N]	[0]
		Der	mand Summ	ary		Supply Summary		Fir	e Storage Summa	ary				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
Heavenly	Heavenly Valley	244	280	524	-	273	273							
Storage	Price Road	59	-	59	-	15	15							
	Terrace	13	-	13	-	3	3							
	Keller	5	225	231	-	138	138							
	Four Seasons	-	-	- 240	-	-	-	3,000	3	540,000	60,281	600,281	1,050,000	-
к. II С	Middle Keller	0	210	210	-	12	12							
Keller Storage		59	11	70	-	(145)	(145)							
	Rocky Point	16	-	16	-	(187)	(187)							
	Sweeping Turn	220	53	273	-	12	12 9							
	Upper Saddle	21	-	21	-	9	9							
	Iraquais	202	222	716	-	622	622							
	Iroquois Comanche	383 8	333	716 8	_	6	6	ł						
Iroquois Storage	e Ottawa	2		2	-		0	2,500	2	300,000	22,572	322,572	530,000	-
	Pine Valley	192	43	235	-	188	188							
	Susquehana	60	-	60	-	51	51							
Country Club	Susquenana	60		60	-	31	31							
Storage	Country Club	207		207	275	_	275	2,500	2	300,000	-	300,000	345,000	-
Arrowhead	country club	207		207				2,500		300,000				
Storage	Arrowhead	358	921	1,279	800	400	1,200	2,500	2	300,000	18,936	318,936	1,080,000	-
Christmas								,						
	Christmas Valley	377	400	777	1,250	-	1,250	2,500	2	300,000	-	300,000	185,000	115,000
Flagpole	Flagpole	363	55	418	-	322	322							
Storage	Mt. Rainier	77	-	77	-	63	63	2,500	2	300,000	23,004	323,004	376,000	-
Angora														
Highlands					-		225				-	120,000	249,000	-
Storage	Angora Highlands	40	-	40		225		1,000	2	120,000		,	,	
Forest														
Mountain					-		240				-	120,000	158,000	-
Storaage	Forest Mountain	21	29	50		240		1,000	2	120,000				
I win Peaks							476				_	120,000	503,000	
Storage	Twin Peaks	164	44	208	-	476	470	1,000	2	120,000	-	120,000	303,000	-
Gardner														
Mountain					550		938					540,000	544,440	
Storage (Note					550		936				-	540,000	344,440	-
2)	Gardner Mountain	648	161	809		388		3,000	3	540,000				
Stateline					6,840		6,840		_	_	699,024	1,239,024	3,590,000	
Storage	Stateline	8,374	1,378	9,753	6,840	-	0,840	3,000	3	540,000	099,024	1,239,024	3,390,000	
Montgomery					-		178				52,782	352,782	480,000	
	Montgomery Estates	393	5	398	_	178	178	2,500	2	· · · · · · · · · · · · · · · · · · ·			400,000	
N/A	H Street	21	-	21	-	-	-	1,000	2		5,040	125,040	-	125,040
N/A	Upper Montgomery Estates	6	-	6	-	(103)	(103)	1,000	2	120,000	26,262	146,262	-	146,262

[[]C] = PHD or Peak Hour Demand

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[[]E] = [C] + [D]

[[]G] = Sum of wells, boosters, and PRVs (per Case) feeding a combined zone, plus contingency supplies that would be activated during a fire event. References Wells, Tanks, and PRVs worksheets.

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[[]L] = 4hr x (PHD-Firm Capacity) where PHD = 1.4 x MDD. References Pressure Zone Demand worksheet for PHD.

[[]M] = [K] + [L]

[[]O] = ([M] - [N]) > 0

^{2.} For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage

	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[J]	[K]	[L]	[M]	[N]	[0]
		De	mand Summ	ary		Supply Summary		Fir	e Storage Summa	ary				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
Heavenly	Heavenly Valley	244	280	524	-	1,600	1,600	Í						
Storage	Price Road	59	-	59	-	95	95							
	Terrace	13	-	13	-	20	20							
	Keller	5	225	231	-	350	350							
	Four Seasons	-	-	-	-	-	-	3,000	3	540,000	-	540,000	1,050,000	_
	Middle Keller	0	210	210	-	323	323	.,		,		,	,,	
Keller Storage		59	11	70	-	166	166							
	Rocky Point	16	-	16	-	124	124							
	Sweeping Turn	220	53	273	-	323	323							
	Upper Saddle	21	-	21	-	23	23							
					-		717							
	Iroquois	383	333	716		717								
Iroquois Storage	e Comanche	8	-	8	-	7	7	2,500	2	300,000	-	300,000	530,000	-
	Ottawa	2	-	2	-	-	-	, , , , , , , , , , , , , , , , , , , ,		,		,	,	
	Pine Valley	192	43	235	-	239	239							
Country Club	Susquehana	60	-	60	-	102	102							
Country Club Storage	Country Club	207	-	207	275	197	472	2,500	2	300,000	-	300,000	345,000	-
Arrowhead					1,290		1,290		_		-	300,000	1,080,000	-
Storage	Arrowhead	358	876	1,234	,		,	2,500	2	300,000		,	,,	
Christmas	Christmas Valley	377		377	1,250	318	1,568	2,500	2	300,000	-	300,000	185,000	115,000
Valley Storage	Christmas Valley	363	-	418		820		2,500		300,000			•	
Flagpole	Flagpole		55		-		820 560	2,500	2	300,000	-	300,000	376,000	-
Storage Angora	Mt. Rainier	77	-	77	-	560	560			-				
Highlands														
Storage	Angora Highlands	40		40	-	103	103	1,000	2	120,000	-	120,000	249,000	-
	Aligora Figilialius	40		40		103		1,000		120,000				
Forest							110					120,000	150,000	
Mountain	Forest Mountain	21	29	50	· ·	118	118	1,000	2	120,000	-	120,000	158,000	-
Storaage Twin Peaks	Forest Mountain	21	25	30		110		1,000		120,000				
Storage	Twin Peaks	164	358	522	-	1,087	1,087	1,000	2	120,000	-	120,000	503,000	-
Gardner	I WILL COKS	104	336	322		1,087		1,000		120,000				
Mountain														
Storage (Note					550		1,550				-	540,000	544,440	-
2)	Gardner Mountain	648	475	1,123		1,000		3,000	3	540,000				
Stateline	Gardner Mountain	648	4/5	1,123		1,000		3,000	3	540,000				
Storage	Stateline	8,374	2,717	11,092	9,864	_	9,864	3,000	3	540,000	294,672	834,672	3,590,000	-
Montgomery	Jacanie	0,374	2,/1/	11,092		-		3,000	3	340,000				
	Montgomery Estates	393	5	398	-	408	408	2,500	2	300,000	-	300,000	480,000	-
N/A	H Street	21		21	_	21	21	1,000	2			120,000		120,000
N/A	Upper Montgomery Estates	6		6	-	127	127	1,000	2		-	120,000	-	
.,,	Opper Montgomery Estates	0		0	-	127	12/	1,000		120,000	-	120,000	-	120,000

[[]C] = PHD or Peak Hour Demand

[[]D] = "Exported PHD" value represents all of the flow provided to tributary zones as well as flow distributed to other storage areas

[[]E] = [C] + [D]

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[[]I] = Fire storage required for duration based on Pressure Zone Demand worksheet. The single greatest fire supply requirement for a combined zone (ie., tank zone plus subzones gravity fed by tank) is referenced [K] = [I] * [J] * 60

[[]L] = 4hr x (PHD-Firm Capacity) where PHD = 1.4 x MDD. References Pressure Zone Demand worksheet for PHD.

[[]M] = [K] + [L]

[[]O] = ([M] - [N]) > 0

^{2.} For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage

	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[١]	[K]	[L]	[M]	[N]	[0]
		Der	mand Summ	ary		Supply Summary		Fir	e Storage Summa	ary				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
Heavenly	Heavenly Valley	244	280	524	_	1,173	1,173							
Storage	Price Road	59	-	59		30	30							
Storage	Terrace	13	-	13	_	6	6							
	Keller	5	225	231	_	215	215							
	Four Seasons	-	-	-	_	-	-	3,000	3	540,000	_	540,000	1,050,000	_
	Middle Keller	0	210	210	_	197	197	3,000	3	340,000		340,000	1,050,000	
Keller Storage	Needle Peak	59	11	70	_	40	40							
nener storage	Rocky Point	16	-	16	_	(2)	(2)							
	Sweeping Turn	220	53	273	_	197	197							
	Upper Saddle	21	-	21	-	14	14							
	Iroquois	383	333	716	-	377	377							
	Comanche	8	-	8	-	2	2		_					
Iroquois Storage	Ottawa	2	-	2	-	-	-	2,500	2	300,000	81,359	381,359	530,000	-
	Pine Valley	192	43	235	-	56	56							
	Susquehana	60	-	60	-	(81)	(81)							
Country Club					275							200.000	245.000	
Storage	Country Club	207	-	207	275	46	321	2,500	2	300,000	-	300,000	345,000	-
Arrowhead Storage	Arrowhead	358	876	1,234	800	-	800	2,500	2	300,000	104,064	404,064	1,080,000	-
Christmas					1 250		1,417				-	300,000	185,000	115,000
Valley Storage	Christmas Valley	377	-	377	1,250	167	1,417	2,500	2	300,000	-	300,000	185,000	115,000
Flagpole	Flagpole	363	55	418	-	746	746	2,500	2	300,000	_	300,000	376,000	
Storage	Mt. Rainier	77	-	77	-	487	487	2,300	2	300,000	_	300,000	370,000	-
Angora														
Highlands					-		89				-	120,000	249,000	-
Storage	Angora Highlands	40	-	40		89		1,000	2	120,000				
Forest														
Mountain					-		104		_		-	120,000	158,000	-
Storaage	Forest Mountain	21	29	50		104		1,000	2	120,000				
I win Peaks					_		967		_		-	120,000	503,000	_
Storage	Twin Peaks	164	358	522		967		1,000	2	120,000				
Gardner														
Mountain					550		1,430				-	540,000	544,440	-
Storage (Note							_,					- 10,000	,	
2)	Gardner Mountain	648	475	1,123		880		3,000	3	540,000				
Stateline					8,364		8,364	_			611,928	1,151,928	3,590,000	-
Storage	Stateline	8,374	2,539	10,914	2,30 .	-	2,50 .	3,000	3	540,000	522,520	-,,520	2,222,000	
Montgomery			_		_		268		_		31,185	331,185	480,000	_
	Montgomery Estates	393	5	398		268		2,500	2	300,000	· ·			
N/A	H Street	21	-	21	-	14	14	1,000	2		1,663	121,663	-	121,663
N/A Notes:	Upper Montgomery Estates	6	-	6	-	(13)	(13)	1,000	2	120,000	4,665	124,665	-	124,665

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[[]L] = $4hr \times (PHD-Firm Capacity)$ where PHD = $1.4 \times MDD$. References Pressure Zone Demand worksheet for PHD.

[[]M] = [K] + [L]

[[]O] = ([M] - [N]) > 0

^{2.} For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage

Table B2-1B: Summary of Storage Current Water System

		mmary of Storage Case 1	Case 2	Case 2A	Case 3	Case 4	Worst Case
		Additional	Additional	Additional	Additional	Additional	Additional
Storage Zone	Zone	Storage	Storage	Storage	Storage	Storage	Storage
		Required	Required	Required	Required	Required	Required
		(gal)	(gal)	(gal)	(gal)	(gal)	(gal)
	Keller						
	Four Seasons						
	Middle Keller						
Keller Storage	Needle Peak	209,000	209,000	230,102	209,000	216,140	230,102
	Rocky Point						
	Sweeping Turn						
	Upper Saddle						
Heavenly	Heavenly Valley						
•	Price Road	-	-	-	-	-	-
Storage	Terrace						
	Iroquois						
Iroquois	Comanche						
Storage	Ottawa	_	_	_	_	_	
	Pine Valley						
	Susquehana						
Country Club						-	
Storage	Country Club	-	-	,	-	-	•
Arrowhead		_	_	_	_	_	_
Storage	Arrowhead			_			
Christmas		115,000	115,000	115,000	115,000	115,000	115,000
Valley Storage	Christmas Valley	113,000	113,000	113,000	113,000	115,000	115,000
Flagpole	Flagpole	_	_	_	_	_	_
Storage	Mt. Rainier						
Angora							
Highlands		-	-	-	-	-	-
Storage	Angora Highlands						
Forest							
Mountain		-	-	-	-	-	-
Storaage Twin Peaks	Forest Mountain						
Storage	T. C. Beele	-	_	-	-	-	-
	Twin Peaks						
Gardner							
Mountain		-	-	-	-	-	-
Storage	Gardner Mountain						
Stateline		_	_	_	_	_	-
Storage	Stateline						
Montgomery		-	-	-	-	-	-
Estates Storage	Montgomery Estates						
N/A	H Street	120,000	120,000	125,040	120,000	121,884	125,040
N/A	Upper Montgomery Estates	120,000	120,000	146,262	120,000	128,876	146,262

	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[1]	[K]	[L]	[M]	[N]	[0]
		Dei	mand Summ	nary		Supply Summary		Fir	e Storage Summa	iry			_	
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
	Keller	5	313	318	-	413	413							
	Four Seasons		-	-	-	-	-							
	Middle Keller	0	298	298	-	389	389							
Keller Storage	Needle Peak	59	11	70	-	88	88	3,000	3	540,000	-	540,000	331,000	209,000
	Rocky Point	16	-	16	-	46	46							
	Sweeping Turn	220	141	360	-	389	389							
	Upper Saddle	21 244		21 295	-	532	20 532							
Heavenly	Heavenly Valley		51	295 59	-	295	295	2,500	2	300,000		300,000	1,050,000	
Storage	Price Road	59 13	-	13	-	62		2,500	2	300,000	-	300,000	1,050,000	-
	Terrace	13		15	-	02	62							
	Iroquois	383	333	716	-	945	945							
	Comanche	8		8	_	945	11							
Iroquois Storage	Ottawa	2		2	-	- 11	- 11	2,500	2	300,000	-	300,000	530,000	-
	Pine Valley	192	43	235	_	363	363							
	Susquehana	60	-	60	-	226	226							
Country Club	Susquentinu	- 00		00		220								
Storage	Country Club	207	-	207	275	298	573	2,500	2	300,000	-	300,000	345,000	-
Arrowhead	,							,		*				
Storage	Arrowhead	358	921	1,279	1,290	400	1,690	2,500	2	300,000	-	300,000	1,080,000	-
Christmas					1 350		1 350					300,000	105.000	115 000
Valley Storage	Christmas Valley	377	400	777	1,250	-	1,250	2,500	2	300,000	-	300,000	185,000	115,000
Flagpole	Flagpole	363	55	418	-	490	490	2,500	2	300,000	_	300,000	376,000	
Storage	Mt. Rainier	77	-	77	-	230	230	2,300	2	300,000	_	300,000	370,000	,
Angora														
Highlands					-		780				-	120,000	249,000	-
Storage	Angora Highlands	40	-	40		780		1,000	2	120,000				
Forest														
Mountain	Facest Manustain	21	29	50	-	070	970	1,000	2	120,000	-	120,000	158,000	-
Storaage Twin Peaks	Forest Mountain	21	29	30		970		1,000		120,000				
Storage	Twin Peaks	164	44	208	-	1,087	1,087	1,000	2	120,000	-	120,000	503,000	-
Gardner	TWITT CORS	104		200		1,007		1,000		120,000				
Mountain														
Storage (Note					550		1,550				-	540,000	544,440	-
2)	Gardner Mountain	648	161	809		1,000		3,000	3	540,000				
Stateline	Garuner Mountain	046	101	009		1,000		3,000	3	340,000				
Storage	Stateline	8,374	1,378	9,753	9,864	_	9,864	3,000	3	540,000	-	540,000	3,590,000	-
Storage	Jucuite	0,374	1,376	3,133		-		3,000	3	340,000				
Montgomery					_		804				_	300,000	480,000	_
	Montgomery Estates	393	5	398	_	804	804	2,500	2	300,000	_	300,000	400,000	
N/A	H Street	21	-	21	_	42	42	1,000	2	120,000	_	120,000	_	120,000
N/A	Upper Montgomery Estates	6		6		523	523	1,000	2			120,000		120,000
Notes:	Equations for Estimating Date			U	_	323	323	1,000		120,000	·	120,000	-	120,000

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[[]H] = [F] + [G]

^{[1] =} Fire storage required for duration based on Pressure Zone Demand worksheet. The single greatest fire supply requirement for a combined zone (ie., tank zone plus subzones gravity fed by tank) is referenced.

[[]K] = [I] * [J] * 60

[[]L] = 4hr x (PHD-Firm Capacity) where PHD = 1.4 x MDD. References Pressure Zone Demand worksheet for PHD.

[[]M] = [K] + [L]

[[]O] = ([M] - [N]) > 0

^{2.} For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage.

-	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[J]	[K]	[L]	[M]	[N]	[0]
		Dei	mand Summ	nary		Supply Summary		Fir	e Storage Summa	iry				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
	Keller	5	225	231	-	413	413							
	Four Seasons	-	-	-	-	-	-							
	Middle Keller	0	210	210	-	382	382							
Keller Storage	Needle Peak	59	11	70	-	225	225	3,000	3	540,000	-	540,000	331,000	209,000
	Rocky Point	16	-	16	-	183	183							
	Sweeping Turn	220	53	273	-	381	381							
	Upper Saddle	21 244		21 295	-	28 441	28 441							
Heavenly	Heavenly Valley	59	51	59	-	220	220	2,500	2	300,000		300,000	1 050 000	
Storage	Price Road Terrace	13	-	13	-	47	47	2,500	2	300,000	-	300,000	1,050,000	-
	rerrace	13		13	-	47								
	Iroquois	383	333	716	-	530	530							
	Comanche	8	-	8	-	4	4							
Iroquois Storage	Ottawa	2		2	-	-	-	2,500	2	300,000	44,764	344,764	530,000	-
	Pine Valley	192	43	235	_	138	138							
	Susquehana	60	-	60	-	1	1							
Country Club	•				275		200					200.000	245.000	
Storage	Country Club	207	-	207	275	114	389	2,500	2	300,000	-	300,000	345,000	-
Arrowhead					800		1,200				57,528	357,528	1,080,000	
Storage	Arrowhead	358	1,082	1,440	800	400	1,200	2,500	2	300,000	37,328	337,328	1,080,000	-
Christmas Valley					1,250		1,250		_		_	300,000	185,000	115,000
Storage	Christmas Valley	377	400	777	· ·	-		2,500	2	300,000		300,000	100,000	115,000
Flagpole Storage	Flagpole	363	216	579	-	415	415	2,500	2	300,000	39,404	339,404	376,000	_
Angora	Mt. Rainier	77	-	77	-	39	39	,		,	,	,	,	
Highlands					_		101				_	120,000	249,000	_
Storage	Angora Highlands	40	-	40		101		1,000	2	120,000		.,	.,	
Forest														
Mountain					-		116				-	120,000	158,000	-
Storaage	Forest Mountain	21	29	50		116		1,000	2	120,000				
Twin Peaks							116				22,064	142,064	503,000	
Storage	Twin Peaks	164	44	208	-	116	110	1,000	2	120,000	22,004	142,004	303,000	-
Gardner					550		1,456					540,000	544,440	
Mountain					550		1,450				-	540,000	544,440	-
Storage (Note 2)) Gardner Mountain	648	-	648		906		3,000	3	540,000				
Stateline					0.264		0.254				204 672	024.672	2 500 000	
Storage	Stateline	8,374	1,217	9,592	8,364	-	8,364	3,000	3	540,000	294,672	834,672	3,590,000	-
Montgomery					-		558				-	300,000	480,000	-
Estates Storage	Montgomery Estates	393	5	398		558		2,500	2	300,000				
N/A	H Street	21	-	21	-	29	29	1,000	2	120,000	-	120,000	-	120,000
N/A	Upper Montgomery Estates	6	-	6	-	278	278	1,000	2	120,000	-	120,000	-	120,000

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[[]D] = "Exported PHD" value represents all of the flow provided to tributary zones as well as flow distributed to other storage areas.

[[]E] = [C] + [D]

[[]G] = Sum of wells, boosters, and PRVs (per Case) feeding a combined zone, plus contingency supplies that would be activated during a fire event. References Wells, Tanks, and PRVs worksheets.

[[]H] = [F] + [G]

^{[1] =} Fire storage required for duration based on Pressure Zone Demand worksheet. The single greatest fire supply requirement for a combined zone (ie., tank zone plus subzones gravity fed by tank) is referenced.

[[]K] = [I] * [J] * 60

[[]L] = 4hr x (PHD-Firm Capacity) where PHD = 1.4 x MDD. References Pressure Zone Demand worksheet for PHD.

[[]M] = [K] + [L]

[[]O] = ([M] - [N]) > 0

^{2.} For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage.

	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[J]	[K]	[L]	[M]	[N]	[0]
		De	mand Summ	ary		Supply Summary		Fir	e Storage Summa	ary				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
	Keller	5	225	231	-	143	143							
	Four Seasons	-	-	-	-	-	-							
	Middle Keller	0	210	210	-	12	12							
Keller Storage		59	11	70	-	(145)	(145)	3,000	3	540,000	21,102	561,102	331,000	230,102
	Rocky Point	16	-	16	-	(187)	(187)							
	Sweeping Turn	220	53	273	-	12	12							
	Upper Saddle	21	-	21	-	9	9							
Heavenly	Heavenly Valley	244	51	295	-	140	140							
Storage	Price Road	59	-	59	-	(28)	(28)	2,500	2	300,000	37,117	337,117	1,050,000	-
	Terrace	13	-	13	-	(6)	(6)							
	Iroquois	383	333	716	-	622	622							
Iroquois Storage	Comanche	8	-	8	-	6	6	2,500	2	300,000	22,572	322,572	530,000	_
ii oquois storage	Ottawa	2	-	2	-	-	-	2,300	2	300,000	22,372	322,372	330,000	_
	Pine Valley	192	43	235	-	188	188							
	Susquehana	60	-	60	-	51	51							
Country Club Storage	Country Club	207	-	207	275	-	275	2,500	2	300,000	-	300,000	345,000	1
Arrowhead Storage	Arrowhead	358	921	1,279	800	400	1,200	2,500	2	300,000	18,936	318,936	1,080,000	-
Christmas Valley Storage	Christmas Valley	377	400	777	1,250	-	1,250	2,500	2	300,000	-	300,000	185,000	115,000
Flagpole	Flagpole	363	55	418	-	322	322		_					
Storage	Mt. Rainier	77	-	77	-	63	63	2,500	2	300,000	23,004	323,004	376,000	-
Angora Highlands Storage	Angora Highlands	40	-	40	-	225	225	1,000	2	120,000	-	120,000	249,000	-
Forest Mountain Storaage	Forest Mountain	21	29	50	-	240	240	1,000	2	120,000	-	120,000	158,000	-
I win Peaks Storage	Twin Peaks	164	44	208	-	476	476	1,000	2	120,000	-	120,000	503,000	-
Gardner Mountain Storage (Note	Conduct Mountain	640	164	900	550	202	938	3.000	2	E40.000	-	540,000	544,440	-
2)	Gardner Mountain	648	161	809		388		3,000	3	540,000				
Stateline Storage	Stateline	8,374	1,378	9,753	6,840	-	6,840	3,000	3	540,000	699,024	1,239,024	3,590,000	-
Montgomery Estates Storage	Montgomery Estates	393	5	398	-	178	178	2,500	2	300,000	52,782	352,782	480,000	-
N/A	H Street	21		21	_	-		1,000	2	,	5,040	125,040	-	125,040
N/A N/A	Upper Montgomery Estates	6		6		(103)	(103)	1,000	2		26,262	146,262	-	146,262
Notes:	Equations for Estimating Day			U	_	(103)	(103)	1,000		120,000	20,202	140,202	-	140,202

[C] = PHD or Peak Hour Demand

[[]D] = "Exported PHD" value represents all of the flow provided to tributary zones as well as flow distributed to other storage areas.

