



Proposed new infrastructure supporting the Twin Lakes Water Storage Project will consist of wells, conveyance pipeline and discharge structures to surface and groundwater (Figure 1). Water will be discharged alternately among the surface water and groundwater discharge locations.

Project Operations

Upon completion of the project infrastructure, pumping from the wells will begin to increase water storage in the lakes and aquifer to a maximum volume of 1,600 acre feet. Pumping at a rate of up to 2,000 gpm and a quantity up to 800 acre feet during each of the first 10 years is expected to be needed. Considering return flows to the Methow River and losses to evaporation, long-term maintenance pumping up to 550 acre feet annually is expected to sustain targeted water levels.

TABLE 1: Number of Pumping Days Required versus Number of Days Available Over Minimum Instream Flows (MIF)

	Years 1 - 10 (800 acre-feet/ year)*			Steady-State > Year 10 (550 acre-feet/year)*		
	Actual Pumping Days at 1,000 gpm	Actual Pumping Days at 2,000 gpm**	Pumping Days Available Over MIF	Actual Pumping Days at 1,000 gpm	Actual Pumping Days at 2,000 gpm**	Pumping Days Available Over MIF
Wet Year	124	62	183	125	62	179
Average Year	145	73	177	121	60	151
Dry Year	80	40	98	28	14	34

* The analysis predicts steady state conditions will be reached in Year 10 if 800 acre-feet/year are delivered the first 10 years. If less water is available to be delivered to the lake/aquifer system during that time period, steady-state conditions and the reduction in pumping to 550 acre-feet/year will occur later in time. TLAC will operate an adaptive management program during the first 10 years of pumping to better understand groundwater storage and lake response to pumping.

** The analysis evaluated the TLAC project engineered to deliver 1,000 gpm, although the final design flow rate has not been determined. If the TLAC project could deliver 2,000 gpm, the pumping days would be approximately half for the same water balance schedule. The storage target could be achieved sooner each year by pumping at up to 2,000 gpm.

Water Pumping Under the MIF

Water will be pumped to storage only during high flows. In its application, TLAC proposed to pump from the Methow River only when flows are above the adopted minimum instream flows (MIF) in WAC 173-548 (i.e. an interruptible withdrawal). Pumping only when flows are above the MIF ensures the project will not impact instream uses and existing senior water rights.

Table 1 shows the number of days available for pumping observing the MIF versus the number of days of pumping proposed to support the Twin Lakes Water Storage Project.

Withdrawals will occur when Methow River flows are generally above the MIF between April and September (80% of the time).

ESTIMATED COSTS

TABLE 2: Capital Costs Assuming 12-inch Pipeline

ENGINEER'S OPINION OF PROBABLE COSTS							31-Dec-09		
PLANNING LEVEL ESTIMATE							RW Beck 11/023-10000		
DIV NO.	TASK DESCRIPTION	QUANTITY		MATERIAL		LABOR & EQUIPMENT		Lump Sum or sub	ENR
		NUMBER	UNIT	UNIT COST	EXTEN.	UNIT COST	EXTEN.		
1	GENERAL								
	Contractor's Mark-ups	1%		\$	-	\$	-	\$8,760	\$ 8,760
	Bond & Insurance	2%		\$	-	\$	-	\$17,519	\$ 17,519
	Mobilization/Demob			\$	-	\$	-	\$2,500	\$ 2,500
	Record Drawings	1	LS	\$	-	\$	-	\$5,000	\$ 5,000
2	SITE WORK								
	SPCC Plan/FESC	1	LS	\$	-	\$	-	\$5,000	\$ 5,000
	Construction Surveying	5	Days	\$	-	\$ 1,360.00	\$ 6,800.00	\$ 6,800	\$ 6,800
	Temporary Fencing	250	LF	\$ 3.00	\$ 750.00	\$	\$	\$ 750	\$ 750
	Well Drilling and Construction	2