[[]E] = [C] + [D]

[[]G] = Sum of wells, boosters, and PRVs (per Case) feeding a combined zone, plus contingency supplies that would be activated during a fire event. References Wells, Tanks, and PRVs worksheets.

[[]H] = [F] + [G]

^{[1] =} Fire storage required for duration based on Pressure Zone Demand worksheet. The single greatest fire supply requirement for a combined zone (ie., tank zone plus subzones gravity fed by tank) is referenced.

[[]K] = [I] * [J] * 60

[[]L] = 4hr x (PHD-Firm Capacity) where PHD = 1.4 x MDD. References Pressure Zone Demand worksheet for PHD.

[[]M] = [K] + [L]

[[]O] = ([M] - [N]) > 0

^{2.} For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage.

-	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[١]	[K]	[L]	[M]	[N]	[0]
		Dei	mand Summ	ary		Supply Summary		Fir	e Storage Summa	iry				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
	Keller	5	225	231	-	327	327							
	Four Seasons	-	-	-	-	-	-							
	Middle Keller	0	210	210	-	302	302							
Keller Storage	Needle Peak	59	11	70	-	145	145	3,000	3	540,000	-	540,000	331,000	209,000
	Rocky Point	16	-	16	-	103	103							
	Sweeping Turn	220	53	273	-	301	301							
	Upper Saddle	21	-	21	-	22	22							
Heavenly	Heavenly Valley	244	51	295	-	1,250	1,250							
Storage	Price Road	59	-	59	-	42	42	2,500	2	300,000	-	300,000	1,050,000	-
	Terrace	13	-	13	-	9	9							
	Iroquois	383	333	716	-	717	717							
Iroquois Storage	Comanche	8	-	8	-	7	7	2,500	2	300,000	_	300,000	530,000	_
ii oquois storuge	Ottawa	2	-	2	-	-	-	2,500	-	300,000		300,000	330,000	
	Pine Valley	192	43	235	-	239	239							
Country Club	Susquehana	60	-	60	-	102	102							
Country Club Storage	Country Club	207	-	207	275	197	472	2,500	2	300,000	-	300,000	345,000	-
Arrowhead Storage	Arrowhead	358	876	1,234	1,290	-	1,290	2,500	2	300,000	-	300,000	1,080,000	-
Christmas Valley Storage	Christmas Valley	377	-	377	1,250	318	1,568	2,500	2	300,000	-	300,000	185,000	115,000
Flagpole	Flagpole	363	55	418	-	820	820	2,500	2	300,000	_	300,000	376,000	
Storage	Mt. Rainier	77	-	77	-	560	560	2,500	2	300,000	-	300,000	376,000	-
Angora Highlands Storage	Angora Highlands	40	-	40	-	103	103	1,000	2	120,000	-	120,000	249,000	-
Forest Mountain Storaage	Forest Mountain	21	29	50	-	118	118	1,000	2	120,000	-	120,000	158,000	-
Twin Peaks Storage	Twin Peaks	164	358	522	-	1,087	1,087	1,000	2	120,000	-	120,000	503,000	-
Gardner Mountain					550		1,550				-	540,000	544,440	-
Storage (Note 2)	Gardner Mountain	648	475	1,123		1,000		3,000	3	540,000				
Stateline Storage	Stateline	8,374	2,717	11,092	9,864		9,864	3,000	3	540,000	294,672	834,672	3,590,000	-
Montgomery Estates Storage	Montgomery Estates	393	5	398	-	408	408	2,500	2	300,000	-	300,000	480,000	-
N/A	H Street	21	-	21	-	21	21		2	120,000	-	120,000	-	120,000
N/A	Upper Montgomery Estates	6	-	6	_	127	127	1,000	2		-	120,000	_	120,000

Notes: 1. Equations for Estimating Data:

[[]C] = PHD or Peak Hour Demand

[[]D] = "Exported PHD" value represents all of the flow provided to tributary zones as well as flow distributed to other storage areas

[[]G] = Sum of wells, boosters, and PRVs (per Case) feeding a combined zone, plus contingency supplies that would be activated during a fire event. References Wells, Tanks, and PRVs worksheets

[[]H] = [F] + [G]

^{[1] =} Fire storage required for duration based on Pressure Zone Demand worksheet. The single greatest fire supply requirement for a combined zone (ie., tank zone plus subzones gravity fed by tank) is referenced

[[]K] = [I] * [J] * 60

[[]L] = 4hr x (PHD-Firm Capacity) where PHD = 1.4 x MDD. References Pressure Zone Demand worksheet for PHD.

[[]M] = [K] + [L]

[[]O] = ([M] - [N]) > 0

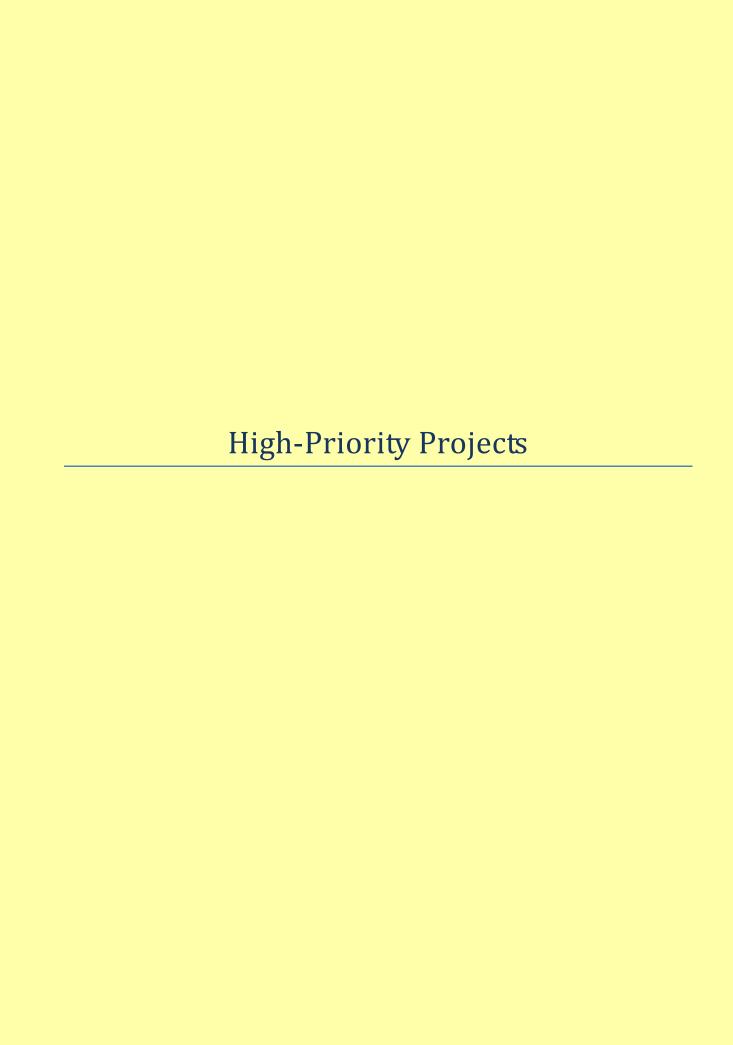
^{2.} For Gardner Mountain assume excess Supply of 1456 gpm - Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage

	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[1]	[١]	[K]	[L]	[M]	[N]	[0]
1	· · · · · · · · · · · · · · · · · · ·	Dei	mand Summ	ary		Supply Summary		Fir	e Storage Summa	ary				
Storage Zone	Zone	PHD	Exported MDD	Total Demand	Zone Supply From Wells	Imported Supply from Adjacent Zones	Total Supply Capacity	Fire Demand	Fire Duration	Fire Volume	Operational Storage Requirement	Total Supply Requirement	Existing Available Storage	Additional Storage Required
		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(hr)	(gal)	(gal)	(gal)	(gal)	(gal)
	Keller	5	225	231	-	201	201							
	Four Seasons	-	-	-	-	-	-							
	Middle Keller	0		210	-	184	184							
	Needle Peak	59	11	70	-	27	27	3,000	3	540,000	7,140	547,140	331,000	216,140
	Rocky Point	16		16	-	(15)	(15)							
	Sweeping Turn	220	53	273	-	184	184							
	Upper Saddle	21	-	21	-	13	13							
	Heavenly Valley	244	51	295	-	1,096	1,096		_					
Storage	Price Road	59	-	59	-	(85)	(85)	2,500	2	300,000	-	300,000	1,050,000	-
<u> </u>	Terrace	13	-	13	-	(18)	(18)							
1	In-access	202	222	71.0	-	377	377							
	Iroquois	383		716 8	_	2								
	Comanche Ottawa	2		2	-		2	2,500	2	300,000	81,359	381,359	530,000	-
	Pine Valley	192		235	-	56	56							
	Susquehana	60		60		(81)	(81)							
Country Club	Susquentiana	00		00		(01)								
	Country Club	207	-	207	275	46	321	2,500	2	300,000	-	300,000	345,000	-
Arrowhead								,		,				
	Arrowhead	358	876	1,234	800	-	800	2,500	2	300,000	104,064	404,064	1,080,000	-
Christmas					1 350		1 117					300,000	105.000	115 000
Valley Storage	Christmas Valley	377	-	377	1,250	167	1,417	2,500	2	300,000	-	300,000	185,000	115,000
Flagpole	Flagpole	363	55	418	-	696	696	2,500	2	300,000	_	300,000	376,000	
	Mt. Rainier	77	-	77	-	436	436	2,500	2	300,000	-	300,000	376,000	-
Angora														
Highlands					-		82				-	120,000	249,000	-
	Angora Highlands	40	-	40		82		1,000	2	120,000				
Forest														
Mountain	F	24	20		-	0.5	96			120.000	-	120,000	158,000	-
Storaage	Forest Mountain	21	29	50		96		1,000	2	120,000				
Twin Peaks					_		910				_	120,000	503,000	_
Storage	Twin Peaks	164	358	522		910	510	1,000	2	120,000		120,000	303,000	_
Gardner														
Mountain							4 272					E40.000	F44 440	
Storage (Note					550		1,372				-	540,000	544,440	-
2)	Gardner Mountain	648	475	1,123		822		3,000	3	540,000				
Stateline					0.354		0.354				654 673	1 104 673	3.500.000	
Storage	Stateline	8,374	2,717	11,092	8,364		8,364	3,000	3	540,000	654,672	1,194,672	3,590,000	
1														
Montgomery					-		250	1			35,396	335,396	480,000	-
Estates Storage	Montgomery Estates	393	5	398		250		2,500	2	300,000				
N/A	H Street	21	-	21	-	13	13	1,000	2	120,000	1,884	121,884	-	121,884
N/A	Upper Montgomery Estates	6	-	6	-	(31)	(31)	1,000	2	120,000	8,876	128,876	-	128,876

- Notes: 1. Equations for Estimating Data:
 - [C] = PHD or Peak Hour Demand
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 - [E] = [C] + [D]
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 - [H] = [F] + [G]
 - [1] = Fire storage required for duration based on Pressure Zone Demand worksheet. The single greatest fire supply requirement for a combined zone (ie., tank zone plus subzones gravity fed by tank) is referenced.
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 - [M] = [K] + [L]
 - [O] = ([M] [N]) > 0
 - 2. For Gardner Mountain assume excess Supply of 1456 gpm Demand of 648 gpm = 808 gpm available for fire supply over 3 hours. This provides 145,440 gallons of storage over 3 hours for fire storage.



Cost Estimates



KENNEDY/JENKS CONSULTANTS

Prepared By: Date Updated: RH/NR 17-Feb-15 K/J Proj. No.: 1270004*00

TW

Date Reviewed: 17-Feb-15

	Project A (HIGH PRIORITY)
Project:	STPUD Water System Optimization Plan

ITEM		TM 1 SECTION/PAGE NUMBER OR TM 4 PROJECT NUMBER			(2)		RECOMMENDED IMPLEMENTATION	
NO. ⁽¹⁾	PROJECT NAME	REFERENCE	BENEFITS OF THIS PROJECT	SITE	TOTAL ⁽²⁾	DEPT	FISCAL YEAR	NOTES
A1	Critical Waterline Evaluation	TM 1: Section 5.5, pg 1-16	Determine condition of critical pipelines to determine remaining useful life and replacement/rehab needed to extend the useful life of these critical assets	Airport Runway/Trout Creek/UTR Meyer Crossing/Keller Discharge/David Lane Discharge	\$ 105,00) Engineering	13/14	
A2	Water Supply to the Y - Engineering Study	TM 4: 33 to 36	Determine the optimal improvements required to improve reliable water service west of the Upper Truckee River Bridge in the Stateline and Gardner Mountain zones.	Upper Truckee River Crossing	\$ 42,00) Engineering	13/14	
A3	H-Street Booster Station Improvements	TM 4: 9	Improve reliability and redudancy of pressure zone to provide emergency water service	H Street Booster PS	\$ 104,00	Engineering	16/17	
A4	Site Drainage and BMP Improvements	TM 1: Section 4.1, Table 7 and Section 4.2, Table 8	Implement site drainage improvements to protect Lake Tahoe water quality	MULTIPLE	\$ 348.00	Engineering / Pumps /URW	13/14	
A5	Mountain View Well Abandonment	TM 1: Section 4.2, Table 8	Abandon existing well to protect groundwater basin from surface water contamination because of poor well sanitary seal	Mountain View Well	\$ 218,00	D Engineering	14/15	Project completed by District late summer 2014
A6	Chemical Safety Improvements at Well Buildings	TM 1: Section 4.2, Table 8	Prevent spillage of sodium hypochlorite to protect workers and the environment	MULTIPLE	\$ 20,00) Pumps	14/15	
A7	Arcflash Assessment Wells and Booster Stations	TM 1: Section 4.1, Table 7 and Section 4.2, Table 8	Electrical Safety and Reliability Improvements	MULTIPLE	\$ 233,00	Engineering / Electrical	21/22	
	PRV Replacement and Reliability Improvements	,	Improve access, security, extend useful life of the PRV, add redundancy, and improve operations of PRVs	MULTIPLE		Engineering / Pumps	21/22 (18%) & 22/23 (82%)	18% of the project completed in FY 21/22 and 82% of the project completed in FY 22/23
A9a	Keller Tank Alternatives - Engineering Study	TM 4: 11 to 19	Determine the preferred alternative to correct storage shortage by providing additional storage of 0.24 MG and fire protection for the Keller, Upper Saddle, and Sweeping Turn zones by evaluating Projects 9B, 9C, and 9D.	Keller Zone, Upper Saddle Zone, Sweeping Turn Zone, Middle Keller, Needle Peak, Rocky Point	\$ 79,00) Engineering/Pumps	14/15	
A9b	Keller Booster Station Relocation	TM 4 ⁽³⁾ :11 to 19	Corrects a shortage of storage and fire flow for these multiple zones	Keller Zone, Upper Saddle Zone, Sweeping Turn Zone	\$ 1,861,00	Engineering / Pumps	14/15, 16/17 & 17/18	Not used for budget planning
A9c	Keller Tanks Relocation	TM 1/TM 4 ⁽³⁾ : Project 20, Alternative for projects 11 to 19	Corrects a shortage of storage and fire flow for these multiple zones	Keller Tank	\$ 3,125,00	Engineering / Pumps	14/15	(serves same purpose as Alt A9a & A9c). Used in budget planning purposes
A9d	Keller Tanks Replacement	TM 1/TM 4 ⁽³⁾ : Project 20, Alternative for projects 11 to 19	Corrects a shortage of storage and fire flow for these multiple zones	Keller Tank	\$ 1,778,00	D Engineering / Pumps	14/15	(serves same purpose as Alt A9A & A9B). Not used in budget planning purposes
	Tank Access and Site Improvements	TM 1: Section 4.4, Table 10	Improve access, protection from fire, and minimize impacts from runoff to Lake Tahoe water quality	MULTIPLE	\$ 444,00	Engineering / Pumps / URW	16/17	
Δ10								
A10 A11	Tank Seismic Improvements	TM 1: Section 4.4, Table 10	Extend useful life and enhance tank protection from earthquake damage	MULTIPLE	\$ 137,00	Engineering / Pumps	16/17	
						Engineering / Pumps		
A11 A12	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures	MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone)	\$ 137,00 \$ 53,00 \$ 118,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15	Project completed by District late summer 2014
A11 A12	Tank Seismic Improvements Well Inspections	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy,	MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to	\$ 137,00 \$ 53,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15	
A11 A12	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational	MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trall & Norma Drive MULTIPLE	\$ 137,00 \$ 53,00 \$ 118,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15	
A11 A12 A13 A14	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Ploneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended	MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 26,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18	District late summer 2014
A11 A12 A13 A14	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time.	MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 26,00 \$ 122,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 14/15 17/18	District late summer 2014 42% of the project completed in FY 17/18 and
A11 A12 A13 A14 A15 A16	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Eliks Club Dr to Busch Way Washoan Bivd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 26,00 \$ 122,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18 15/16 17/18 17/18 (42%) and 18/19	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improves fire protection and redundancy	MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 26,00 \$ 122,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18 15/16 17/18 17/18 (42%) and 18/19 (58%)	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16 A17	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improves fire protection and redundancy Improve fire flow and service redundancy	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 122,00 \$ 1,356,00 \$ 118,00 \$ 118,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18 15/16 17/18 17/18 (42%) and 18/19 (58%) 17/18	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16 A17 A18 A19	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improves fire protection and redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during emergency and shut-down conditions to improve reliability of service	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club)	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 122,00 \$ 1,356,00 \$ 118,00 \$ 118,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18 15/16 17/18 17/18 17/18 (42%) and 18/19 (58%) 17/18	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16 A17 A18 A19 A20	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering Study	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3 TM 4: 3	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improves fire protection and redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club) Stateline Zone	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 26,00 \$ 1,356,00 \$ 118,00 \$ 79,00 \$ 26,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18 15/16 17/18 17/18 (42%) and 18/19 (58%) 17/18 17/18	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering Study Critical Valve Assessment SCADA Improvements	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3 TM 1/TM 4: 37 TM 1: 60 TM 4: 55	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improve fire flow and service redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during emergency and shut-down conditions to improve reliability of service Improves data to develop diurnal curve to improve hydraulic model tool and enhance operations of water system Improve hydraulic model with actual data will improve future optimization of the	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club) Stateline Zone MULTIPLE MULTIPLE	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 122,00 \$ 1,356,00 \$ 118,00 \$ 79,00 \$ 26,00 \$ 118,00 \$ 118,00 \$ 118,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18 15/16 17/18 17/18 (42%) and 18/19 (58%) 17/18 17/18 22/23 18/19	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16 A17 A18 A19 A20	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering Study Critical Valve Assessment	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3 TM 1/TM 4: 37 TM 1: 60	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improve fire flow and service redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during emergency and shut-down conditions to improve reliability of service Improves data to develop diurnal curve to improve hydraulic model tool and enhance operations of water system Improve hydraulic model with actual data will improve future optimization of the water system evaluations	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club) Stateline Zone MULTIPLE	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 122,00 \$ 1,356,00 \$ 118,00 \$ 79,00 \$ 26,00 \$ 11,00 \$ 11,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18 15/16 17/18 17/18 (42%) and 18/19 (58%) 17/18 17/18 22/23	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering Study Critical Valve Assessment SCADA Improvements Water Model Demand Allocation Improvements	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3 TM 1/TM 4: 37 TM 1: 60 TM 4: 55 TM 4: 56	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improve fire flow and service redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during emergency and shut-down conditions to improve reliability of service Improves data to develop diurnal curve to improve hydraulic model tool and enhance operations of water system Improve hydraulic model with actual data will improve future optimization of the water system evaluations Improves fre flow and redundancy Determine optimal pressure zone configuration to improve areas that experience low pressure and improve other areas that experience high pressures that exceed the District's LOS standards	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Bird & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club) Stateline Zone MULTIPLE MULTIPLE MULTIPLE MULTIPLE	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 122,00 \$ 1,356,00 \$ 118,00 \$ 79,00 \$ 26,00 \$ 11,00 \$ 11,00 \$ 11,00	D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 17/18 15/16 17/18 17/18 17/18 (42%) and 18/19 (58%) 17/18 22/23 18/19 18/19	District late summer 2014 42% of the project completed in FY 17/18 and 55% of the project
A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering Study Critical Valve Assessment SCADA Improvements Water Model Demand Allocation Improvements Pine Valley - Susquehanna Waterline Montgomery Estates Zone Evaluation - Engineering Study Fire Flow Calibration Testing	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 39 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3 TM 1/TM 4: 37 TM 1: 60 TM 4: 55 TM 4: 56 TM 4: 27, 28, & 29	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improves fire protection and redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during emercency and shut-down conditions to improve reliability of service Improves hydraulic model with actual data will improve during condense to improve hydraulic model tool and enhance operations of water system Improves fire flow and redundancy Determine optimal pressure zone configuration to improve areas that experience low pressure and improve other areas that experience high	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club) Stateline Zone MULTIPLE MULTIPLE MULTIPLE MULTIPLE Pine Valley & Susquehanna Zones Montgomery Estates and Upper Montgomery Estates	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 122,00 \$ 1,356,00 \$ 118,00 \$ 79,00 \$ 26,00 \$ 11,00 \$ 11,00 \$ 11,00	D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 14/15 17/18 15/16 17/18 17/18 17/18 17/18 17/18 17/18 17/18 17/18 17/18 18/19 18/19 18/19 17/18	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering Study Critical Valve Assessment SCADA Improvements Water Model Demand Allocation Improvements Pine Valley - Susquehanna Waterline Montgomery Estates Zone Evaluation - Engineering Study	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3 TM 1/TM 4: 37 TM 1: 60 TM 4: 55 TM 4: 55 TM 4: 56 TM 4: 27, 28, 8, 29 TM 4: 23 8, 24	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improve fire flow and service redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during emeraency and shut-down conditions to improve reliability of service Improves data to develop diurnal curve to improve hydraulic model tool and enhance operations of water system Improve hydraulic model with actual data will improve future optimization of the water system evaluations Improves fre flow and redundancy Determine optimal pressure zone configuration to improve areas that experience high pressures that exceed the District's LOS standards Improve the hydraulic model tool to enhance predictability and reliability of predicting fire flow capabilities	MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Eliks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club) Stateline Zone MULTIPLE MULTIPLE MULTIPLE MULTIPLE Pine Valley & Susquehanna Zones Montgomery Estates and Upper Montgomery Estates Zones	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 122,00 \$ 1,356,00 \$ 118,00 \$ 79,00 \$ 26,00 \$ 110,00 \$ 11,00 \$ 258,00 \$ 53,00	D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 14/15 17/18 15/16 17/18 17/18 17/18 17/18 17/18 22/23 18/19 18/19 18/19 17/18	District late summer 2014 42% of the project completed in FY 17/18 and 58% of the project
A11 A12 A13 A14 A15 A16 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 A26	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering Study Critical Valve Assessment SCADA Improvements Water Model Demand Allocation Improvements Pine Valley - Susquehanna Waterline Montgomery Estates Zone Evaluation - Engineering Study Fire Flow Calibration Testing Fire Hydrants on 4-inch Waterlines - Engineering Study Cornelian Fire Pump and Waterline Installation	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3 TM 1/TM 4: 37 TM 1: 60 TM 4: 55 TM 4: 55 TM 4: 55 TM 4: 56 TM 4: 27, 28, & 29 TM 4: 57	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improve fire flow and service redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during emeraency and shut-down conditions to improve reliability of service Improves data to develop diurnal curve to improve hydraulic model tool and enhance operations of water system Improve hydraulic model with actual data will improve future optimization of the water system evaluations Improves fre flow and redundancy Determine optimal pressure zone configuration to improve areas that experience high pressures that exceed the District's LOS standards Improve the hydraulic model tool to enhance predictability and reliability of predicting fire flow capabilities	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club) Stateline Zone MULTIPLE MULTIPLE MULTIPLE MULTIPLE MOULTIPLE	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 26,00 \$ 1,356,00 \$ 118,00 \$ 118,00 \$ 11,00 \$ 258,00 \$ 11,00 \$ 21,00	D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 14/15 17/18 15/16 17/18 17/18 17/18 17/18 22/23 18/19 18/19 18/19 17/18 15/16 15/16	District late summer 2014 42% of the project completed in FY 17/18 and 55% of the project
A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 A26 A27	Tank Seismic Improvements Well Inspections Crest-Bonita PRV Installation Pioneer-Norma Check Valve Installation Forest Fire Capability Assessment - Engineering Study Pioneer-Busch PRV Installation Pioneer Trail Waterline Installation Washoan-Nadowa PRV Installation Glen Eagle PRV Installation Glen Eagle PRV Installation Water Supply to Stateline Zone - Engineering Study Critical Valve Assessment SCADA Improvements Water Model Demand Allocation Improvements Pine Valley - Susquehanna Waterline Montgomery Estates Zone Evaluation - Engineering Study Fire Flow Calibration Testing Fire Hydrants on 4-inch Waterlines - Engineering Study	TM 1: Section 4.4, Table 10 TM 1: Section 4.2, Table 8 TM 4: 38 TM 4: 30 TM 4: 59 TM 1/TM 4: 25 TM 4: 26 TM 4: 2 TM 4: 3 TM 1/TM 4: 37 TM 1: 60 TM 4: 55 TM 4: 56 TM 4: 27, 28, & 29 TM 4: 23 & 24 TM 4: 58	Extend useful life and enhance tank protection from earthquake damage Extend useful life of Palolma and Sunset Well assets Provides a redundant supply connection that will improve reliability, redudnacy, fire flow and pressures Enhances fire flow service and improves redundancy Evaluate existing water system performance and identify operational procedures and system improvements to increase fire flows for extended periods of time. Improve reliability and redundancy and provide improved fire flows Improves fire protection and redundancy Improve fire flow and service redundancy Improve fire flow and service redundancy Determine preferred alternative to correct supply capacity shortfall Correct "panhandle areas" and non-valved areas that are vulnerable during emergency and shut-down conditions to improve reliability of service Improves data to develop diurnal curve to improve hydraulic model tool and enhance operations of water system Improves hydraulic model with actual data will improve future optimization of the water system evaluations Improves fire flow and redundancy Determine optimal pressure zone configuration to improve areas that experience high pressures that exceed the District's LOS standards Improve the hydraulic model tool to enhance predictability and reliability of predicting fire flow capabilities Improve fire protection and life safety for the community served by the District	MULTIPLE MULTIPLE MULTIPLE Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone) Pioneer Trail & Norma Drive MULTIPLE Pioneer Trail & Busch Way (Iroquois to Pine Valley zone) Pioneer Trail from Elks Club Dr to Busch Way Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club) Stateline Zone MULTIPLE MULTIPLE MULTIPLE Pine Valley & Susquehanna Zones Montgomery Estates and Upper Montgomery Estates Zones MULTIPLE	\$ 137,00 \$ 53,00 \$ 118,00 \$ 122,00 \$ 26,00 \$ 1,356,00 \$ 118,00 \$ 118,00 \$ 11,00 \$ 258,00 \$ 11,00 \$ 21,00	D Engineering / Pumps D Engineering / Pumps	16/17 14/15 14/15 14/15 17/18 15/16 17/18 17/18 17/18 17/18 17/18 22/23 18/19 18/19 18/19 18/19 15/16 15/16	District late summer 2014 42% of the project completed in FY 17/18 and 55% of the project

NOTE:

Total High-Priority Projects⁽³⁾ \$ 11,000,000

⁽¹⁾ Project-number designations do not necessarily reflect the sequence or priority of implementation
(2) Total Project Cost Estimates are based on JULY 1, 2014 costs and **are not** escalated to the recommended implementation year.

⁽³⁾ Projects A9c was used in the Total Project Cost determination and Projects A9b and A9d are not used in determining the Total Project Cost

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

Item No: A1

Project Name: Critical Waterline Evaluation

Prepared By: RH/NR
Updated: 17-Feb-15

Site: Airport Runway/Trout Creek/UTR Meyer Crossing/Keller Discharge/David Lane Discharge

General Description: Pipeline Evaluation

Benefits of this Project: Determine condition of critical pipelines to determine remaining useful life and replacement/rehab needed to extend the useful life of these

critical assets

Item No.	ITEM DESCRIPTION		TOTAL
	ENGINEERING STUDY TO ESTABLISH THE REMAINING USEFUL LIFE OF CRITICAL PIPELINES	\$	100,000
	LIFE OF CRITICAL PIPELINES	Ф	100,000
	Subtotals	\$	100,000

 K/J Proj. No.:
 1270004*00

 Reviewed By:
 TW

 Date Reviewed:
 17-Feb-15

ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

Subtotals	\$ 100,000	
	\$ -	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 100,000	
	\$ -	Contractor OH&P
Subtotal	\$ 100,000	
	\$ -	Estimate Contingency
Total Construction	\$ 100,000	
	\$ -	Engineering & CM
	\$ -	Administration/Permitting
	\$ 100,000	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 105,000	Escalation Factor

105,000

Total Project \$

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1270004*00 TW 17-Feb-15 10,366.54 10,897.59 1.05

STPUD Water System Optimization Plan Item No: A2

42,000 Escalation Factor

42,000

Prepared By: NR/RH Updated: 17-Feb-15

Project Name: Water Supply to the Y - Engineering Study Site: Upper Truckee River Crossing

General Description: Water-to-Y Engineering Study

Benefits of this Project: Determine the optimal improvements required to improve reliable water service west of the Upper Truckee River Bridge in the Stateline and

	Gardner Mountain zones.		K/J Proj. No.: 1
Item No.	ITEM DESCRIPTION	TOTAL	Reviewed By:
	ENGINEERING STUDY	\$ 40,000	Date Reviewed:
			ENR Index Jul 2012:
			ENR Index Jul 2014:
			Escalation Factor:
	Subtotals	\$ 40,000	
		\$ -	Sales tax on materials (materials cost = 33% of total cost)
	Subtotal	\$ 40,000	
		\$ -	Contractor OH&P
	Subtotal	\$ 40,000	
		\$ -	Estimate Contingency
	Total Construction	\$ 40,000	
		\$ -	Engineering & CM
		\$ -	Administration/Permitting
		\$ 40,000	Subtotal Total Construction; Engr & CM and Admin/Permitting

Total Project \$

Item No: A3

Project Name: H-Street Booster Station Improvements

Site: H Street Booster PS

General Description: Add new check valve around pump station to supply H-Street Zone w/o pumping

Benefits of this Project: Improve reliability and redudancy of pressure zone to provide emergency water service

Item No.	ITEM DESCRIPTION	TOTAL
	8" check valve	\$ 2,000
	Valve Vault Traffic Rated	\$ 20,000
	Piping	\$ 7,000
	Cut and Patch AC	\$ 5,000
	Traffic Control	\$ 2,000
	Locking Hatch	\$ 2,000
	Isolation Valve x 2	\$ 4,000
	Pressure Gauges	\$ 2,000
	Flowmeter	\$ 3,000
	Pipe Supports	\$ 1,000

Subtotals \$ 48,000 7.75% \$ 1,239 Sales tax on materials (materials cost = 33% of total cost) 49,239 Subtotal \$ 15% \$ 7,386 Contractor OH&P 56,625 Subtotal \$ 30% \$ 16,987 Estimate Contingency Total Construction \$ 73,612 25% \$ 18,403 Engineering & CM 10% \$ 7,361 Administration/Permitting \$ 99,376 Subtotal Total Construction; Engr & CM and Admin/Permitting

104,000 Escalation Factor

Total Project \$ 104,000

STPUD Water System Optimization Plan

Prepared By: NR/RH

KENNEDY/JENKS CONSULTANTS

Updated: 17-Feb-15

1270004*00 K/J Proj. No.:

Reviewed By: TW Date Reviewed: 17-Feb-15

ENR Index Jul 2012: 10.366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

Item No: A

Project Name: Site Drainage and BMP Improvements

Site: MULTIPLE

General Description: Site Drainage Improvements (mandatory BMPs)

Benefits of this Project: Implement site drainage improvements to protect Lake Tahoe water

	ıa	

Item No.	ITEM DESCRIPTION		TOTAL
	CLEAR VEGETATION & OTHER BMPS		
1	AIRPORT BOOSTER	\$	1,000
2	BLACK BART BOOSTER	\$	15,000
3	BOULDER MOUNTAIN BOOSTER	\$	1,000
4	COLD CREEK TANK BOOSTER	\$	40,000
5	CORNEILIAN BOOSTER	\$	1,000
6	DAVID LANE BOOSTER	\$	10,000
7	FLAGPOLE BOOSTER	\$	1,000
8	H STREET BOOSTER	\$	40,000
9	KELLER BOOSTER	\$	10,000
10	SOUTH APACHE BOOSTER	\$	6,000
	IMPROVE SITE DRAINAGE & OTHER BMPS		
1	AIRPORT WELL (OFFLINE)	\$	10,000
2	AL TAHOE NO. 2	\$	1,000
3	BAKERSFIELD WELL	\$	1,000
4	BAYVIEW WELL	\$	1,000
5	BLACKROCK NO. 2 (OFFLINE)	\$	10,000
6	CHRIS WELL (OFFLINE)	\$	10,000
7	CLEMENT WELL (OFFLINE)	\$	15,000
8	COLLEGE WELL (OFFLINE - URANIUM)	\$	10,000
9	ELKS CLUB NO. 2	\$	1,000
10	GLENWOOD WELL NO. 5	\$	1,000
11	HELEN WELL NO. 2	\$	20,000
12	MARTIN WELL (OFFLINE - IRON/MANGANESE)	\$	40,000
13	MOUNTAIN VIEW WELL	\$	40,000
14	PALOMA WELL	\$	1,000
15	SUNSET WELL	\$	5,000
16	TATA WELL NO. 1 (OFFLINE - ARSENIC)	\$	40,000
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STPUD Water System Optimization Plan Prepared By: NR/RH

Updated: 17-Feb-15

K/J Proj. No.: 1270004*00
Reviewed By: TW

Date Reviewed: 17-Feb-15

ENR Index Jul 2012: 10,366.54

10,897.59

Escalation Factor: 1.05

Note: markups for sales tax on materials, contractor OH&P, estimated contingency, engineering & CM, and administration/permitting are included in the cost listed for each line item

ENR Index Jul 2014:

Subtotals \$ 331,000

7.75% Sales tax on materials (materials cost = 33% of total cost)

Subtotal \$ 331,000

15% Contractor OH&P

Subtotal \$ 331,000 30% Estimate Contingency

Total Construction \$ 331,000 25% 10%

Engineering & CM Administration/Permitting

\$ 331,000 Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 348.000 Escalation Factor

Total Project \$ 348.000

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10,366.54

10,897.59 1.05

STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014:

Escalation Factor:

Updated:

Item No: A5 Project Name: Mountain View Well Abandonment

Site: Mountain View Well

General Description: Groundwater Protection

Benefits of this Project: Abandon existing well to protect groundwater basin from surface water contamination because of poor well sanitary seal

	contamination because of poor well samilary sear
ltem No.	

Item No.		TOTAL
	Abandon Well	\$ 100,000

Subtotals	\$ 100,000	•
7.75%	\$ 2,581	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 102,581	
15%	\$ 15,387	Contractor OH&P
Subtotal	\$ 117,968	
30%	\$ 35,390	Estimate Contingency
Total Construction	\$ 153,358	
25%	\$ 38,340	Engineering & CM
10%	\$ 15,336	Administration/Permitting
	\$ 207,034	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 218,000	Escalation Factor
Total Project	\$ 218,000	

NOTE: PROJECT COMPLETED BY DISTRICT IN LATE SUMMER OF 2014

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10,897.59

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014:

Escalation Factor:

Updated:

Item No: A6

Project Name: Chemical Safety Improvements at Well Buildings

Site: MULTIPLE

General Description: Safety Improvements

Benefits of this Project: Prevent spillage of sodium hypochlorite to protect workers and the

environment

Item No.	ITEM DESCRIPTION	T	OTAL
	PROVIDE SPILL SKID FOR SODIUM HYPOCHLORITE DRUM(S)		
	AL TAHOE NO. 2	\$	1,000
	ARROWHEAD WELL NO. 3	\$	1,000
	ELKS CLUB NO. 2	\$	1,000
	GLENWOOD WELL NO. 5	\$	1,000
	HELEN WELL NO. 2	\$	1,000
	MOUNTAIN VIEW WELL	\$	1,000
	PALOMA WELL	\$	1,000
	SUNSET WELL	\$	1,000
	VALHALLA WELL	\$	1,000

	<u> </u>		
Subtotals	\$	9,000	
7.75%	\$	232	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$	9,232	
15%	\$	1,385	Contractor OH&P
Subtotal	\$	10,617	
30%	\$	3,185	Estimate Contingency
Total Construction	\$	13,802	
25%	\$	3,451	Engineering & CM
10%	\$	1,380	Administration/Permitting
	\$	18,633	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$	20,000	Escalation Factor
Total Project	\$	20,000	

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17-Feb-15

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17-Feb-15 10,366.54

10,897.59 1.05

STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Updated:

Item No: A7

Project Name: Arcflash Assessment Wells and Booster Stations

Site: MULTIPLE

General Description: Perform ARC-FLASH study improve emergency generator facilities, and useful life evaluation of electrical equipment

Benefits of this Project: Electrical Safety and Reliability Improvements

Item No.	ITEM DESCRIPTION	Т	OTAL
	PERFORM ARC-FLASH STUDY		
	GRIZZLY MOUNTAIN BOOSTER	\$	2,000
	ONEEET MOONTAIN BOOCTER		2,000
	NORTH APACHE BOOSTER	\$	2,000
	TWIN PEAKS BOOSTER	\$	2,000
	PROVIDE PIN-AND-SLEEVE SOCKET AND MANUAL TRANSFER SWITCH		
	HELEN WELL NO. 2	\$	4,000
	MOUNTAIN VIEW WELL	\$	4,000
	PALOMA WELL	\$	7,000
	SUNSET WELL	\$	4,000
	BOULDER MOUNTAIN BOOSTER	\$	4,000
	H STREET BOOSTER	\$	4,000
	TATA BOOSTER	\$	4,000
	EVALUATE PHYSICAL MORTALITY OF ELECTRICAL GEAR		5.000
	AL TAHOE NO. 2	\$	5,000
	HELEN WELL NO. 2		5,000
	MOUNTAIN VIEW WELL	\$	5,000
	SUNSET WELL	\$ \$	5,000
	VALHALLA WELL	\$	5,000
	BLACK BART BOOSTER		5,000
	BOULDER MOUNTAIN BOOSTER	\$	5,000
	COLD CREEK TANK BOOSTER	\$	5,000
	DAVID LANE BOOSTER		5,000
	FLAGPOLE BOOSTER	\$	5,000
	FOREST MOUNTAIN BOOSTER	\$ \$	5,000
	KELLER BOOSTER		5,000
	SOUTH APACHE BOOSTER	\$	5,000
	TATA BOOSTER	\$	5,000

ability improvements		100110,.10
ITEM DESCRIPTION	TOTAL	Reviewed By:
STUDY		Date Reviewed:
		7
OOSTER	\$ 2,00	ENR Index Jul 2012:
TER	\$ 2,00	ENR Index Jul 2014:
₹	\$ 2,00	Escalation Factor:
EVE SOCKET AND MANUAL TRANSFER SWITCH		
	\$ 4,00	
-	\$ 4,00	
	\$ 7,00	
	\$ 4,00	
BOOSTER	\$ 4,00	
	\$ 4,00	
	\$ 4,00	<u>) </u>
MORTALITY OF ELECTRICAL GEAR		_
	\$ 5,00	
	\$ 5,00	
-	\$ 5,00	<u>) </u>
	\$ 5,00	<u>) </u>
	\$ 5,00	<u>)</u>
₹	\$ 5,00)
BOOSTER	\$ 5,00	
OSTER	\$ 5,00	
	\$ 5,00	
	\$ 5,00	
OOSTER	\$ 5,00	
	\$ 5,00	
TER	\$ 5,00	
	\$ 5,00	
		1

Subtotals	\$ 107,000	
7.75%	\$ 2,761	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 109,761	
15%	\$ 16,464	Contractor OH&P
Subtotal	\$ 126,226	
30%	\$ 37,868	Estimate Contingency
Total Construction	\$ 164,093	
25%	\$ 41,023	Engineering & CM
10%	\$ 16,409	Administration/Permitting
	\$ 221,526	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 233,000	Escalation Factor
Total Project	\$ 233,000	

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Item No: A8

Project Name: PRV Replacement and Reliability Improvements

Site: MULTIPLE

General Description: PRV Improvements

Benefits of this Project: Improve access, security, extend useful life of the PRV, add redundancy, and improve

operations of PRVs

STPUD Water System Optimization Plan Prepared By: NR/RH 17-Feb-15 Updated:

K/J Proj. No.: 1270004*00 Reviewed By: TW **Date Reviewed:**

17-Feb-15

ENR Index Jul

2014: 10,897.59 Factor: 1.05

Item No.	ITEM DESCRIPTION		TOTAL
	CONSTRUCT/RELOCATE TRAFFIC RATED VAULT & PIPING, PATCH AC, TRAFFIC CONTROL		
	COUNTRY CLUB	\$	34,000
		+	
	KELLER NO. 3	\$	34,000
	OVERLOOK	\$	34,000
	PIONEER NO. 2	\$	34,000
	PIONEER NO. 1	\$	34,000
	SADDLE NO. 3	\$	34,000
	INSTALL TWO PRV 8" FIREFLOW AND 6" DOMESTIC	Φ.	40.000
	COUNTRY CLUB	\$	18,000
	KELLER NO. 3	\$	18,000
	OVERLOOK	\$	18,000
	PIONEER NO. 2	\$	18,000
	PIONEER NO. 1	\$	18,000
	SADDLE NO. 3	\$	18,000
	INSTALL LOCKING HATCH		
	COUNTRY CLUB	\$	2,000
	KELLER NO. 3	\$	2,000
	OVERLOOK	\$	2,000
	PIONEER NO. 2	\$	2,000
	PIONEER NO. 1	\$	2,000
	SADDLE NO. 3	\$	2,000
	INSTALL ISOLATION VALVES		
	COUNTRY CLUB	\$	4,000
	KELLER NO. 3	\$	4,000
	OVERLOOK	\$	4,000
	PIONEER NO. 2	\$	4,000
	PIONEER NO. 1	\$	4,000
	SADDLE NO. 3	\$	4,000
	INSTALL PRESSURE GAGES		
	COUNTRY CLUB	\$	2,000
	KELLER NO. 3	\$	2,000
	OVERLOOK	\$	2,000
	PIONEER NO. 2	\$	2,000
	PIONEER NO. 1	\$	2,000
	SADDLE NO. 3	\$	2,000
	INSTALL FLOWMETER		
	COUNTRY CLUB	\$	3,000
	KELLER NO. 3	\$	3,000
	OVERLOOK	\$	3,000
	PIONEER NO. 2	\$	3,000
	PIONEER NO. 1	\$	3,000
	SADDLE NO. 3	\$	3,000
	INSTALL PIPE SUPPORTS		
	COUNTRY CLUB	\$	1,000
	KELLER NO. 3	\$	1,000
	OVERLOOK	\$	1,000
	PIONEER NO. 2	\$	1,000
	PIONEER NO. 1	\$	1,000
	SADDLE NO. 3	\$	1,000
	5	Ť	.,

Subtotals \$ 384,000 7.75% \$ Sales tax on materials (materials cost = 33% 9,910 of total cost) 393,910 Subtotal \$ 15% \$ 59,087 Contractor OH&P Subtotal \$ 452,997 30% \$ 135,899 Estimate Contingency **Total Construction \$** 588,896 147,224 Engineering & CM 25% \$ 10% \$ 58,890 Administration/Permitting Subtotal Total Construction; Engr & CM and \$ 795,009 Admin/Permitting 836,000 Escalation Factor \$

836,000

Total Project \$

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STPUD Water System Optimization Plan

Item No: A9a

Project Name: Keller Tank Alternatives - Engineering Study

Site: Keller Zone, Upper Saddle Zone, Sweeping Turn Zone, Middle Keller, Needle Peak, Rocky Point

General Description: Storage and Fire Protection

Benefits of this Project: Determine the preferred alternative to correct storage shortage by

providing additional storage of 0.24 MG and fire protection for the Keller, Upper Saddle, and Sweeping Turn zones by evaluating Projects 9B, 9C,

K/J Proj. No.: 12

1270004*00

Reviewed By: Date Reviewed:

Prepared By:

Updated:

TW 17-Feb-15

RH

17-Feb-15

ENR Index Jul 2012: ENR Index Jul 2014: 10,366.54 10,897.59

Escalation Factor:

1.05

Keller Zone Optimization

Item No.	ITEM DESCRIPTION	TOTAL
	ENGINEERING STUDY	\$ 75,000

Subtotals	\$	75,000	•
	\$	-	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$	75,000	
	\$	-	Contractor OH&P
Subtotal	\$	75,000	
	\$	-	Estimate Contingency
Total Construction	\$	75,000	
	\$	-	Engineering & CM
	\$	-	Administration/Permitting
	\$	75,000	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$	79,000	Escalation Factor
	Subtotal Subtotal	Subtotal \$ Subtotal \$ Subtotal \$ Total Construction \$	\$ - Subtotal \$ 75,000 \$ - Subtotal \$ 75,000 \$ - Total Construction \$ 75,000 \$ - \$ - \$ - \$ 75,000

Total Project \$ 79,000

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17-Feb-15

1270004*00

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17-Feb-15

10,366.54

10,897.59

1.05

Updated:

K/J Proj. No.:

Reviewed By:

Item No: A9b STPUD Water System Optimization Plan Project Name: Keller Booster Station Relocation Prepared By: NR/RH

Site: Keller Zone, Upper Saddle Zone, Sweeping Turn Zone

General Description: Replace existing Keller Booster and tanks w/ new pump station @ Heavenly tank site

Benefits of this Project: Corrects a shortage of storage and fire flow for these multiple zones

Keller Zone Optimization

Item No.	ITEM DESCRIPTION	TOTAL	Date Reviewed:
	demolish 2 tanks	\$ 20,000	ENR Index Jul 2012:
	1000 gpm fire pump	\$ 80,000	ENR Index Jul 2014:
	3 domestic water pumps (115 gpm/pump @ 15 hp ea)	\$ 54,000	Escalation Factor:
	wood framed building	\$ 100,000	T actor.
	site work	\$ 50,000	
	100 LF X 10" pipeline	\$ 22,000	
	add isolation valves	\$ 4,000	
	abandon 2800 LF 6"	\$ 1,000	
	remove Keller PRV Nos. 2 & 3 from service	\$ 1,000	
	2800 LF X 8"	\$ 493,000	
	hydropneumatic tank	\$ 30,000	

Subtotals	\$ 855,000	•
7.75%	\$ 22,065	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 877,065	
15%	\$ 131,560	Contractor OH&P
Subtotal	\$ 1,008,625	
30%	\$ 302,588	Estimate Contingency
Total Construction	\$ 1,311,213	
25%	\$ 327,803	Engineering & CM
10%	\$ 131,121	Administration/Permitting
	\$ 1,770,137	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 1,861,000	Escalation Factor
Total Project	\$ 1,861,000	

Note

- 1. REMOVE KELLER TANKS 1 AND 2 FROM SERVICE.
- 2. ADD NEW BOOSTER PUMP STATION AT SADDLE RD AND KELLER RD (BOOST FROM JUNE WAY ZONE TO KELLER ZONE). HYD. TANK FIRE RATED PUMP
- 3. ADD 10-INCH DIAMETER PIPELINE FROM NEW BOOSTER PUMP STATION TO EXISTING KELLER TANK FILL 6-INCH DIAMETER PIPELINE (HIGH PRESSURE PIPELINE) (APPROXIMATELY 100').
- 4. ADD ISOLATION VALVES AT CONNECTION TO HIGH PRESSURE PIPELINE TO ALLOW HIGH PRESSURE LINE TO BE CLOSED NORTHWEST OF TIE-IN LOCATION.
- 5. Abandon parallel 6-inch diameter pipeline in Keller Rd from Saddle Rd to Sherman Way (approximately 2,800').
- 6. Add new 8-inch diameter pipeline in Keller Rd from Saddle Rd to Sherman Way. Tie new pipeline in to existing pipeline near 1621 Keller Rd and existing 6-inch diameter pipeline at Sherman Way (approximately 2,800').
- 7. Middle Keller Zone and Keller Zone become a single zone. Upper Saddle Zone continues to be fed from the Keller Zone through the Keller PRV #1. Sweeping Turn Zone (as modified in Figures 1 and 5 in TM 4) is now fed through new PRVs added as shown in Figure 1 (TM 4).
- 8. Keller booster pump station may be maintained as a back-up option to the new Saddle Rd booster pump station or altered to be lower pressure booster pump and be the main feed to the Sweeping Turn Zone.

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Item No: A9c STPUD Water System Optimization Plan
Project Name: Keller Tanks Relocation RH

Prepared By: RH
Updated: 17-Feb-15

Site: Keller Tank

General Description: Tank Replacement at alternate location TBD (alternative to projects A9 and A9C)

Benefits of this Project: Corrects a shortage of storage and fire flow for these multiple zones

Keller Zone Optimization

Item No.	ITEM DESCRIPTION	TOTAL
	new 561,000 gallon tank (includes allowance for site development	\$ 1,122,000
	1000 LF of 12" pipe (allowance)	\$ 264,000
	demolish existing Keller tanks	\$ 50,000

Reviewed By:	TW
Date Reviewed:	17-Feb-15
ENR Index Jul 2012:	10,366.54
ENR Index Jul 2014:	10,897.59
Escalation Factor:	1.05

K/J Proi. No.:

Subtotals	\$ 1,436,000	
7.75%	\$ 37,060	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 1,473,060	
15%	\$ 220,959	Contractor OH&P
Subtotal	\$ 1,694,019	
30%	\$ 508,206	Estimate Contingency
Total Construction	\$ 2,202,224	
25%	\$ 550,556	Engineering & CM
10%	\$ 220,222	Administration/Permitting
	\$ 2,973,002	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 3,125,000	Escalation Factor
Total Project	\$ 3,125,000	

Note

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1.05

STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014: Escalation Factor:

Updated:

Item No: A9d

Project Name: Keller Tanks Replacement

Site: Keller Tank

General Description: Tank Replacement at existing site

Benefits of this Project: Corrects a shortage of storage and fire flow for these multiple zones

Keller Zone Optimization

Rener Zone Optimization			
ITEM DESCRIPTION	TOTAL		
new 561,000 gallon tank	\$	614,000	
200 LF of 12" pipe (allowance)	\$	52,800	
demolish existing Keller tanks	\$	50,000	
mitigate rock hazard	\$	100,000	
magate rook nazara		100,000	
	ITEM DESCRIPTION new 561,000 gallon tank	ITEM DESCRIPTION new 561,000 gallon tank 200 LF of 12" pipe (allowance) demolish existing Keller tanks \$	

 Subtotals
 \$ 816,800

 7.75%
 \$ 21,080
 Sales tax on materials (materials cost = 33% of total cost)

 Subtotal
 \$ 837,880

15% \$ 125,682 Contractor OH&P

 Subtotal
 963,562

 30%
 \$ 289,068
 Estimate Contingency

 Total Construction
 \$ 1,252,630

25% \$ 313,157 Engineering & CM 10% \$ 125,263 Administration/Permit

\$ 125,263 Administration/Permitting \$ 1,691,050 Subtotal Total Construction; Engr & CM and Admin/Permitting

1,778,000 Escalation Factor

Total Project \$ 1,778,000

Note

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Item No: A10

Project Name: Tank Access and Site Improvements

Site: MULTIPLE

General Description: Tank Site Improvements

Benefits of this Project: Improve access, protection from fire, and minimize impacts from runoff to Lake

Tahoe water quality

Item No.	lo. ITEM DESCRIPTION		TOTAL
	CLEAR VEGETATION & OTHER BMPS		
	ARROWHEAD TANK	\$	1,000
	HEAVENLY VALLEY TANK	\$	33,000
	IROQUOIS TANK NO. 1	\$	70,000
	INSTALL ACCESS ROAD IMPROVEMENTS		
	IROQUOIS TANK NO. 1	\$	100,000

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

Prepared By:

NR/RH

Updated: 17-Feb-15

K/J Proj. No.: 1270004*00 Reviewed By: TW Date Reviewed: 17-Feb-15

ENR Index Jul 2012:

17-Feb-15 10,366.54

ENR Index Jul 2014:

10,897.59

Escalation Factor:

1.05

Subtotals	\$	204,000
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30% \$ 72,196 Estimate Contingency

Total Construction \$ 312,851

25% \$ 78,213 Engineering & CM 10% \$ 31,285 Administration/Permitting

422,349 Subtotal Total Construction; Engr & CM and Admin/Permitting

444,000 Escalation Factor

Total Project \$ 444,000

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Item No: A11

Project Name: Tank Seismic Improvements

Site: MULTIPLE

General Description: Tank Seismic Improvements

Benefits of this Project: Extend useful life and enhance tank protection from earthquake damage

Item No.	ITEM DESCRIPTION	TOTAL	
	PERFORM SEISMIC EVALUATION		
	ARROWHEAD TANK	\$	10,000
	COLD CREEK TANK	\$	10,000
	FLAGPOLE TANK NO. 1	\$	10,000
	H STREET TANK	\$	10,000
	HEAVENLY VALLEY TANK	\$	10,000
	IROQUOIS TANK NO. 1	\$	10,000
	REPLACE ANCHOR-BOLT FASTENERS		
	ARROWHEAD TANK	\$	1,000
	GARDNER MOUNTAIN TANK NO. 1	\$	1,000
	GARDNER MOUNTAIN TANK NO. 2	\$	1,000
		<u> </u>	

Subtotals \$ 63,000 7.75% \$ 1,626 Sales tax on materials (materials cost = 33% of total cost) Subtotal \$ 64,626 15% \$ 9.694 Contractor OH&P Subtotal \$ 74,320 30% \$ 22,296 Estimate Contingency 96,616 25% \$ 24,154 Engineering & CM 9,662 Administration/Permitting 10% \$ \$ 130,431 Subtotal Total Construction; Engr & CM and Admin/Permitting 137,000 Escalation Factor

Total Construction \$

137,000 Total Project \$

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NR/RH

17-Feb-15

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TW

17-Feb-15

10,366.54

10,897.59

1.05

Prepared By:

K/J Proj. No.: Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014:

Escalation Factor:

Updated:

KENNEDY/JENKS CONSULTANTS

Prepared By:

Item No: A12

Project Name: Well Inspections

Site: MULTIPLE

General Description: Paloma and Sunset Well Inspections
Benefits of this Project: Extend useful life of Palolma and Sunset Well assets

Item No.	ITEM DESCRIPTION	TOTAL	
	PULL PUMP & PERFORM DETAILED INSPECTION		
	PALOMA WELL	\$ 10,000	
	SUNSET WELL	\$ 10,000	
	PERFORM DOWN-HOLE CCTV INSPECTION		
	PALOMA WELL	\$ 1,000	
	SUNSET WELL	\$ 1,000	
		\$ 1,000	

Updated:	17-Feb-15
K/J Proj. No.: Reviewed By: Date Reviewed:	1270004*00 TW 17-Feb-15
ENR Index Jul 2012:	10,366.54
ENR Index Jul 2014:	10,897.59
Escalation Factor:	1.05

STPUD Water System Optimization Plan

NR/RH

Subtotals	\$ 23,000	
7.75%	\$ 1,783	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 24,783	
15%	\$ 3,717	Contractor OH&P
Subtotal	\$ 28,500	
30%	\$ 8,550	Estimate Contingency
Total Construction	\$ 37,050	
25%	\$ 9,262	Engineering & CM
10%	\$ 3,705	Administration/Permitting
	\$ 50,017	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 53,000	Escalation Factor
Total Project	\$ 53,000	

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17-Feb-15

STPUD Water System Optimization Plan

Prepared By:

Updated:

Item No: A13

Project Name: Crest-Bonita PRV Installation

Site: Crest Rd. & Bonita Rd. (Upper Saddle Zone to Sweeping Turn Zone)

General Description: Add 6-inch PRV (improve fire flow, pressures and service redundancy)
Benefits of this Project: Provides a redundant supply connection that will improve reliability,

redudnacy, fire flow and pressures

Sweeping Turn Zone / Four Seasons Zone / Upper Saddle Zone Optimization

Item No.	ITEM DESCRIPTION	1	TOTAL	
	6-INCH PRV	\$	8,000	
	Valve Vault Traffic Rated	\$	20,000	
	Piping	\$	7,000	
	Cut and Patch AC	\$	5,000	
	Traffic Control	\$	2,000	
	Locking Hatch	\$	2,000	
	Isolation Valve x 2	\$	4,000	
	Pressure Gauges	\$	2,000	
	Flowmeter	\$	3,000	
	Pipe Supports	\$	1,000	

K/J Proj. No.: 1270004*00
Reviewed By: TW
Date Reviewed: 17-Feb-15
ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

Subtotals \$ 54,000
7.75% \$ 1,394 Sales tax on materials (materials cost = 33% of total cost)

Subtotal \$ 55,394 15% \$ 8,309 Contractor OH&P

15% \$ 8,309 **Subtotal \$ 63,703**

30% \$ 19,111 Estimate Contingency

Total Construction \$ 82,813

25% \$ 20,703 Engineering & CM 10% \$ 8,281 Administration/Permitting \$ 111.798 Subtotal Total Construction

111,798 Subtotal Total Construction; Engr & CM and Admin/Permitting 118,000 Escalation Factor

\$ 118,000 Total Project \$ 118,000

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Item No: A14

Project Name: Pioneer-Norma Check Valve Installation

Site: Pioneer Trail & Norma Drive

General Description: Add 8-inch check valve at normally closed valve (P25-042NC)

Benefits of this Project: Enhances fire flow service and improves redundancy

Price Rd/. (Ralph) Zone Optimization

Item No.	ITEM DESCRIPTION	TOTAL		
	8-INCH CHECK VALVE	\$	10,000	
	Valve Vault Traffic Rated	\$	20,000	
	Piping	\$	7,000	
	Cut and Patch AC	\$	5,000	
	Traffic Control	\$	2,000	
	Locking Hatch	\$	2,000	
	Isolation Valve x 2	\$	4,000	
	Pressure Gauges	\$	2,000	
	Flowmeter	\$	3,000	
<u> </u>	Pipe Supports	\$	1,000	

Subtotals	\$ 56,000	
7.75%	\$ 1,445	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 57,445	
15%	\$ 8,617	Contractor OH&P
Subtotal	\$ 66,062	
30%	\$ 19,819	Estimate Contingency
Total Construction	\$ 85,881	
25%	\$ 21,470	Engineering & CM
10%	\$ 8,588	Administration/Permitting
	\$ 115,939	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 122,000	Escalation Factor
Total Project	\$ 122,000	

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STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012: ENR Index Jul 2014:

Escalation Factor:

Updated:

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Item No: A15 STPUD Water System Optimization Plan

> Prepared By: NR/RH Updated: 17-Feb-15

Project Name: Forest Fire Capability Assessment - Engineering Study Site: MULTIPLE

Benefits of this Project: Evaluate existing water system performance and identify operational

procedures and system improvements to increase fire flows for

General Description: Improve capability to fight forest fires

	extended periods of time.			K/J Proj. No.:	1270004*00
Item No.	ITEM DESCRIPTION	TO	TAL	Reviewed By:	TW
	ENGINEERING STUDY - use hydraulic model to evaluate water system capabilities to fight urban forest fires and identify operational procedures and system improvements to enhance extended periods of time to fight forest fires	\$	25,000	Date Reviewed:	17-Feb-15
				ENR Index Jul 2012:	10,366.54
				ENR Index Jul 2014:	10,897.59
				Escalation Factor:	1.05
	Subtotals	\$	25,000	21	
	Subtotal	\$ ¢	25,000	Sales tax on materials (materials cost = 33% of total cost)	
	Subtotal	\$	•	Contractor OH&P	
	Subtotal	\$	25,000	Contractor Orial	
		\$		Estimate Contingency	
	Total Construction	\$	25,000	• •	
		\$	-	Engineering & CM	
		\$	-	Administration/Permitting	
		\$		Subtotal Total Construction; Engr & CM and Admin/Permitti	ing
		\$	26,000	Escalation Factor	
	Total Project	\$	26,000		

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Item No: A16

Project Name: Pioneer-Busch PRV Installation

Site: Pioneer Trail & Busch Way (Iroquois to Pine Valley zone)

General Description: Add 8-inch PRV

Benefits of this Project: Improve reliability and redundancy and provide improved fire flows

Pine Valley Zone / Susquehana Zone Optimization

Total Project \$

122,000

Item No.	ITEM DESCRIPTION	TOTAL
	8-INCH PRV	\$ 10,000
	Valve Vault Traffic Rated	\$ 20,000
	Piping	\$ 7,000
	Cut and Patch AC	\$ 5,000
	Traffic Control	\$ 2,000
	Locking Hatch	\$ 2,000
	Isolation Valve x 2	\$ 4,000
	Pressure Gauges	\$ 2,000
	Flowmeter	\$ 3,000
	Pipe Supports	\$ 1,000

Subtotals \$ 56.000 7.75% \$ 1,445 Sales tax on materials (materials cost = 33% of total cost) Subtotal \$ 57,445 15% \$ 8,617 Contractor OH&P Subtotal \$ 66.062 30% \$ 19,819 Estimate Contingency Total Construction \$ 85,881 25% \$ 21,470 Engineering & CM 10% \$ 8,588 Administration/Permitting 115,939 Subtotal Total Construction; Engr & CM and Admin/Permitting 122,000 Escalation Factor

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STPUD Water System Optimization Plan

Prepared By: NR/RH

Updated: 17-Feb-15

K/J Proj. No.: 1270004*00
Reviewed By: TW
Date Reviewed: 17-Feb-15
ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

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Item No: A17

Project Name: Pioneer Trail Waterline Installation

Site: Pioneer Trail from Elks Club Dr to Busch Way

General Description: Add 2,250 ft. long 12-inch pipeline

Benefits of this Project: Improves fire protection and redundancy

Pine Valley Zone / Susquehana Zone Optimization

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STPUD Water System Optimization Plan

Prepared By: NR/RH Updated: 17-Feb-15

K/J Proj. No.: 1270004*00 TW

Reviewed By:

Date Reviewed: 17-Feb-15 10,366.54

ENR Index Jul 2012:

ENR Index Jul 2014: 10.897.59

Escalation Factor:

1.05

Item No.	ITEM DESCRIPTION		TOTAL	
	INSTALL 2,250 LF 12-INCH WATER MAIN	\$	603,000	
	TRAFFIC CONTROL	\$	20,000	
	Subtotals	•	CO2 000	

Subtotals \$

7.75% \$

16,078 Sales tax on materials (materials cost = 33% of total cost)

Subtotal \$ 639,078

> 15% \$ 95,862 Contractor OH&P

Subtotal \$ 734,940

> 30% \$ 220,482 Estimate Contingency

Total Construction \$ 955,422

> 25% \$ 238,855 Engineering & CM

95,542 Administration/Permitting 10% \$

\$ 1,289,819 Subtotal Total Construction; Engr & CM and Admin/Permitting

1,356,000 Escalation Factor

Total Project \$ 1,356,000

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Item No: A18

Project Name: Washoan-Nadowa PRV Installation

Site: Washoan Blvd & Nadowa St at normally closed valve (M33-047) Pine Valley to Country Club

General Description: Add 6-inch PRV

Benefits of this Project: Improve fire flow and service redundancy

Country Club Zone Optimization

Item No.	ITEM DESCRIPTION	TOTAL
	6-INCH PRV	\$ 8,000
	Valve Vault Traffic Rated	\$ 20,000
	Piping	\$ 7,000
	Cut and Patch AC	\$ 5,000
	Traffic Control	\$ 2,000
	Locking Hatch	\$ 2,000
	Isolation Valve x 2	\$ 4,000
	Pressure Gauges	\$ 2,000
	Flowmeter	\$ 3,000
	Pipe Supports	\$ 1,000

Subtotals	\$ 54,000	
7.75%	\$ 1,394	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 55,394	
15%	\$ 8,309	Contractor OH&P
Subtotal	\$ 63,703	
30%	\$ 19,111	Estimate Contingency
Total Construction	\$ 82,813	
25%	\$ 20,703	Engineering & CM
10%	\$ 8,281	Administration/Permitting
	\$ 111,798	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 118,000	Escalation Factor
Total Project	\$ 118,000	

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NR/RH

17-Feb-15

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STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012: ENR Index Jul 2014:

Escalation Factor:

Updated:

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A18
Date Printed: 7/21/2016

Item No: A19

Project Name: Glen Eagle PRV Installation

Site: Glen Eagle Rd at normally closed valve M34-021NC (Pine Valley to Country Club)

General Description: Add 6-inch PRV

Benefits of this Project: Improve fire flow and service redundancy

Country Club Zone Optimization

Item No.	ITEM DESCRIPTION	TOTAL
	6-INCH PRV	\$ 8,000
	Valve Vault Traffic Rated	\$ 20,000
	Piping	\$ 7,000
	Cut and Patch AC	\$ 5,000
	Traffic Control	\$ 2,000
	Locking Hatch	\$ 2,000
	Isolation Valve x 2	\$ 4,000
	Pressure Gauges	\$ 2,000
	Flowmeter	\$ 3,000
	Pipe Supports	\$ 1,000

Subtotals	\$ 54,000	
7.75%	\$ 1,394	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 55,394	
15%	\$ 8,309	Contractor OH&P
Subtotal	\$ 63,703	
30%	\$ 19,111	Estimate Contingency
Total Construction	\$ 82,813	
25%	\$ 20,703	Engineering & CM
10%	\$ 8,281	Administration/Permitting
	\$ 111,798	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 118,000	Escalation Factor
Total Project	\$ 118,000	

Date Printed: 7/21/2016

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17-Feb-15

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STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012: ENR Index Jul 2014:

Escalation Factor:

Updated:

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17-Feb-15 10,366.54

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STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014:

Escalation Factor:

Updated:

Item No: A20

Project Name: Water Supply to Stateline Zone - Engineering Study

Site: Stateline Zone

General Description: Evaluate alternatives to correct insufficient supply capacity for Stateline Zone

Benefits of this Project: Determine preferred alternative to correct supply capacity shortfall

Stateline Zone Optimization

Total Project \$

79,000

Item No.	ITEM DESCRIPTION	TOTAL
	Engineering Study: Complete study to evaluate the water quality risks of increasing the production of the Poloma Well from 1,200 gpm to 2,400 gpm and using Twin Peaks PRV to provide 200 gpm vs. drilling a new 1,400 gpm well in the Stateline Zone.	\$ 75,000

Subtotals \$ 75,000 Sales tax on materials (materials cost = 33% of total cost) Subtotal \$ 75,000 Contractor OH&P Subtotal \$ 75,000 **Estimate Contingency** Total Construction \$ 75,000 Engineering & CM Administration/Permitting 75,000 Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 79,000 Escalation Factor

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STPUD Water System Optimization Plan

Prepared By:

Updated:

Item No: A21 Project Name: Critical Valve Assessment

Site: MULTIPLE

General Description: Valve criticality study

Benefits of this Project:

Correct "panhandle areas" and non-valved areas that are vulnerable during emergency and shut-down

conditions to improve reliability of service

Multiple Zones Optimization

K/J Proj. No.: 1270004*00 Reviewed By: TW Date Reviewed: 17-Feb-15

Item No.	ITEM DESCRIPTION	TOTAL
	Conduct an engineering study using the hydraulic model to evaluate valve criticality to determine where inline isolation valves need to be added so that not too many customers are impacted by water service during a water main repair.	\$ 25,000
	-	

ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: **Escalation Factor:** 10,897.59 1.05

Date Printed: 7/21/2016

NR/RH

17-Feb-15

Subtotals	\$ 25,000	
	\$ -	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 25,000	
	\$ -	Contractor OH&P
Subtotal	\$ 25,000	
	\$ -	Estimate Contingency
Total Construction	\$ 25,000	
	\$ -	Engineering & CM
	\$ -	Administration/Permitting
	\$ 25,000	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 26,000	_Escalation Factor
		1

Total Project \$

26,000

Note

A21

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17-Feb-15

STPUD Water System Optimization Plan

Item No: A22

Project Name: SCADA Improvements

Site: MULTIPLE

General Description: Improve SCADA collection to hourly or less

Benefits of this Project: Improves data to develop diurnal curve to improve hydraulic model tool and enhance operations of water system

MULTIPLE

Item No.	ITEM DESCRIPTION	TOTAL
	SCADA Data Collection improvements	\$ 10,000

K/J Proj. No.: 1270004*00
Reviewed By: TW
Date Reviewed: 17-Feb-15
ENR Index Jul 2012: 10,366.54
ENR Index Jul 2014: 10,897.59

Prepared By:

Updated:

Escalation Factor: 1.05

Subtotals	\$ 10,000	
	\$ -	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 10,000	
	\$ -	Contractor OH&P
Subtotal	\$ 10,000	
	\$ -	Estimate Contingency
Total Construction	\$ 10,000	
	\$ -	Engineering & CM
	\$ -	Administration/Permitting
	\$ 10,000	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 11,000	Escalation Factor
Total Project	\$ 11,000	

Note

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Item No: A23 STPUD Water System Optimization Plan Project Name: Water Model Demand Allocation Improvements

Prepared By: NR/RH

Site: MULTIPLE Updated: 17-Feb-15

10.000

General Description: Improve Water System Hydraulic Model Demand Allocation Benefits of this Project: Improve hydraulic model with actual data will improve future optimization of the water system evaluations 1270004*00 K/J Proj. No.:

Subtotals \$

Conduct hydraulic model demand allocation using real water meter data \$ 10,000 ENR Index Jul 2012: ENR Index Jul 2014:
ENR Index Jul 2012:

- Cantotalo	Ψ	.0,000	
	\$	-	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$	10,000	
	\$	-	Contractor OH&P
Subtotal	\$	10,000	
	\$	-	Estimate Contingency
Total Construction	\$	10,000	
	\$	-	Engineering & CM
	\$	-	Administration/Permitting
	\$	10,000	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$	11,000	Escalation Factor
Total Project	\$	11,000	

Total Project \$

Note

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STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014:

Updated:

Item No: A24

Project Name: Pine Valley - Susquehanna Waterline

Site: Pine Valley & Susquehanna Zones

General Description: Add loop system to improve fire flow and redundancy and combine with Project A18

Benefits of this Project: Improves fire flow and redundancy

Item No.	ITEM DESCRIPTION	TOTAL		
	300 LF X 6" pipeline, Loop Susquehanna Dr. & Ibache St.	\$ 40,000		
	250 LF X 6" pipeline, Loop Ibache St. and Guadalupe St.	\$ 33,000		
	300 LF X 6" pipeline, Loop Guadalupe St and Arawaipa St	\$ 40,000		

		Eitht mack our zor 4.
		Escalation Factor:
iche St.	\$ 40,000	
upe St.	\$ 33,000	
vaipa St	\$ 40,000	
•		
Subtotals	\$ 113,000	•
7.75%	\$ 8,758	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 121,758	
15%	\$ 18,264	Contractor OH&P
Subtotal	\$ 140,021	
30%	\$ 42,006	Estimate Contingency
Total Construction	\$ 182,027	
25%	\$ 45,507	Engineering & CM

18,203 Administration/Permitting \$ 245,737 Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 258,000 Escalation Factor Total Project \$ 258,000

10% \$

Note

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STPUD Water System Optimization Plan Item No: A25

Project Name: Montgomery Estates Zone Evaluation - Engineering Study Prepared By: NR/RH Site: Montgomery Estates and Upper Montgomery Estates Zones Updated: 17-Feb-15

General Description: Re-configuration of Pressure Zones Evaluation

Benefits of this Project: Determine optimal pressure zone configuration to improve areas that experience low pressure and improve other areas that experience high

	pressures that exceed the District's LOS standards		K/J Proj. No.:	1270004*00
Item No.	ITEM DESCRIPTION	TOTAL	Reviewed By:	TW
	ENGINEERING STUDY	\$ 50,000	Date Reviewed:	17-Feb-15
			ENR Index Jul 2012:	10,366.54
			ENR Index Jul 2014:	10,897.59
			Escalation Factor:	1.05
	Subtotals	\$ 50,000		
		\$	Sales tax on materials (materials cost = 33% of total cost)	
	Subtotal	\$ 50,000		
		\$	Contractor OH&P	
	Subtotal	\$ 50,000		
		\$	Estimate Contingency	
	Total Construction	\$ 50,000		
		\$ -	Engineering & CM	
		\$ -	Administration/Permitting	
		\$	Subtotal Total Construction; Engr & CM and Admin/Permittir	ng
		\$ 53,000	Escalation Factor	
	Total Project	\$ 53,000		

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17-Feb-15

1270004*00

STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Updated:

Item No: A26

Project Name: Fire Flow Calibration Testing

Site: MULTIPLE

General Description: Fire Flow Field Calibration

Benefits of this Project: Improve the hydraulic model tool to enhance predictability and reliability

of predicting fire flow capabilities

ENR Index Jul 2012: 10,366.54				1270004 00		
ENR Index Jul 2012: 10,366.5.5 ENR Index Jul 2014: 10,897.53 Escalation Factor: 1.05 Escalation Factor: 1.05 Subtotal \$ 20,000	Item No.	ITEM DESCRIPTION		TOTAL	Reviewed By:	TW
Subtotals Subtotals Subtotals Subtotals Subtotal Subto		ENGINEERING STUDY - perform additional fire flow field testing	\$	20,000	Date Reviewed:	17-Feb-15
Subtotals \$ 20,000 \$ - Sales tax on materials (materials cost = 33% of total cost) \$ 20,000 \$ - Contractor OH&P \$ 20,000 \$ - Estimate Contingency \$ - Estimate Contingency \$ - Engineering & CM \$ - Administration/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 20,000 \$ - Subtotal Total Construction; Engr & CM and Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Construction; Engr & CM \$ - Subtotal Total Constructio					ENR Index Jul 2012:	10,366.54
Subtotals \$ 20,000 \$ - Sales tax on materials (materials cost = 33% of total cost) \$ 20,000 \$ - Contractor OH&P \$ 20,000 \$ - Estimate Contingency \$ 20,000 \$ - Engineering & CM \$ - Administration/Permitting \$ 20,000 \$ - Subtotal					ENR Index Jul 2014:	10,897.59
Subtotal Subtotal					Escalation Factor:	1.05
Subtotal \$ 20,000 Subtotal \$ 20,000 Subtotal \$ 20,000 \$ - Estimate Contingency \$ 20,000 \$ - Engineering & CM Administration/Permitting \$ 20,000 Subtotal Total Construction; Engr & CM and Admin/Permitting		Subtotals	\$	20,000	J	
Subtotal Subtotal			\$	-	Sales tax on materials (materials cost = 33% of total cost)	
Subtotal \$ 20,000 \$ - Estimate Contingency Total Construction \$ 20,000 \$ - Engineering & CM \$ - Administration/Permitting \$ 20,000 Subtotal Total Construction; Engr & CM and Admin/Permitting		Subtotal	\$	20,000		
Total Construction \$ 20,000 \$ Estimate Contingency \$ 20,000 \$ - Engineering & CM \$ Administration/Permitting \$ 20,000 Subtotal Total Construction; Engr & CM and Admin/Permitting			\$	-	Contractor OH&P	
Total Construction \$ 20,000 \$ - Engineering & CM \$ - Administration/Permitting \$ 20,000 Subtotal Total Construction; Engr & CM and Admin/Permitting		Subtotal	\$	20,000		
\$ - Engineering & CM \$ - Administration/Permitting \$ 20,000 Subtotal Total Construction; Engr & CM and Admin/Permitting			\$	-	Estimate Contingency	
\$ - Administration/Permitting \$ 20,000 Subtotal Total Construction; Engr & CM and Admin/Permitting		Total Construction	\$	20,000		
\$ 20,000 Subtotal Total Construction; Engr & CM and Admin/Permitting			\$	-	Engineering & CM	
			\$	-	Administration/Permitting	
\$ 21,000 Escalation Factor			\$	20,000	Subtotal Total Construction; Engr & CM and Admin/Permitti	ng
			\$	21,000	_Escalation Factor	
				·		

21,000

Total Project \$

KENNEDY/JENKS CONSULTANTS STPUD Water System Optimization Plan

NR/RH

17-Feb-15

Prepared By:

Updated:

Item No: A27

Project Name: Fire Hydrants on 4-inch Waterlines - Engineering Study

Site: MULTIPLE

General Description: Determine where to effectively add fire hydrants on 4" pipelines **Benefits of this Project:** Improve fire protection and life safety for the community served by the

District

				K/J Proj. No.:	1270004*00
Item No.	D. ITEM DESCRIPTION		ΓAL	Reviewed By:	TW
	ENGINEERING STUDY - using the hydraulic model determine from the "all nodes" scenario where additional fire hydrants would be effectively added on 4" water distribution mains	\$	10,000	Date Reviewed:	17-Feb-15
				ENR Index Jul 2012:	10,366.54
				ENR Index Jul 2014:	10,897.59
				Escalation Factor:	1.05
	Subtotals	\$	10,000		
		\$	-	Sales tax on materials (materials cost = 33% of total cost)	
	Subtotal	\$	10,000		
		\$	-	Contractor OH&P	
	Subtotal	\$	10,000		
		\$	-	Estimate Contingency	
	Total Construction	\$	10,000		
		\$	-	Engineering & CM	
		\$	-	Administration/Permitting	
		\$	-	Subtotal Total Construction; Engr & CM and Admin/Permitt	ing
		\$	11,000	Escalation Factor	
	Total Project	\$	11,000		

Item No: A28

Project Name: Cornelian Fire Pump and Waterline Installation

Site: Cornelian Booster Pump Station site

General Description: Provide additional fire flow for fire protection

Benefits of this Project: Improve fire flow protection for the Christmas Valley zone

	Christmas Valley Zone Optimization		Reviewed By:	TW
Item No.	ITEM DESCRIPTION	TOTAL	Date Reviewed:	17-Feb-15
			ENR Index Jul 2012:	10,366.54
	INSTALL NEW 2,500 gpm fire pump at Cornelian Booster Pump Station (estimated horsepower @ 130)	\$ 150,000	ENR Index Jul 2014:	10,897.59
	Add 200 ft of 12" pipeline to loop the pump station discharge to existing dead-end line in Keetak St.	\$ 52,800	Escalation Factor:	1.05
	Addition to Booster Pump Station Building for Fire Pump and Controls (150 sf approximately, slump block with metal roof)	\$ 75,000		
	Subtotals	\$ 277,800		
	7.75%	\$ 21,530	Sales tax on materials (materials cost = 33% of total cost)	
	Subtotal	\$ 299,330		
	15%	\$ 44,899	Contractor OH&P	
	Subtotal	\$ 344,229		
	30%	\$ 103,269	Estimate Contingency	
	Total Construction	\$ 447,498		
	25%	\$ 111,874	Engineering & CM	
	10%	\$ 44,750	Administration/Permitting	
		\$ 604,122	Subtotal Total Construction; Engr & CM and Admin/Permitting)
		\$ 635,000	Escalation Factor	
	Total Project	\$ 635,000		

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KENNEDY/JENKS CONSULTANTS

NR/RH

17-Feb-15

1270004*00

STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Updated:

KENNEDY/JENKS CONSULTANTS

Item No: A29

Item No.

Project Name: Upper Montgomery Estates Pump Station Replacement

Site: Upper Montgomery Estates

mechanical piping

hyrdopneumatic tank

Site work

General Description: Add 1,000 gpm pump station with back up power

3 pumps 500 gpm X 215' tdh

Benefits of this Project: Improves fire protection and redundancy in emergency conditions

New masonry block building (625 sf)

New standby generator inside building

ITEM DESCRIPTION

STPUD Water System	Optimization Plan
Brangrad By	ND/DLI

Prepared By: Updated: 17-Feb-15

K/J Proj. No.: 1270004*00 Reviewed By: TW

Date Reviewed: 17-Feb-15 ENR Index Jul 2012: 10,366.54 10,897.59 ENR Index Jul 2014: **Escalation Factor:** 1.05

Subtotals	\$ 530,000	•
7.75%	\$ 13,678	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 543,678	
15%	\$ 81,552	Contractor OH&P
Subtotal	\$ 625,230	
30%	\$ 187,569	Estimate Contingency
Total Construction	\$ 812,799	
25%	\$ 203,200	Engineering & CM
10%	\$ 81,280	Administration/Permitting
	\$ 1,097,278	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 1,153,000	Escalation Factor
Total Project	\$ 1,153,000	

TOTAL

\$

\$

192,000

50,000

113,000

50,000

75,000

50,000

Note

33 of 34 Date Printed: 7/21/2016 A29

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

Prepared By: NR/RH

17-Feb-15

Updated:

K/J Proj. No.: 1270004*00

Reviewed By: Date Reviewed:

TW

17-Feb-15 ENR Index Jul 2012: 10,366.54 10,897.59 ENR Index Jul 2014: **Escalation Factor:** 1.05

Item No: A30

Project Name: Install New Standby Generators

Site: Keller Zone - Keller Booster Pump Station and Heavenly Zone - David Lane Booster Pump Station

General Description: Add 1,000 gpm pump station with back up power

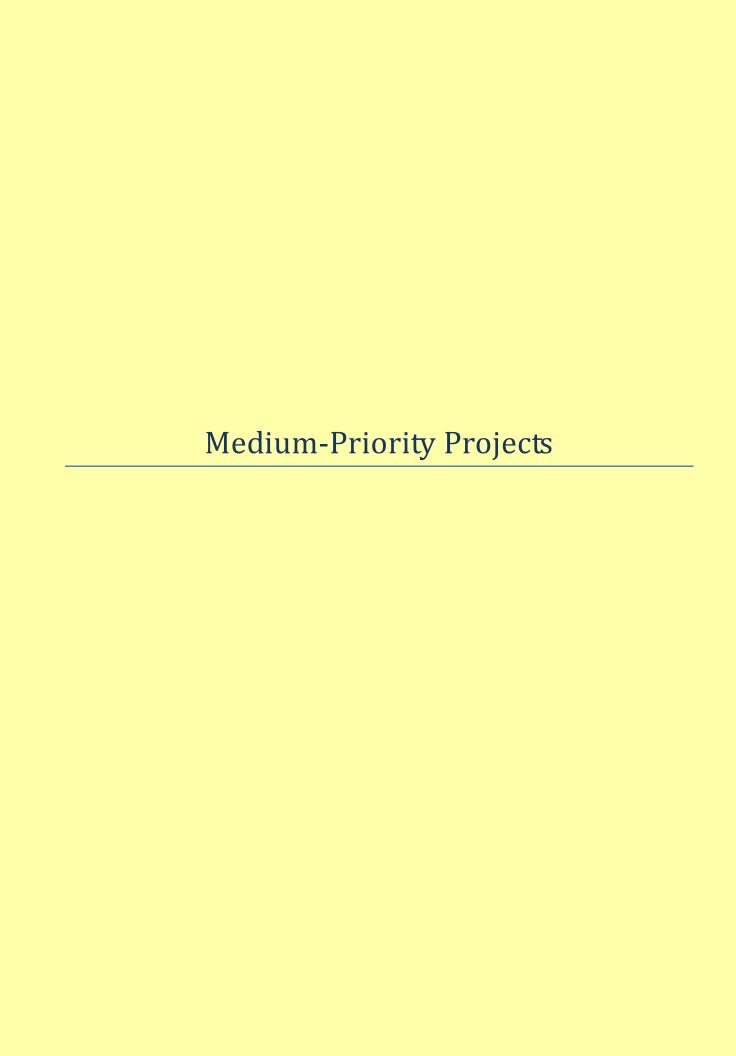
Benefits of this Project: Provide Water Reliable; Provide Redundancy Within System; 100% of critical

facilities have backup power capabilities

Item No.	ITEM DESCRIPTION	TOTAL
	Keller Pump Station	\$ -
	Install new 30KW Standby Generator with Auto Transfer Switch	\$ 50,000
	New masonry block building (10' x 10' = 100 sf)	\$ 50,000
	Misc improvements	\$ 10,000
	David Lane Booster Pump Station	
	Install new 200KW Standby Generator with Auto Transfer Switch	\$ 120,000
	New masonry block building (20' x 10' = 200 sf)	\$ 100,000
	Misc improvements	\$ 20,000

Subtotals	\$ 350,000	•
7.75%	\$ 9,033	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 359,033	
15%	\$ 53,855	Contractor OH&P
Subtotal	\$ 412,888	
30%	\$ 123,866	Estimate Contingency
Total Construction	\$ 536,754	
25%	\$ 134,188	Engineering & CM
10%	\$ 53,675	Administration/Permitting
	\$ 724,618	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 762,000	Escalation Factor
Total Project	\$ 762,000	

Note



Project B (MEDIUM PRIORITY) **Project:** STPUD Water System Optimization Plan

ITEM		TM 1 SECTION/PAGE NUMBER OR TM 4 PROJECT NUMBER						RECOMMENDED IMPLEMENTATION	
NO. ⁽¹⁾	PROJECT NAME	REFERENCE	BENEFITS OF THIS PROJECT	SITE		ΓΟΤΑL ⁽²⁾	DEPT	FISCAL YEAR	NOTES
B1	UTR Bridge Freeze Protection	TM 1: Section 4.5, Table 11	Pipeline Reliability Improvements	UTR Bridge Crossing	\$	44,000	Engineering / URW	14/15	
B2	SCADA Improvements, Phase 2, Monitoring, Security	TM 1: Section 4.4, Table 10	Improve operational flexibility and performance and enhance security	MULTIPLE	\$	286,000	Engineering / Electrical	17/18 & 23/24 to 32/33	
В3	Tank Coatings - Interior Repair and Replacement		Extend the useful life of the tank structures	MULTIPLE	\$	1,400,000	Engineering	16/17, 21/22	
B4	Security Fencing at Tanks		Improve site security to protect the tank structures from vandalism	MULTIPLE	\$	470,000	Pumps	14/15	
B5	Building Coatings,Insulation, and Security Improvements	TM 1: Section 4.1, Table 7 and Section 4.2, Table 8	Extend the useful life of the Wells and Booster Pump Structures and enhance site security	MULTIPLE	\$	279,000	Pumps	17/18 & 21/22 to 31/32	
В6	Pump Reliability and Efficiency Assessments	TM 1: Section 4.1, Table 7	Improve the pump reliability and efficiency by modifying inspection and condition assessment frequency	MULTIPLE	\$	104,000	Engineering / Pumps	14/15	
B7	Stateline Zone Capacity Improvements	TM 4: 33 to 36	Solves pressure problems, increases reliability and redundancy for Gardner Mountain zone with new well and piping.	MULTIPLE	\$	6,453,000	Engineering	19/20	
В8	Airport Waterline Improvement	TM 1: Section 4.5, Table 11	Improve critical pipeline reliability by replacing pipeline that has reached its useful life	Airport Runway Crossing	\$	10,011,000	Engineering	23/24 to 32/33	
В9	Trout Creek Waterline Improvement	TM 1: Section 4.5, Table 11	Improve critical pipeline reliability by replacing pipeline that has reached its useful life	Trout Creek Crossing	\$	521,000	Engineering	16/17	
B10	Keller Booster Waterline Improvement	TM 1: Section 4.5, Table 11	Improve critical pipeline reliability by protecting and repairing pipeline to extend its useful life	Keller Tank Supply	\$	200,000	Engineering	16/17	
B11	UTR Meyers Waterline Reliability Improvements	TM 1: Section 4.5, Table 11	Improve critical pipeline reliability by replacing pipeline that has reached its useful life	UTR Meyer Waterline Crossing	\$	522,000	Engineering	23/24 to 32/33	
B12	Well Assessment and Replacement Program	TM 1: Section 4.2, Table 8	Extend the useful life of well assets	MULTIPLE	\$	154,000	Engineering / URW	16/17	
B13	Fire Hydrant Installations	TM 1: Section 5.5	Improve fire protection	MULTIPLE	\$	1,143,000	Engineering	13/14 to 26/27 (3)	
B14	Rocky Saddle Multiple Zone Improvements	TM 4: 44 to 47	Improve fire flow, pressures and redundancy for Sweeping Turn, Four Seasons, Upper Saddle Zones, Needle Peak, and Rocky Point Zones	MULTIPLE	\$	440.000	Engineering	17/18	
B15a	H-Street Booster Station Replacement	TM 4 ⁽³⁾ : 10	Improve Fire Flow, Pressures and Service Redundancy	H Street Zone	\$	710,000	Engineering	15/16	
B15b	H-Street Booster Pump Spare	TM 1 ⁽³⁾ : Section 4.1. Table 8	Improve redundancy and reliability of pump station	H Street Pump Station	\$	13.000	Engineering	14/15	
B16	Kokanee - Golden Bear PRV Abandonment	TM 4: 21 & 22	Provides emergency water supply, improves fire protection, provides redundancy and enhances pressure in Kokane and Golden Bear Zones	Kokanee and Golden Bear	\$	68,000	Engineering	15/16	
B17	Upper Saddle-Sweeping Turn Zone Improvements	TM 4: 39 to 43	Improve fire flow, system pressure and service redundancy	Sweeping Turn, Four Seasons & Upper Saddle Zones	\$	2,653,000	Engineering	14/15	Project completed by District late summer 2014
B18	Price-Ralph Improvements	TM 4: 31 & 32	Improve Fire Flow and Service Redundancy	Price Rd (Ralph)	\$	631,000	Engineering	15/16	
B19	Terrace Zone Improvements	TM 4: 48 to 52	Improve fire flow and service redundancy	Terrace PRV	\$	1,230,000	Engineering	15/16	

Total Project ⁽³⁾	\$ 28,000,000

NOTE:

KENNEDY/JENKS CONSULTANTS

Prepared By: RH/NR Date Updated 17-Feb-15 1270004*00 K/J Proj. No.:

Reviewed By:

17-Feb-15 Date Reviewed:

⁽¹⁾ Project-number designations do not necessarily reflect the sequence or priority of implementation(2) Total Project Cost Estimates are based on July 1, 2014 costs and not escalated to the recommended implementation year.

⁽³⁾ If project 15a is constructed prior to implementing project 15b then eliminate project 15b. Total project cost does not include project 15b.

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Item No: B1

Project Name: UTR Bridge Freeze Protection

Site: UTR Bridge Crossing

General Description: Install insulation on exposed pipelines on Upper Truckee River pipeline crossing

Benefits of this Project: Pipeline Reliability Improvements

Item No.	ITEM DESCRIPTION	TOTAL		
	INSTALL INSULATION TO PREVENT FREEZE DAMAGE	\$	20,000	

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STPUD Water System Optimization Plan

Prepared By: NR/RH

Updated: 17-Feb-15

K/J Proj. No.: 1270004*00

10,366.54

Reviewed By: TW

Date Reviewed: 17-Feb-15

ENR Index Jul 2014: 10,897.59

ENR Index Jul 2012:

Escalation Factor: 1.05

Subtotals \$ 20.000 7.75% \$ 516 Sales tax on materials (materials cost = 33% of total cost) Subtotal \$ 20,516 15% \$ 3,077 Contractor OH&P Subtotal \$ 23,594 30% \$ 7,078 Estimate Contingency Total Construction \$ 30,672 25% \$ 7,668 Engineering & CM 10% \$ 3,067 Administration/Permitting \$ 41,407 Subtotal Total Construction; Engr & CM and Admin/Permitting 44,000 Escalation Factor Total Project \$ 44,000

Item No: B2

Project Name: SCADA Improvements, Phase 2, Monitoring, Security

Site: MULTIPLE

General Description: Miscellaneous SCADA Improvements - Monitoring and Security

Benefits of this Project: Improve operational flexibility and performance and enhance security

Item No.	ITEM DESCRIPTION	TOTAL
	ADJUST WATER-LEVEL CONTROLS TO PROVIDE FREEBOARD	
	IROQUOIS TANK NO. 1	\$ 500
	IROQUOIS TANK NO. 2	\$ 500
	STATELINE TANK NO. 1	\$ 500
	STATELINE TANK NO. 2	\$ 500
	PERFORM REGULAR CALIBRATION OF LEVEL TRANSMITTER	
	ANGORA TANK	\$ 200
	ARROWHEAD TANK	\$ 200
	CHRISTMAS VALLEY TANK	\$ 200
	COLD CREEK TANK	\$ 200
	COUNTRY CLUB TANK	\$ 200
	ECHO VIEW TANK	\$ 200
	FLAGPOLE TANK NO. 1	\$ 200
	FLAGPOLE TANK NO. 2	\$ 200
	FOREST MOUNTAIN TANK	\$ 200
	GARDNER MOUNTAIN TANK NO. 1	\$ 200
	GARDNER MOUNTAIN TANK NO. 2	\$ 200
	H STREET TANK	\$ 200
	HEAVENLY VALLEY TANK	\$ 200
	IROQUOIS TANK NO. 1	\$ 200
	IROQUOIS TANK NO. 2	\$ 200
	LOOKOUT TANK	\$ 200
	STATELINE TANK NO. 1	\$ 200
	STATELINE TANK NO. 2	\$ 200
	INSTALL SURVEILLANCE CAMERAS	
	ANGORA TANK	\$ 10,000
	GARDNER MOUNTAIN TANK NO. 1	\$ 10,000
	GARDNER MOUNTAIN TANK NO. 2	\$ 10,000
	H STREET TANK	\$ 10,000
	HEAVENLY VALLEY TANK	\$ 10,000
	IROQUOIS TANK NO. 1	\$ 10,000
	IROQUOIS TANK NO. 2	\$ 10,000
	STATELINE TANK NO. 1	\$ 10,000
	STATELINE TANK NO. 2	\$ 10,000
	INSTALL INTRUSION ALARMS ON LADDER AND ROOF HATCH	•
	ANGORA TANK	\$ 2,000
	ARROWHEAD TANK	\$ 2,000
	CHRISTMAS VALLEY TANK	\$ 2,000
	COLD CREEK TANK	\$ 2,000
-	COUNTRY CLUB TANK	\$ 2,000
-		
-	ECHO VIEW TANK	\$ 2,000
-	FLAGPOLE TANK NO. 1	\$ 2,000
	FLAGPOLE TANK NO. 2	\$ 2,000
	FOREST MOUNTAIN TANK	\$ 2,000
-	GARDNER MOUNTAIN TANK NO. 1	\$ 2,000
<u> </u>	GARDNER MOUNTAIN TANK NO. 2	\$ 2,000
	H STREET TANK	\$ 2,000
	HEAVENLY VALLEY TANK	\$ 2,000
	IROQUOIS TANK NO. 1	\$ 2,000
	IROQUOIS TANK NO. 2	\$ 2,000
	LOOKOUT TANK	\$ 2,000
	STATELINE TANK NO. 1	\$ 2,000
	STATELINE TANK NO. 2	\$ 2,000

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

Prepared By: NR/RH Updated: 17-Feb-15

K/J Proj. No.: 1270004*00
Reviewed By: TW
Date Reviewed: 17-Feb-15

ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

 Subtotals
 \$ 131,600

 7.75%
 \$ 3,396
 Sales tax on materials (materials cost = 33% of total cost)

 Subtotal
 \$ 134,996

15% \$ 20,249 Contractor OH&P

Subtotal \$ 155,24630% \$ 46,574 Estimate Contingency

Total Construction \$ 201,819

25% \$ 50,455 Engineering & CM 10% \$ 20,182 Administration/Permitting

\$ 272,456 Subtotal Total Construction; Engr & CM and Admin/Permitting

286,000 Escalation Factor

Total Project \$ 286,000

KENNEDY/JENKS CONSULTANTS

NR/RH

17-Feb-15

1270004*00

TW

17-Feb-15 10,366.54

10,897.59

1.05

STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014:

Escalation Factor:

Updated:

Item No: B3

Project Name: Tank Coatings - Interior Repair and Replacement

Site: MULTIPLE

General Description: Tank Coating Replacement (interior)

Benefits of this Project: Extend the useful life of the tank structures

Item No.	ITEM DESCRIPTION	TOTAL
	REPLACE/REPAIR COATING DEFECTS (INTERIOR)	
	COLD CREEK TANK	\$ 124,960
	FLAGPOLE TANK NO. 2	\$ 49,700
	FOREST MOUNTAIN TANK	\$ 36,920
	GARDNER MOUNTAIN TANK NO. 2	\$ 53,960
	H STREET TANK	\$ 26,980
	HEAVENLY VALLEY TANK	\$ 213,000
	IROQUOIS TANK NO. 1	\$ 62,480
	LOOKOUT TANK	\$ 75,260

Subtotals	\$ 643,260	-
7.75%	\$ 16,601	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 659,861	
15%	\$ 98,979	Contractor OH&P
Subtotal	\$ 758,840	
30%	\$ 227,652	Estimate Contingency
Construction	\$ 986,492	
25%	\$ 246,623	Engineering & CM
10%	\$ 98,649	Administration/Permitting
	\$ 1,331,764	Subtotal Total Construction; Engr & CM and Admin/Permitti
	\$ 1,400,000	Escalation Factor

Total Construction \$ 986,492
25% \$ 246,623
10% \$ 98,649
\$ 1,331,764
\$ 1,400,000

Total Project \$ 1,400,000

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KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

Prepared By: NR/RH

Updated: 17-Feb-15

K/J Proj. No.: 1270004*00

Reviewed By: TW
Date Reviewed: 17-Feb-15

ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

Item No: B4

Project Name: Security Fencing at Tanks

Site: MULTIPLE

General Description: Tank-Site Security Projects (fencing)

Benefits of this Project: Improve site security to protect the tank structures from vandalism

Item No.	ITEM DESCRIPTION	TOTAL
	PERIMETER FENCE	
	ARROWHEAD TANK	\$ 24,000
	FOREST MOUNTAIN TANK	\$ 24,000
	H STREET TANK	\$ 24,000
	HEAVENLY VALLEY TANK	\$ 24,000
	IROQUOIS TANK NO. 1	\$ 24,000
	IROQUOIS TANK NO. 2	\$ 24,000
	LOOKOUT TANK	\$ 24,000
	STATELINE TANK NO. 1	\$ 24,000
	FOREST MOUNTAIN BOOSTER	\$ 12,000
	KELLER BOOSTER	\$ 12,000
		•

Subtotals \$ 216,000

7.75% \$ 5,574 Sales tax on materials (materials cost = 33% of total cost)

Subtotal \$ 221,574

15% \$ 33,236 Contractor OH&P

Subtotal \$ 254,811

30% \$ 76,443 Estimate Contingency

Total Construction \$ 331,254

25% \$ 82,813 Engineering & CM

10% \$ 33,125 Administration/Permitting

\$ 447,193 Subtotal Total Construction; Engr & CM and Admin/Permitting

470.000 Escalation Factor

Total Project \$ 470,000

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NR/RH

10,897.59

STPUD Water System Optimization Plan

Item No: B5

Project Name: Building Coatings, Insulation, and Security Improvements

Site: MULTIPLE

General Description: Improve Site Security and Building Maintenance Projects

Benefits of this Project: Extend the useful life of the Wells and Booster Pump Structures and enhance site security

[Item No.]

ITEM DESCRIPTION

Item No.	ITEM DESCRIPTION	T	OTAL
	MISC REPAIRS & COATINGS TO BUILDING		
	BLACK BART BOOSTER	\$	10,00
		_	40.00
	DAVID LANE BOOSTER	\$	10,00
		_	40.00
	FLAGPOLE BOOSTER	\$	10,00
	TATA BOOSTER	\$	10,00
	REPAIR INSULATION	_	
	COLD CREEK TANK BOOSTER	\$	2,00
	TATA BOOSTER	\$	2,00
	ASSESS SITE-SECURITY	φ.	0.0
	AIRPORT WELL (OFFLINE)	\$	2,0
	AL TAHOE NO. 2	\$	2,0
	ARROWHEAD WELL NO. 3	\$	2,0
	BAKERSFIELD WELL	\$	2,0
	BAYVIEW WELL	\$	2,0
	BLACKROCK NO. 2 (OFFLINE)	\$	2,0
	CHRIS WELL (OFFLINE)	\$	2,0
	CLEMENT WELL (OFFLINE)	\$	2,0
	COLLEGE WELL (OFFLINE - URANIUM)	\$	2,0
	ELKS CLUB NO. 2	\$	2,0
	GLENWOOD WELL NO. 5	\$	2,0
	HELEN WELL NO. 2	\$	2,0
	MARTIN WELL (OFFLINE - IRON/MANGANESE)	\$	2,0
	MOUNTAIN VIEW WELL	\$	2,0
	PALOMA WELL	\$	2,0
	UPPER TRUCKEE WELL NO. 3	\$	2,0
	SUNSET WELL	\$	2,0
	TATA WELL NO. 1 (OFFLINE - ARSENIC)	\$	2,0
	TATA WELL NO. 2 (OFFLINE - ARSENIC)	\$	2,0
	TATA WELL NO. 3 (OFFLINE - ARSENIC)	\$	2,0
	VALHALLA WELL	\$	2,0
	INSTALL INTRUSION ALARMS ON ALL ENTRANCES	<u> </u>	
	AIRPORT WELL (OFFLINE)	\$	2,0
	AL TAHOE NO. 2	\$	2,0
	ARROWHEAD WELL NO. 3	\$	2,0
	BAKERSFIELD WELL	\$	2,0
	BAYVIEW WELL	\$	2,0
	BLACKROCK NO. 2 (OFFLINE)	\$	2,0
	CHRIS WELL (OFFLINE)	\$	2,0
	CLEMENT WELL (OFFLINE)	\$	2,0
	COLLEGE WELL (OFFLINE - URANIUM)	\$	2,0
	ELKS CLUB NO. 2	\$	2,0
	GLENWOOD WELL NO. 5	\$	2,0
	HELEN WELL NO. 2	\$	2,0
	MARTIN WELL (OFFLINE - IRON/MANGANESE)	\$	2,0
	MOUNTAIN VIEW WELL	\$	2,0
	PALOMA WELL	\$	2,0
	UPPER TRUCKEE WELL NO. 3	\$	2,0
	SUNSET WELL	\$	2,0
	TATA WELL NO. 1 (OFFLINE - ARSENIC)	\$	2,0
	TATA WELL NO. 2 (OFFLINE - ARSENIC)	\$	2,0
	TATA WELL NO. 3 (OFFLINE - ARSENIC)	\$	2,0
	· · · · · · · · · · · · · · · · · · ·		
	VALHALLA WELL	\$	2,0

Updated: 17-Feb-15

K/J Proj. No.: 1270004*00

Reviewed By: TW

Prepared By:

 Date Reviewed:
 17-Feb-15

 ENR Index Jul 2012:
 10,366.54

ENR Index Jul 2014:

Escalation Factor: 1.05

7.75% \$ 3,303 Sales tax on materials (materials cost = 33% of total cost) Subtotal \$ 131,303 15% \$ 19,696 Contractor OH&P Subtotal \$ 150,999 30% \$ 45,300 Estimate Contingency Total Construction \$ 196,299 25% \$ 49,075 Engineering & CM 10% \$ 19,630 Administration/Permitting 265,003 Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 279,000 Escalation Factor

Total Project \$ 279,000

KENNEDY/JENKS CONSULTANTS

1270004*00

TW

17-Feb-15

10,366.54

10,897.59

1.05

 Item No: B6
 STPUD Water System Optimization Plan

 Project Name: Pump Reliability and Efficiency Assessments
 Prepared By: NR/RH

Prepared By: NR/RH
Updated: 17-Feb-15

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014:

Escalation Factor:

Site: MULTIPLE

General Description: Pump Reliability and Efficiency Projects

Benefits of this Project: Improve the pump reliability and efficiency by modifying inspection and condition assessment frequency

Item No.	ITEM DESCRIPTION	TOTAL
	PERFORM DETAIL PUMP INSPECTION	
	COLD CREEK TANK BOOSTER	\$ 4,000
	CORNELIAN BOOSTER	\$ 4,000
	EVALUATE PUMP CONTROLS & DUTY CONDITIONS	
	BLACK BART BOOSTER	\$ 5,000
	BOULDER MOUNTAIN BOOSTER	\$ 5,000
	COLD CREEK TANK BOOSTER	\$ 5,000
	CORNELIAN BOOSTER	\$ 5,000
	DAVID LANE BOOSTER	\$ 5,000
	FLAGPOLE BOOSTER	\$ 5,000
	FOREST MOUNTAIN BOOSTER	\$ 5,000
	TATA BOOSTER	\$ 5,000

\$ 48,0	00
\$ 1,2	39 Sales tax on materials (materials cost = 33% of total cost)
\$ 49,2	39
\$ 7,3	36 Contractor OH&P
\$ 56,6	25
\$ 16,9	37 Estimate Contingency
\$ 73,6	12
\$ 18,4	O3 Engineering & CM
\$ 7,3	61 Administration/Permitting
\$ 99,3	76 Subtotal Total Construction; Engr & CM and Admin/Permitting
\$ 104,0	00 Escalation Factor
	1,23 1,23

Total Project \$

104,000

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Project Name: Stateline Zone Capacity Improvements

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STPUD Water System Optimization Plan

Prepared By: NR/RH

Updated: 17-Feb-15

Site: MULTIPLE

General Description: Water to the Y Water System Improvement Project

Item No: B7

Benefits of this Project: Solves pressure problems, increases reliability and redundancy for Gardner

Mountain zone with new well and piping.

K/J Proj. No.:	1270004*00
Reviewed By:	TW
Date Reviewed:	17-Feb-15

10,366.54 ENR Index Jul 2012:

ENR Index Jul 2014: 10,897.59

1.05 **Escalation Factor:**

Item No.	ITEM DESCRIPTION		TOTAL
	NEW WELL AT STATE ST.		
	New 1,000 gpm Well with pump, building and controls at State St.	\$	1,500,000
	NEW PIPELINE		
	Replace 580 LF of 6" pipeline in Sunset Dr. and Conestoga St. from Sunset Well to Lodi Ave. with a new 12" water main	\$	77,000
	Construct new 800 LF of 12" water main in Lodi Ave from Conestoga St. to Lake Tahoe Blvd.	\$	212,000
	Construct new 1,400 LF of 14" trenchless pipeline in Lake Tahoe Blvd. from Lodi Ave. to southwest side of the Upper Truckee River Bridge	\$	1,176,000
		<u></u>	

Subtotals	\$ 2,965,000	
7.75%	\$ 76,519	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 3,041,519	
15%	\$ 456,228	Contractor OH&P
Subtotal	\$ 3,497,747	
30%	\$ 1,049,324	Estimate Contingency
Total Construction	\$ 4,547,071	
25%	\$ 1,136,768	Engineering & CM
10%	\$ 454,707	Administration/Permitting
	\$ 6,138,546	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 6,453,000	Escalation Factor
Total Project	\$ 6,453,000	

Note

Estimate contingent upon Water to the Y Condition Assessment Project A20. If the alternative to increase production at Paloma Well is chosen this project is no longer necessary.

Date Printed: 7/21/2016

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan Item No: B8 Project Name: Airport Waterline Improvement

Prepared By: NR/RH Updated: 17-Feb-15

Site: Airport Runway Crossing General Description: Pipeline Replacement

K/J Proj. No.: 1270004*00

17-Feb-15

TW Reviewed By:

ENR Index Jul 2012: 10,366.54

Date Reviewed:

10,897.59 ENR Index Jul 2014:

1.05 **Escalation Factor:**

Benefits of this Project: Improve critical pipeline reliability by replacing pipeline that has reached its useful life Item No. ITEM DESCRIPTION TOTAL REALIGN PIPE (12" DIA x 1.2 MILES) TRENCHLESS CONSTRUCTION 4,600,000

> Subtotals \$ 4,600,000 7.75% \$ 118,715 Sales tax on materials (materials cost = 33% of total cost) Subtotal \$ 4,718,715

15% \$ 707,807 Contractor OH&P

Subtotal \$ 5,426,522

30% \$ 1,627,957 Estimate Contingency

Total Construction \$ 7,054,478

Total Project \$

25% \$ 1,763,620 Engineering & CM 10% \$ 705,448 Administration/Permitting

\$ 9,523,546 Subtotal Total Construction; Engr & CM and Admin/Permitting

10.011.000 Escalation Factor 10,011,000

Estimate Contingent upon Pipeline Condition Assessment Project A1 Note

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KENNEDY/JENKS CONSULTANTS

Item No: B9

Project Name: Trout Creek Waterline Improvement

Site: Trout Creek Crossing
General Description: Pipeline Replacement

Benefits of this Project: Improve critical pipeline reliability by replacing pipeline that has reached its useful life

Item No.	ITEM DESCRIPTION	TOTAL
	REALIGN PIPE (12" DIA x 340 LF) TRENCHLESS CONSTRUCTION	\$ 240,000

STPUD Water System Optimization Plan

Prepared By: NR/RH
Updated: 17-Feb-15

K/J Proj. No.: 1270004*00

Reviewed By: TW

Date Reviewed: 17-Feb-15

ENR Index Jul 2012: 10,366.54

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Escalation Factor: 1.05

Subtotals	\$	240,000	•
7.25%	•	•	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$	245,794	
15%	\$	36,869	Contractor OH&P
Subtotal	\$	282,663	
30%	\$	84,799	Estimate Contingency
Total Construction	\$	367,462	
25%	\$	91,866	Engineering & CM
10%	\$	36,746	Administration/Permitting
	\$	496,074	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$	521,000	Escalation Factor
Total Project	\$	521,000	

Note Estimate Contingent upon Pipeline Condition Assessment Project A1

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KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan Item No: B10 Project Name: Keller Booster Waterline Improvement

Prepared By: NR/RH Updated: 17-Feb-15

Site: Keller Tank Supply General Description: Pipeline Improvements Benefits of this Project: Improve critical pipeline reliability by protecting and repairing pipeline to extend its useful life

K/J Proj. No.: 1270004*00

Reviewed By: TW Date Reviewed: 17-Feb-15

10,366.54 ENR Index Jul 2012:

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1.05

Date Printed: 7/21/2016

Escalation Factor:

Item No.	ITEM DESCRIPTION	TOTAL
	NEGOTIATE PUBLIC UTILITY EASEMENT FOR PORTION OF PIPELINE	\$ 10,000
	INSTALL CATHODIC PROTECTION SYSTEM	\$ 80,000
	PERFORM LEAK SURVEY	\$ 2,000

Subtotals	\$ 92,000	
7.75%	\$ 2,374	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 94,374	
15%	\$ 14,156	Contractor OH&P
Subtotal	\$ 108,530	
30%	\$ 32,559	Estimate Contingency
Total Construction	\$ 141,090	
25%	\$ 35,272	Engineering & CM
10%	\$ 14,109	Administration/Permitting
	\$ 190,471	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 200,000	Escalation Factor
Total Project	\$ 200,000	

Note Estimate Contingent upon Pipeline Condition Assessment Project A1

B10

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan Item No: B11 Project Name: UTR Meyers Waterline Reliability Improvements

Prepared By: NR/RH

Site: UTR Meyer Waterline Crossing

Updated: 17-Feb-15

10,366.54

General Description: Pipeline Replacement

K/J Proj. No.: 1270004*00 Reviewed By: TW

Benefits of this Project: Improve critical pipeline reliability by replacing pipeline that has reached its useful life

Date Reviewed: 17-Feb-15

Item No.	ITEM DESCRIPTION		TOTAL
	REALIGN PIPE (12" DIA x 340 LF) TRENCHLESS CONSTRUCTION	\$	240,000
		—	
		4—	
		+	

ENR Index Jul 2014: 10,897.59

ENR Index Jul 2012:

Escalation Factor:

1.05

Subtotals	\$ 240,000	
7.75%	\$ 6,194	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 246,194	
15%	\$ 36,929	Contractor OH&P
Subtotal	\$ 283,123	
30%	\$ 84,937	Estimate Contingency
Total Construction	\$ 368,060	
25%	\$ 92,015	Engineering & CM
10%	\$ 36,806	Administration/Permitting
	\$ 496,881	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 522,000	_Escalation Factor
Total Project	\$ 522,000	

Note Estimate Contingent upon Pipeline Condition Assessment Project A1

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KENNEDY/JENKS CONSULTANTS

Item No: B12

Project Name: Well Assessment and Replacement Program

Site: MULTIPLE

General Description: Develop a downhole well condition assessment and well replacement program

Benefits of this Project: Extend the useful life of well assets

Item No.	ITEM DESCRIPTION	TOTAL
	Gather data on existing wells based on criteria to evaluate condition and estimate remaining useful life	\$ 50,000
	Develop a prioritization for replacing wells and location of potential new wells	\$ 25,000
	Develop capital improvement projects for well replacement	\$ 10,000
	Complete Tech Memo	\$ 15,000

STPUD	Water	System	Ontimization	Plan

Prepared By: NR/RH

Updated:

K/J Proj. No.: 1270004*00

Reviewed By: TW

Date Reviewed:

17-Feb-15

Date Printed: 7/21/2016

17-Feb-15

ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

1.05 **Escalation Factor:**

Subtotals \$ 100,000 7.75% \$ 2,581 Sales tax on materials (materials cost = 33% of total cost) 102,581 Subtotal \$ Contractor OH&P Subtotal \$ 102,581 30% \$ 30,774 Estimate Contingency 133,355 **Total Construction \$** Engineering & CM 10% \$ 13,335 Administration/Permitting \$ 146,690 Subtotal Total Construction; Engr & CM and Admin/Permitting 154,000 Escalation Factor 154,000 Total Project \$

Note

Once the Capital Improvement Projects are identified add them to the CIP based on a prioritization

B12

Hot tapping existing water mains @ 75 ea

Install new fire hydrant with shut off valve @ 75 ea

General Description: Installation of 75 new Fire Hydrants on Pipelines > 6" in diam with no fire hydrants within 500 ft. in developed areas and 1,000 ft. spacing in urban/forest undeveloped areas

ITEM DESCRIPTION

Item No: B13

Benefits of this Project: Improve fire protection

Item No.

Project Name: Fire Hydrant Installations

Site: MULTIPLE

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

Prepared By: NR/RH

17-Feb-15

Updated:

K/J Proj. No.: 1270004*00

Reviewed By: TW Date Reviewed: 17-Feb-15

10,366.54 ENR Index Jul 2012:

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Escalation Factor: 1.05

Subtotals	\$ 525,000	
7.75%	\$ 13,549	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 538,549	
15%	\$ 80,782	Contractor OH&P
Subtotal	\$ 619,331	
30%	\$ 185,799	Estimate Contingency
Total Construction	\$ 805,131	
25%	\$ 201,283	Engineering & CM
10%	\$ 80,513	Administration/Permitting
	\$ 1,086,926	Subtotal Total Construction; Engr & CM and Admin/Permittir
	\$ 1,143,000	Escalation Factor

TOTAL

97.500

427,500

1,143,000

Note

See WSOP Fire Hydrant Install CIP Figures 1-16

FH infill spacing based on 500 ft. radius for urban developed areas and 1,000 ft. radius for urban / forest undeveloped areas per the LOS Study

Total Project \$

Date Printed: 7/21/2016 14 of 21 B13

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

Prepared By: NR/RH

Updated: 17-Feb-15

Project Name: Rocky Saddle Multiple Zone Improvements

Site: MULTIPLE

Item No: B14

General Description: Reconfigure Pressure Zones, add pipelines between zones, and replace

undersized pipelines

Benefits of this Project: Improve fire flow, pressures and redundancy for Sweeping Turn, Four Seasons,

Upper Saddle Zones, Needle Peak, and Rocky Point Zones

Item No.	ITEM DESCRIPTION	TOTAL	
	Close existing valve Q22-008 located on Keller Rd. near Keller PRV #5. Transfers portion of Needle Peak and Sweeping Turn Zones south of Keller Rd. to Heavenly Zone. Rocky Point Zone now fed from Heavenly Zone through Rocky Point PRV.	\$ -	
	Using 185 LF x 8" pipeline connect existing 6" pipeline in Needle Peak Rd. to existing 6" pipeline in Keller downstream of Keller PRV #5, in progress	\$ 25,000	
	Replace existing 6" pipeline in Needle Peak from Keller Rd. to 3809 Needle Peak Rd. with 600 ft. of 8" pipeline	\$ 106,000	
	Add 8" x 400 LF of pipeline in Needle Peak Rd. from Wildwood Ave. to replace existing 6" pipeline to approx. 3809 Needle Peak Rd.	\$ 71,000	

K/J Proj. No.: 1270004*00 Reviewed By: TW

Date Reviewed:

17-Feb-15

ENR Index Jul 2012: 10,366.54

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10,897.59 1.05

Escalation Factor:

Subtotals	\$ 202,000	•
7.75%	\$ 5,213	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 207,213	
15%	\$ 31,082	Contractor OH&P
Subtotal	\$ 238,295	
30%	\$ 71,489	Estimate Contingency
Total Construction	\$ 309,784	
25%	\$ 77,446	Engineering & CM
10%	\$ 30,978	Administration/Permitting
	\$ 418,208	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 440,000	Escalation Factor
Total Project	\$ 440,000	

Note

KENNEDY/JENKS CONSULTANTS

Item No: B15a

Project Name: H-Street Booster Station Replacement

Site: H Street Zone

General Description: Replace existing H Street Pump Station

Benefits of this Project: Improve Fire Flow, Pressures and Service Redundancy

Item No.	ITEM DESCRIPTION	TOTAL
	NEW PRE-ENGINEERED BUILDING (PRESERVE EXISTING ELECTRICAL)	\$ 75,000
	DEMOLISH OLD BUILDING	\$ 5,000
	NEW SCADA EQUIPMENT	\$ 20,000
	NEW DOMESTIC PUMPS (2 x 20 gpm @ 5HP each)	\$ 12,000
	PIPING & APPURTENANCES	\$ 50,000
	PROVIDE HYDROPNEUMATIC TANK	\$ 20,000
	ENGINE-DRIVEN FIRE PUMP (1,000 gpm)	\$ 80,000
	PROVIDE PIN & SLEEVE CONNECTOR AND MANUAL XFR SWITCH	\$ 4,000
	REPLACE ELECTRICAL GEAR	\$ 10,000
	SITE WORK	\$ 50,000

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Prepared By: NR/RH
Updated: 17-Feb-15

 K/J Proj. No.:
 1270004*00

 Reviewed By:
 TW

 Date Reviewed:
 17-Feb-15

ENR Index Jul 2012: 10,366.54

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Escalation Factor: 1.05

Subtotals	\$ 326,000	
7.75%	\$ 8,413	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 334,413	
15%	\$ 50,162	Contractor OH&P
Subtotal	\$ 384,575	
30%	\$ 115,373	Estimate Contingency
Total Construction	\$ 499,948	
25%	\$ 124,987	Engineering & CM
10%	\$ 49,995	Administration/Permitting
	\$ 674,930	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 710,000	Escalation Factor
Total Project	\$ 710,000	

Note

Item No: B15b

General Description: Provide Spare Pump

Project Name: H-Street Booster Pump Spare

Site: H Street Pump Station

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STPUD Water System Optimization Plan

Prepared By: NR/RH

Updated: 17-Feb-15

K/J Proj. No.: 1270004*00

Reviewed By: TW

Date Reviewed:

17-Feb-15 10,366.54 ENR Index Jul 2012: ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

Benefits of this Project: Improve redundancy and reliability of pump station							
	Item No.	No. ITEM DESCRIPTION					
		provide spare pump on the shelf (1 X 20 gpm @ 5 hp)	\$	6,000			

Subtotals	\$ 6,000	
7.75%	\$ 155	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 6,155	
15%	\$ 923	Contractor OH&P
Subtotal	\$ 7,078	
30%	\$ 2,123	Estimate Contingency
Total Construction	\$ 9,201	
25%	\$ 2,300	Engineering & CM
10%	\$ 920	Administration/Permitting
	\$ 12,422	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 13,000	Escalation Factor
Total Project	\$ 13,000	

Note

If project 15A is elected to move forward before project 15B is implemented then eliminate project 15B

KENNEDY/JENKS CONSULTANTS

Item No: B16

Project Name: Kokanee - Golden Bear PRV Abandonment

Prepared By: NR/RH

NR/RH

Prepared By: NR/RH
Updated: 17-Feb-15

Site: Kokanee and Golden Bear

General Description: Improve Fire Flow, Pressures And Redundancy For Kokane, And Golden Bear Zones

Benefits of this Project: Provides emergency water supply, improves fire protection, provides redundancy and enhances

pressure in Kokane and Golden Bear Zones

Item No.	ITEM DESCRIPTION	TOTAL	
	150 LF X 8" pipeline	\$ 26,400	
	Remove Pioneer Kokanee PRV from service, replace with pipe spool	\$ 5,000	

K/J Proj. No.:	1270004*00
Reviewed By:	TW
Date Reviewed:	17-Feb-15
ENR Index Jul 2012:	10,366.54
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Escalation Factor:	1.05

Subtotals	\$ 31,400	
7.75%	\$ 810	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 32,210	
15%	\$ 4,832	Contractor OH&P
Subtotal	\$ 37,042	
30%	\$ 11,113	Estimate Contingency
Total Construction	\$ 48,154	
25%	\$ 12,039	Engineering & CM
10%	\$ 4,815	Administration/Permitting
	\$ 65,009	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 68,000	Escalation Factor
Total Project	\$ 68,000	

Notes:

^{1.} ADD SECONDARY 8-INCH DIAMETER CONNECTION (APPROXIMATELY 150 FT) TO STATELINE ZONE AT PIONEER TRAIL AND MARSHALL TRAIL WITH A NORMALLY CLOSED VALVE. STATELINE OPERATES AT A LOWER PRESSURE BUT WOULD PROVIDE SUPPLY AT A REDUCED PRESSURE FOR EMERGENCY CONDITIONS. THIS CONNECTION WOULD ALSO PROVIDE EMERGENCY SUPPLY TO THE SOUTHEAST AREA OF STATELINE ZONE ALONG PLATEAU CIRCLE AND FAIR MEADOW TRAIL WHICH IS RELIANT ON A SINGLE PIPELINE APPROXIMATELY 4,800 FT LONG LOCATED IN PIONEER TRAIL.

^{2.} Remove Pioneer Kokanee PRV from service

Item No: B17

KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

Prepared By: NR/RH

Updated: 17-Feb-15

General Description: Upgrade by removing PRVs, adding PRV, replacing under sized pipelines with fire

hydrants, adding pipeline interconnections to improve low pressure areas, and

abandon undersized pipelines

Project Name: Upper Saddle-Sweeping Turn Zone Improvements

Site: Sweeping Turn, Four Seasons & Upper Saddle Zones

Benefits of this Project: Improve fire flow, system pressure and service redundancy

ITEM DESCRIPTION	i	TOTAL
Remove Saddle PRV No. 1 serving Four Seasons hydrant	\$	1,000
1390 LF X 8" pipeline to replace parallel 4" and 6" pipelines in Saddle Rd. between Bridal Rd. and Keller Rd.	\$	245,000
3 fire hydrants	\$	17,000
350 LF X 8" pipeline to connect 6" pipeline in Needle Peak to low pressure 6" pipeline in Keller Rd.	\$	62,000
4750 LF X 8" pipeline to replace all 4" pipelines in Bonita, Crest, and Bridle Rd.	\$	836,000
Add 10 fire hydrants to meet min. 500 ft. spacing	\$	57,000
Abandon 4-inch pipeline in Bridal Rd. between Saddle Rd. and Bonita Rd. (steep area, no services)	\$	1,000
	1390 LF X 8" pipeline to replace parallel 4" and 6" pipelines in Saddle Rd. between Bridal Rd. and Keller Rd. 3 fire hydrants 350 LF X 8" pipeline to connect 6" pipeline in Needle Peak to low pressure 6" pipeline in Keller Rd. 4750 LF X 8" pipeline to replace all 4" pipelines in Bonita, Crest, and Bridle Rd. Add 10 fire hydrants to meet min. 500 ft. spacing Abandon 4-inch pipeline in Bridal Rd. between Saddle Rd. and Bonita Rd. (steep	1390 LF X 8" pipeline to replace parallel 4" and 6" pipelines in Saddle Rd. between Bridal Rd. and Keller Rd. \$ 3 fire hydrants \$ 350 LF X 8" pipeline to connect 6" pipeline in Needle Peak to low pressure 6" pipeline in Keller Rd. \$ 4750 LF X 8" pipeline to replace all 4" pipelines in Bonita, Crest, and Bridle Rd. \$ Add 10 fire hydrants to meet min. 500 ft. spacing \$ Abandon 4-inch pipeline in Bridal Rd. between Saddle Rd. and Bonita Rd. (steep

K/J Proj. No.: 1270004*00 Reviewed By: TW Date Reviewed: 17-Feb-15 ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59 1.05 **Escalation Factor:**

7.75% \$ 31,459 Sales tax on materials (materials cost = 33% of total cost) Subtotal \$ 1,250,459	Subtotals	\$ 1,219,000	
15% 187,569 Contractor OH&P	7.75%	\$ 31,459	Sales tax on materials (materials cost = 33% of total cost)
Subtotal \$ 1,438,028 Estimate Contingency Total Construction \$ 1,869,437 Engineering & CM 25% \$ 467,359 Engineering & CM 10% \$ 186,944 Administration/Permitting \$ 2,523,740 Subtotal Total Construction; Engr & CM and Admin/Permitting Escalation Factor	Subtotal	\$ 1,250,459	
30% 431,408 Estimate Contingency 1,869,437	15%	\$ 187,569	Contractor OH&P
Total Construction 1,869,437	Subtotal	\$ 1,438,028	
25% \$ 467,359 Engineering & CM 10% \$ 186,944 Administration/Permitting \$ 2,523,740 Subtoal Total Construction; Engr & CM and Admin/Permitting \$ 2,653,000 Escalation Factor	30%	\$ 431,408	Estimate Contingency
10% \$ 186,944 Administration/Permitting \$ 2,523,740 Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 2,653,000 Escalation Factor	Total Construction	\$ 1,869,437	
\$ 2,523,740 Subtotal Total Construction; Engr & CM and Admin/Permitting \$ 2,653,000 Escalation Factor	25%	\$ 467,359	Engineering & CM
\$ 2,653,000 Escalation Factor	10%	\$ 186,944	Administration/Permitting
, , , , , , , , , , , , , , , , , , ,		\$ 2,523,740	Subtotal Total Construction; Engr & CM and Admin/Permitting
Total Project \$ 2,653,000		\$ 2,653,000	Escalation Factor
	Total Project	\$ 2,653,000	

Note PROJECT COMPLETED BY DISTRICT IN LATE SUMMER 2014

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KENNEDY/JENKS CONSULTANTS

STPUD Water System Optimization Plan

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 10,897.59

 Escalation Factor:
 1.05

Item No: B18

Project Name: Price-Ralph Improvements

Site: Price Rd (Ralph)

General Description: Provide redundant service from Heavenly to Price Road.

Benefits of this Project: Improve Fire Flow and Service Redundancy

Item No.	ITEM DESCRIPTION	TOTAL
	6" PRV	\$ 8,000
	Valve Vault Traffic Rated	\$ 20,000
	Piping	\$ 7,000
	Cut and Patch AC	\$ 5,000
	Traffic Control	\$ 2,000
	Locking Hatch	\$ 2,000
	Isolation Valve x 2	\$ 4,000
	Pressure Gauges	\$ 2,000
	Flowmeter	\$ 3,000
	Pipe Supports	\$ 1,000
	1340 LF X 8" pipeline	\$ 236,000

Subtotals	\$ 290,000	•
7.75%	\$ 7,484	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 297,484	
15%	\$ 44,623	Contractor OH&P
Subtotal	\$ 342,107	
30%	\$ 102,632	Estimate Contingency
Total Construction	\$ 444,739	
25%	\$ 111,185	Engineering & CM
10%	\$ 44,474	Administration/Permitting
	\$ 600,397	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 631,000	Escalation Factor
Total Project	\$ 631,000	
		•

Note

Rd (Ralph) Zone). Redundant service.

Pioneer Trail with 8-inch diameter pipeline (approximately 1,340 ft).

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17-Feb-15

1270004*00

TW

17-Feb-15

10,366.54

10,897.59

1.05

STPUD Water System Optimization Plan

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014: **Escalation Factor:**

Updated:

Item No: B19

Project Name: Terrace Zone Improvements

Site: Terrace PRV

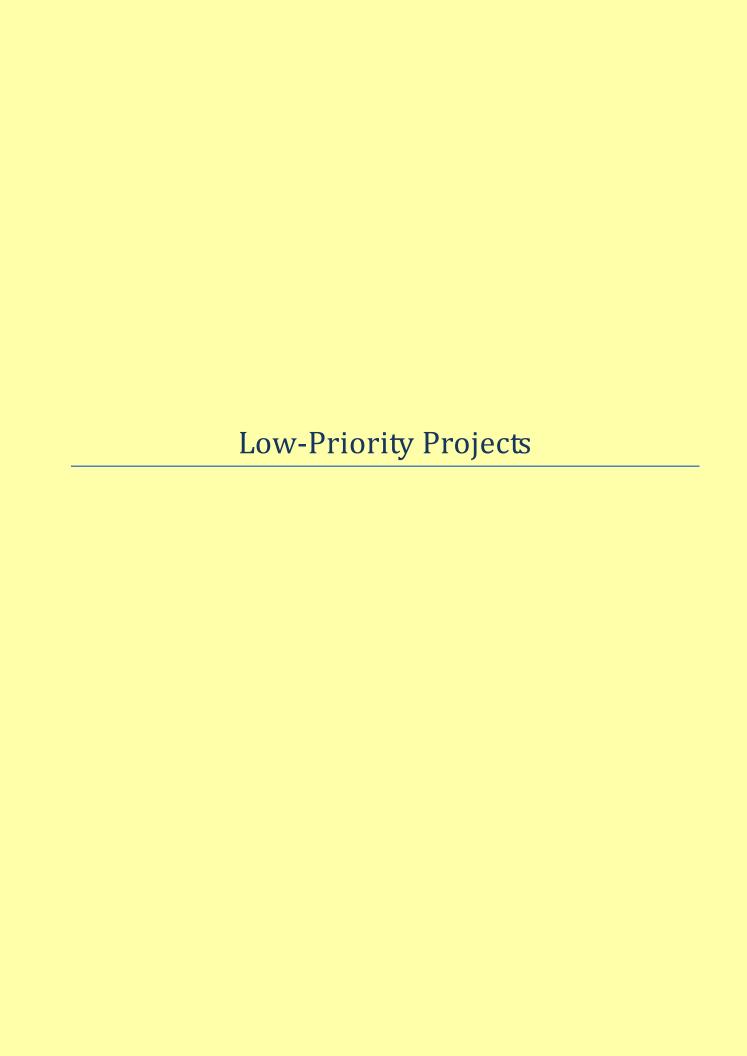
General Description: Fire Flow And Service Redundancy Benefits of this Project: Improve fire flow and service redundancy

Item No.	ITEM DESCRIPTION	TOTAL
	Replace 2-inch and 4-inch diameter pipeline in Terrace Zone with 6-inch diameter pipeline (approximately 1,950')	\$ 257,000
	Connect new 500 LF X 6" pipeline in Knoll Ln to existing 6" pipeline in Needle Peak Rd. at Verdon Ln, rock excavation	\$ 198,000
	Hot tap connection 6" pipeline in Needle Peak Rd. at Verdon Ln.	\$ 1,300
	Remove Terrace PRV at Wildwood Ave & Terrace Dr	\$ 1,000
	Add 5 each fire hydrants on new 6" pipelines	\$ 15,000
	Connect 700 LF of new 6" pipeline at Terrace Dr (north) to existing 4" pipeline in Wildwood Dr.	\$ 93,000
	11 7 9 11	\$ 93

Subtotals	\$ 565,300	•
7.75%	\$ 14,589	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 579,889	
15%	\$ 86,983	Contractor OH&P
Subtotal	\$ 666,872	
30%	\$ 200,062	Estimate Contingency
Total Construction	\$ 866,934	
25%	\$ 216,734	Engineering & CM
10%	\$ 86,693	Administration/Permitting
	\$ 1,170,361	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 1,230,000	Escalation Factor
Total Project	\$ 1,230,000	

Note

Date Printed: 7/21/2016 B19



Project C (LOW PRIORITY) **Project:** STPUD Water System Optimization Plan

 Prepared By:
 NR/RH

 Date Updated
 17-Feb-15

 K/J Proj. No.:
 1270004*00

Reviewed By: TW

17-Feb-15

Date Reviewed:

		TM 4 OF OT ION/DAGE					
ITEM NO. ⁽¹⁾	PROJECT NAME	TM 1 SECTION/PAGE NUMBER OR TM 4 PROJECT NUMBER REFERENCE	BENEFITS OF THIS PROJECT	SITE	TOTAL ⁽²⁾	DEPT	RECOMMENDED IMPLEMENTATION FISCAL YEAR
C1	PRV Improvements	TM 1: Section 4.3, Table 9	Extend useful life, improve reliability, and increase security of this PRV	Multiple PRV sites	\$ 592,000	Pumps	Beyond FY 2033-2034
C2	Well Electrical Equipment Evaluation	TM 1: Section 4.2, Table 8	Extend useful life of electrical gear	Multiple Well sites	\$ 47,000	Wells	Beyond FY 2033-2034
C3	Water Quality Evaluation - Engineering Study	TM 4: 62	Evaluate the water system during low demand periods to determine operational improvements to maintain adequate water quality	Water System-wide	\$ 37,000	Engineering/Pumps	Beyond FY 2033-2034
C4	Well Sites Pipe Coating Improvements	TM 1: Section 4.2, Table 8	Extend useful life and improve reliability of piping	Multiple Well Sites	\$ 58,000	Pumps	Beyond FY 2033-2034
C5	SCADA Improvements - Phase 3, Flowmeters		Improve reliability of well operation	Multiple Well Sites	\$ 550,000	Electrical	Beyond FY 2033-2034
C6	Boulder Mountain and Cold Creek Tank Booster Pipe Coating Improvements	TM 1: Section 4.1, Table 7	Extend useful life and improve reliability of piping	Boulder Mountain and Cold Creek Tank booster pump stations	\$ 13,000	Pumps	Beyond FY 2033-2034
C7	SCADA Improvements - Phase 3, Flowmeters	TM 1: Section 4.1, Table 7	Improve reliability of booster pump station operation	Multiple pump stations	\$ 805,000	Electrical	Beyond FY 2033-2034
C8	South Apache Booster Improvements	TM 1: Section 4.1, Table 7		South Apache Booster	\$ 337,000	Engineering	Beyond FY 2033-2034
C 9	Airport Booster Improvements	TM 1: Section 4.1, Table 7	Replace useful life of building, improve redundancy and reliability, extend useful life of piping and electrical/controls, improve fire flow, and improve site security	Airport Booster	\$ 436,000	Engineering	Beyond FY 2033-2034
C10	Tank Inlet / Outlet Piping Retrofits	TM 1: Section 4.4, Table 10	Improve water quality, reliability, and extend useful life of tanks	Multiple Tank sites	\$ 1,698,000	Engineering	Beyond FY 2033-2034
C11	Tata Tank Removal	TM 1: Section 4.4, Table 10	Eliminate a tank asset that has reached its useful life and is not needed	Tata Tank	\$ 54,000	Engineering	Beyond FY 2033-2034
C12	Flagpole Zone Improvements	TM 4: 4 to 8	Reduce system pressures that exceed 120 psi	Flagpole Zone	\$ 748,000	Engineering	Beyond FY 2019-2020
C13	Unidirectional Flushing Program	TM 4: 63	Consulting services to train District staff to develop and implement a District-wide flushing program to improve the District's ability to maintain system-wide water quality	Water System-wide	\$ 21,000	Engineering	FY 2019-2020
C14	Pipeline Replacement Program	TM 4: 61	Improve Redundancy and Reliability for All Zones	Water System-wide	\$ 347,000	Engineering	FY 2019-2020
					·		

Total Project \$ 5,800,000	Total Project	\$	5,800,000
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NOTE:

⁽¹⁾ Project-number designations do not necessarily reflect the sequence or priority of implementation

⁽²⁾ Total Project Cost Estimates are based on July 1, 2014 costs and are not escalated to the recommended implementation year.

Item No: C1

Project Name: PRV Improvements

Site: Multiple PRV sites

General Description: PRV improvements

Benefits of this Project: Extend useful life, improve reliability, and increase security of this PRV

Item No.	ITEM DESCRIPTION	TOTAL	
	INSTALL LOCKING HATCH @ 1) Comanche PRV; 2) Country Club PRV; 3) Keller PRV No. 1; 4) Keller PRV No. 5; 5) Oflying PRV; 6) Pine Valley PRV; 7) Price Rd PRV; 8) Rocky Point PRV; 9) Saddle No. 2 PRV; and 10) Susquehana PRV	\$	20,000
	CONTROL WATER INTRUSION @ 1) Comanche PRV; 2) Country Club PRV; 3) Keller PRV No. 1; 4) Oflying PRV; 5) Rocky Point PRV; and 6) Saddle No. 2 PRV	\$	12,000
	INSTALL FLOWMETER @ 1) Comanche PRV; 2) Country Club PRV; 3) Keller PRV No. 1; 4) Keller PRV No. 5; 5) Oflying PRV; 6) Pine Valley PRV; 7) Price Rd PRV; 8) Rocky Point PRV; 9) Saddle No. 2 PRV; and 10) Susquehana PRV	\$	30,000
	REPAIR PROTECTIVE COATINGS @ 1) Country Club PRV; and 2) Keller PRV No. 5	\$	2,000
	REPAIR BYPASS CONNECTION @ 1) Keller No. 1 PRV	\$	5,000
	REMOVE "SEWER" DESIGNATION FROM HATCH @ 1) Keller No. 5 PRV; 2) Pine Valley PRV; 3) Price Rd PRV; and 4) Saddle No. 2 PRV	\$	800
	REPLACE OR REBUILD PRV @ 1) Pine Valley PRV; 2) Price Rd PRV; 3) Rocky Point PRV; and 4) Susquehana PRV	\$	32,000
	INSTALL PIPE SUPPORTS @ 1) Pine Valley PRV; 2) Price Rd PRV; and 3) Rocky Point PRV	\$	1,500
	INSTALL PRESSURE GAGES @ 1) Saddle No. 2 PRV	\$	2,000
	INSTALL FLOWMETERS, PRESSURE GAUGES, BATTERY BACKUP POWER (AS NEEDED), AND SCADA COMMUNICATIONS AT 18 PRV STATIONS	\$	166,500
	Subtotals	\$	271.800

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STPUD Water	System	Optimization Plan
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Prepared By: Updated: NR/RH 17-Feb-15

K/J Proj. No.: Reviewed By: 1270004*00 TW

Date Reviewed:

17-Feb-15

ENR Index Jul 2012:

10,366.54

ENR Index Jul 2014:

10,897.59

Escalation Factor:

1.05

Subtotais	Ф	271,000	
7.75%	\$	7,014	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$	278,814	
15%	\$	41,822	Contractor OH&P
Subtotal	\$	320,637	
30%	\$	96,191	Estimate Contingency
Total Construction	\$	416,828	
25%	\$	104,207	Engineering & CM
10%	\$	41,683	Administration/Permitting
	\$	562,717	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$	592,000	Escalation Factor

592,000

Total Project \$

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STPUD Water System Optimization Plan

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17-Feb-15

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17-Feb-15

10,366.54 10,897.59

1.05

Prepared By:

K/J Proj. No.:

Reviewed By:

Date Reviewed:

ENR Index Jul 2012:

ENR Index Jul 2014: Escalation Factor:

Updated:

Item No: C2

Project Name: Well Electrical Equipment Evaluation

Site: Multiple Well sites

General Description: EVALUATE PHYSICAL MORTALITY OF ELECTRICAL GEAR

Benefits of this Project: Extend useful life of electrical gear

Item No.	ITEM DESCRIPTION	TOTAL
	ENGINEERING STUDY: EVALUATE PHYSICAL MORTALITY OF	
	ELECTRICAL GEAR	
	AIRPORT WELL (OFFLINE)	\$ 5,000.00
	BLACKROCK NO. 2 (OFFLINE)	\$ 5,000.00
	CHRIS WELL (OFFLINE)	\$ 5,000.00
	CLEMENT WELL (OFFLINE)	\$ 5,000.00
	COLLEGE WELL (OFFLINE - URANIUM)	\$ 5,000.00
	MARTIN WELL (OFFLINE - IRON/MANGANESE)	\$ 5,000.00
	TATA WELL NO. 1 (OFFLINE - ARSENIC)	\$ 5,000.00
	TATA WELL NO. 2 (OFFLINE - ARSENIC)	\$ 5,000.00
	TATA WELL NO. 3 (OFFLINE - ARSENIC)	\$ 5,000.00

Subtotals \$ 45,000 Sales tax on materials (materials cost = 33% of total cost) 45,000 Subtotal \$ \$ Contractor OH&P Subtotal \$ 45,000 **Estimate Contingency** Total Construction \$ 45,000 Engineering & CM \$ Administration/Permitting \$ 45,000 Subtotal Total Construction; Engr & CM and Admin/Permitting 47,000 Escalation Factor Total Project \$ 47,000

Note

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Item No: C3 STPUD Water System Optimization Plan Project Name: Water Quality Evaluation - Engineering Study

Prepared By: NR/RH

Site: Water System-wide Updated: 17-Feb-15 General Description: Conduct system-wide water quality evaluation for low-water demand

Benefits of this Project: Evaluate the water system during low demand periods to determine

operational improvements to maintain adequate water quality

Item No.	ITEM DESCRIPTION	TOTAL
	ENGINEERING STUDY: Using the hydraulic model evaluate system- wide water quality to determine potential water quality problem areas and identify operational options to maintain water quality during low water demand periods.	\$ 35,000

K/J Proj. No.: 1270004*00 Reviewed By: TW

Date Reviewed:

17-Feb-15

ENR Index Jul 2012: 10,366.54 ENR Index Jul 2014: 10,897.59 **Escalation Factor:** 1.05

Subtotals	\$ 35,000	-
	\$ -	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 35,000	
	\$ -	Contractor OH&P
Subtotal	\$ 35,000	
	\$ -	Estimate Contingency
Total Construction	\$ 35,000	
	\$ -	Engineering & CM
	\$ -	Administration/Permitting
	\$ 35,000	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 37,000	Escalation Factor
Total Project	\$ 37,000	

Note

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Item No: C4

Item No.

Project Name: Well Sites Pipe Coating Improvements

Site: Multiple Well Sites General Description: Piping improvements

Benefits of this Project: Extend useful life and improve reliability of piping

(Offline - arsenic); and 5) Valhalla Well

ITEM DESCRIPTION

SECURE PIPE SUPPORTS TO CONCRETE FLOOR @ 1) Airport Well

APPLY NEW COATINGS TO PIPING AND VALVES @ 1) Airport Well (Offline); 2) Al Tahoe Well; 3) Chris Well (Offline); 4) Tata Well No. 3

(Offline); 2) Chris Well (Offline); and 3) Tata Well No. 3 (Offline -

STPUD Water System Optimization Plan

Prepared By: NR/RH Updated: 17-Feb-15

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1270004*00

Date Reviewed:

17-Feb-15

ENR Index Jul 2012:

10,366.54

ENR Index Jul 2014:

10,897.59

Escalation Factor:

1.05

		Escalation Factor:
Subtotals	\$ 26,500	•
7.75%	\$ 684	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 27,184	
15%	\$ 4,078	Contractor OH&P
Subtotal	\$ 31,261	
30%	\$ 9,378	Estimate Contingency
Total Construction	\$ 40,640	
25%	\$ 10,160	Engineering & CM
10%	\$ 4,064	Administration/Permitting
	\$ 54,864	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 58,000	Escalation Factor
Total Project	\$ 58,000	

TOTAL

1,500

25,000

Item No: C5

Project Name: SCADA Improvements - Phase 3, Flowmeters

Site: Multiple Well Sites

General Description: SCADA improvements

Benefits of this Project: Improve reliability of well operation

Item No.	ITEM DESCRIPTION	TOTAL	
	INTEGRATE FLOWMETER TO SCADA SYSTEM		
	AIRPORT WELL (OFFLINE)		
	AL TAHOE NO. 2	\$ 22,990	
	ARROWHEAD WELL NO. 3	\$ 22,990	
	BAKERSFIELD WELL	\$ 22,990	
	BAYVIEW WELL	\$ 22,990	
	CLEMENT WELL (OFFLINE)		
	ELKS CLUB NO. 2	\$ 22,990	
	GLENWOOD WELL NO. 5	\$ 22,990	
	HELEN WELL NO. 2	\$ 22,990	
	MOUNTAIN VIEW WELL (OFFLINE)		
	PALOMA WELL	\$ 22,990	
	UPPER TRUCKEE WELL NO. 3	\$ 22,990	
	SUNSET WELL	\$ 22,990	
	TATA WELL NO. 3 (OFFLINE - ARSENIC)		
	VALHALLA WELL	\$ 22,990	

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STPUD Water System Optimization Plan

Prepared By: NR/RH
Updated: 17-Feb-15

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 1270004*00

 Reviewed By:
 TW

 Date Reviewed:
 17-Feb-15

ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

Subtotals	\$ 252,890	•
7.75%	\$ 6,526	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 259,416	
15%	\$ 38,912	Contractor OH&P
Subtotal	\$ 298,329	
30%	\$ 89,499	Estimate Contingency
Total Construction	\$ 387,828	
25%	\$ 96,957	Engineering & CM
10%	\$ 38,783	Administration/Permitting
	\$ 523,567	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 550,000	Escalation Factor
Total Project	\$ 550,000	

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Item No: C6

Project Name: Boulder Mountain and Cold Creek Tank Booster Pipe Coating Improvements

Site: Boulder Mountain and Cold Creek Tank booster pump stations

General Description: Piping improvements

Benefits of this Project: Extend useful life and improve reliability of piping

Item No.	ITEM DESCRIPTION	TOTAL	
	SECURE PIPE SUPPORTS TO FLOOR		
	BOULDER MOUNTAIN BOOSTER	\$ 500	
	COLD CREEK TANK BOOSTER	\$ 500	
	APPLY NEW EXTERIOR COATINGS TO PIPING		
	COLD CREEK TANK BOOSTER	\$ 5,000	

STPUD Water System Optimization Plan

Prepared By: NR/RH
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K/J Proj. No.: 1270004*00

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Date Reviewed: 17-Feb-15

ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

Subtotals	\$ 6,000	•
7.75%	\$ 155	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 6,155	
15%	\$ 923	Contractor OH&P
Subtotal	\$ 7,078	
30%	\$ 2,123	Estimate Contingency
Total Construction	\$ 9,201	
25%	\$ 2,300	Engineering & CM
10%	\$ 920	Administration/Permitting
	\$ 12,422	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 13,000	Escalation Factor
Total Project	\$ 13,000	

Item No: C7

Project Name: SCADA Improvements - Phase 3, Flowmeters

Site: Multiple pump stations

General Description: SCADA improvements

Benefits of this Project: Improve reliability of booster pump station operation

Item No.	ITEM DESCRIPTION	TOTAL
	PROVIDE FLOWMETER	
	H STREET BOOSTER FLOWMETER	\$ 2,000
	INTEGRATE FLOWMETER INTO SCADA SYSTEM	
	AIRPORT BOOSTER	\$ 22,990
	BLACK BART BOOSTER	\$ 22,990
	BOULDER MOUNTAIN BOOSTER	\$ 22,990
	COLD CREEK FILTER PLANT BOOSTER (NOT EVALUATED)	\$ 22,990
	COLD CREEK TANK BOOSTER	\$ 22,990
	CORNELIAN BOOSTER	\$ 22,990
	DAVID LANE BOOSTER	\$ 22,990
	FLAGPOLE BOOSTER	\$ 22,990
	FOREST MOUNTAIN BOOSTER	\$ 22,990
	GRIZZLY MOUNTAIN BOOSTER	\$ 22,990
	H STREET BOOSTER	\$ 22,990
	KELLER BOOSTER	\$ 22,990
	NORTH APACHE BOOSTER	\$ 22,990
	SOUTH APACHE BOOSTER	\$ 22,990
	TATA BOOSTER	\$ 22,990
	TWIN PEAKS BOOSTER	\$ 22,990

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STPUD Water System Optimization Plan

Prepared By: NR/RH
Updated: 17-Feb-15

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 1270004*00

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 TW

 Date Reviewed:
 17-Feb-15

ENR Index Jul 2012: 10,366.54

ENR Index Jul 2014: 10,897.59

Escalation Factor: 1.05

Subtotals	\$ 369,840	-
7.75%	\$ 9,545	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 379,385	
15%	\$ 56,908	Contractor OH&P
Subtotal	\$ 436,292	
30%	\$ 130,888	Estimate Contingency
Total Construction	\$ 567,180	
25%	\$ 141,795	Engineering & CM
10%	\$ 56,718	Administration/Permitting
	\$ 765,693	Subtotal Total Construction; Engr & CM and Admin/Permittir
	\$ 805,000	_Escalation Factor

805,000

Total Project \$

Item No: C8

Project Name: South Apache Booster Improvements

Site: South Apache Booster

General Description: Building replacement

Benefits of this Project: Replace useful life of building, and improve electrical/controls reliability

Item No.	ITEM DESCRIPTION	TOTAL
	NEW PRE-ENGINEERED BUILDING (PRESERVE EXISTING ELECTRICAL	\$ 150,000
	EVALUATE PUMP CONTROLS & DUTY CONDITIONS	\$ 5,000

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STPUD Water System Optimization Plan

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Updated: 17-Feb-15

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Date Reviewed: 17-Feb-15

ENR Index Jul 2012: 10,366.54

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Escalation Factor: 1.05

Subtotals	\$ 155,000	
7.75%	\$ 4,000	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 159,000	
15%	\$ 23,850	Contractor OH&P
Subtotal	\$ 182,850	
30%	\$ 54,855	Estimate Contingency
Total Construction	\$ 237,705	
25%	\$ 59,426	Engineering & CM
10%	\$ 23,771	Administration/Permitting
	\$ 320,902	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 337,000	_Escalation Factor
Total Project	\$ 337,000	

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STPUD Water System Optimization Plan

Prepared By:

Updated:

Item No: C9

Project Name: Airport Booster Improvements

Site: Airport Booster

General Description: Miscellaneous improvements

Benefits of this Project: Replace useful life of building, improve redundancy and reliability, extend useful life of piping and electrical/controls, improve fire flow, and improve site security

		TOTAL
NEW PRE-ENGINEERED BUILDING (PRESERVE EXISTING ELECTRICAL	\$	150,000
PROVIDE STANDBY PUMP (1 X 400 gpm @ 30 hp)	\$	36,000
SECURE PIPE SUPPORTS TO FLOOR	\$	500
APPLY NEW EXTERIOR COATINGS TO PIPING	\$	5,000
PROVIDE PIN & SLEEVE CONNECTOR AND MANUAL XFR SWITCH	\$	4,000
EVALUATE PHYSICAL MORTALITY OF ELECTRICAL GEAR	\$	5,000
P S	ROVIDE STANDBY PUMP (1 X 400 gpm @ 30 hp) ECURE PIPE SUPPORTS TO FLOOR PPLY NEW EXTERIOR COATINGS TO PIPING PROVIDE PIN & SLEEVE CONNECTOR AND MANUAL XFR SWITCH	ROVIDE STANDBY PUMP (1 X 400 gpm @ 30 hp) ECURE PIPE SUPPORTS TO FLOOR \$ PPLY NEW EXTERIOR COATINGS TO PIPING ROVIDE PIN & SLEEVE CONNECTOR AND MANUAL XFR SWITCH \$

K/J Proj. No.: Reviewed By: Date Reviewed:	1270004*00 TW 17-Feb-15
ENR Index Jul 2012:	10,366.54
ENR Index Jul 2014:	10,897.59
Escalation Factor:	1.05

Subtotals	\$ 200,500	
7.75%	\$ 5,174	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 205,674	
15%	\$ 30,851	Contractor OH&P
Subtotal	\$ 236,526	
30%	\$ 70,958	Estimate Contingency
Total Construction	\$ 307,483	
25%	\$ 76,871	Engineering & CM
10%	\$ 30,748	Administration/Permitting
	\$ 415,102	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 436,000	_Escalation Factor
]
Total Project	\$ 436,000	

Date Printed: 7/21/2016

Item No: C10

Project Name: Tank Inlet / Outlet Piping Retrofits

Site: Multiple Tank sites

General Description: Piping and coating improvements

Benefits of this Project: Improve water quality, reliability, and extend useful life of tanks

Item No.	ITEM DESCRIPTION	TOTAL	
	INSTALL SEPARATE INLET/OUTLET OR OTHER MIXING SYSTEM		
	ARROWHEAD TANK	\$ 50,000	
	CHRISTMAS VALLEY TANK	\$ 50,000	
	COLD CREEK TANK	\$ 50,000	
	FLAGPOLE TANK NO. 1	\$ 50,000	
	FLAGPOLE TANK NO. 2	\$ 50,000	
	FOREST MOUNTAIN TANK	\$ 50,000	
	GARDNER MOUNTAIN TANK NO. 1	\$ 50,000	
	GARDNER MOUNTAIN TANK NO. 2	\$ 50,000	
	H STREET TANK	\$ 50,000	
	HEAVENLY VALLEY TANK	\$ 50,000	
	IROQUOIS TANK NO. 1	\$ 50,000	
	IROQUOIS TANK NO. 2	\$ 50,000	
	LOOKOUT TANK	\$ 50,000	
	STATELINE TANK NO. 1	\$ 50,000	
	STATELINE TANK NO. 2	\$ 50,000	
	INSTALL FLEXIBLE INLET/OUTLET TANK CONNECTIONS		
	COLD CREEK TANK	\$ 5,000	
	HEAVENLY VALLEY TANK	\$ 5,000	
	IROQUOIS TANK NO. 1	\$ 5,000	
	IROQUOIS TANK NO. 2	\$ 5,000	
	REPLACE TANK COATINGS		
	FLAGPOLE TANK NO. 1	\$ 5,000	
	HEAVENLY VALLEY TANK	\$ 5,000	

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STPUD Water System Optimization Plan

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Escalation Factor: 1.05

Subtotals	\$ 780,000	-
7.75%	\$ 20,130	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 800,130	
15%	\$ 120,019	Contractor OH&P
Subtotal	\$ 920,149	
30%	\$ 276,045	Estimate Contingency
Total Construction	\$ 1,196,194	
25%	\$ 299,049	Engineering & CM
10%	\$ 119,619	Administration/Permitting
	\$ 1,614,862	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 1,698,000	Escalation Factor

1,698,000

Total Project \$

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Item No: C11

Project Name: Tata Tank Removal

Site: Tata Tank

General Description: Remove Storage Tank

Benefits of this Project: Eliminate a tank asset that has reached its useful life and is not needed

Item No.	ITEM DESCRIPTION	TOTAL
	Remove and dispose of tank	\$ 25,000

STPUD Water System Optimization Plan

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Escalation Factor: 1.05

Subtotals	\$ 25,000	-
7.75%	\$ 645	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 25,645	
15%	\$ 3,847	Contractor OH&P
Subtotal	\$ 29,492	
30%	\$ 8,848	Estimate Contingency
Total Construction	\$ 38,340	
25%	\$ 9,585	Engineering & CM
10%	\$ 3,834	Administration/Permitting
	\$ 51,758	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 54,000	Escalation Factor

Total Project \$ 54,000

Item No: C12

Project Name: Flagpole Zone Improvements

Site: Flagpole Zone

General Description: Pipeline projects to address excessive system pressures

Benefits of this Project: Reduce system pressures that exceed 120 psi

Item No.	ITEM DESCRIPTION	TOTAL
	10" Angle PRV @ Flagpole Booster Pump Stations	\$ 8,000
	10" Piping & Fittings	\$ 7,000
	10" BFV (Isolation) Valve	\$ 2,500
	Close Existing 6" Gate Valve at 1863 Normuck St.	\$ -
	Connect new 8" pipeline to existing 6" pipelines at intersections of Shawnee St., Normuk St., and Cholula St. with San Bernardino Ave.	\$ 12,000
	1,700 LF X 8" pipeline	\$ 299,200
	Connect new 8" pipeline at Flagpole Booster Pump Station and at North Upper Truckee Rd./San Bernardino Ave. Intersection	\$ 15,000

Subtotals \$ 343,700 7.75% \$ 8,870 Sales tax on materials (materials cost = 33% of total cost) Subtotal \$ 352,570 15% \$ 52,886 Contractor OH&P Subtotal \$ 405,456 30% \$ 121,637 Estimate Contingency Total Construction \$ 527,092 25% \$ 131,773 Engineering & CM 10% \$ 52,709 Administration/Permitting 711,574 Subtotal Total Construction; Engr & CM and Admin/Permitting 748,000 Escalation Factor

748,000

Total Project \$

Note

J:\2012\1270004.00_STPUD_Water Sys Opt Plan\09-Reports\9.09-Reports\9.09-Reports\Final Report\Appendices\E - Project Cost Est\App A Cost Estimates - Low-Priority_ALL.xls

C12

Date Printed: 7/21/2016

STPUD Water System Optimization Plan

Prepared By: NR/RH
Updated: 17-Feb-15

K/J Proj. No.: 1270004*00
Reviewed By: TW
Date Reviewed: 17-Feb-15
ENR Index Jul 2012: 10,366.54
ENR Index Jul 2014: 10,897.59
Escalation Factor: 1.05

KENNEDY/JENKS CONSULTANTS

Item No: C13

Project Name: Unidirectional Flushing Program

Site: Water System-wide

General Description: On-call Engineering Support for System-Wide Unidirectional Flushing Program

Benefits of this Project: Consulting services to train District staff to develop and implement a

District-wide flushing program to improve the District's ability to maintain

system-wide water quality

Item No.	ITEM DESCRIPTION	TOTAL
	ENGINEERING STUDY: Develop a system-wide unidirectional flushing program over phases. This has been done for a small part of the water system to address a sanding problem. It is suggested to be done in four phases, breaking up the entire water system into four areas by combining pressure zones and to spread the impacts to District staff implementing the program over four consecutive years.	\$ 20,000

STPUD Water System Optimization Plan

Prepared By: NR/RH

Updated: 17-Feb-15

K/J Proj. No.: 1270004*00 Reviewed By: TW

Date Reviewed:

17-Feb-15

ENR Index Jul 2012: 10,366.54 ENR Index Jul 2014: 10,897.59 1.05

Escalation Factor:

Subtotals	\$ 20,000	
	\$ -	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 20,000	
	\$ -	Contractor OH&P
Subtotal	\$ 20,000	
	\$ -	Estimate Contingency
Total Construction	\$ 20,000	
	\$ -	Engineering & CM
	\$ -	Administration/Permitting
	\$ 20,000	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 21,000	Escalation Factor
Total Project	\$ 21,000	
		-

Date Printed: 7/21/2016

KENNEDY/JENKS CONSULTANTS STPUD Water System Optimization Plan

NR/RH

17-Feb-15

Item No: C14

Project Name: Pipeline Replacement Program

Site: Water System-wide

General Description: Conduct an evaluation to develop a pipeline replacement priority program

Benefits of this Project: Improve Redundancy and Reliability for All Zones

K/J Proj. No.: 1270004*00 **Reviewed By:** TW

Prepared By:

Updated:

Date Reviewed: 17-Feb-15

Item No.	ITEM DESCRIPTION	TOTAL
	ENGINEERING STUDY: Develop systematic pipe replacement program to upgrade aging infrastructure that has outlived its useful service life. Use pipeline physical attributes, leak history; conduct a consequence of failure analysis using the hydraulic model to identify pipelines critical to maintain the District established Level of Service requirements.	\$ 300,000

ENR Index Jul 2012: 10,366.54 ENR Index Jul 2014: 10,897.59 Escalation Factor: 1.05

Subtotals	\$ 300,000	
	\$ -	Sales tax on materials (materials cost = 33% of total cost)
Subtotal	\$ 300,000	
	\$ -	Contractor OH&P
Subtotal	\$ 300,000	
	\$ -	Estimate Contingency
Total Construction	\$ 300,000	
	\$ -	Engineering & CM
10%	\$ 30,000	Administration/Permitting
	\$ 330,000	Subtotal Total Construction; Engr & CM and Admin/Permitting
	\$ 347,000	Escalation Factor
Total Project	\$ 347,000	

Note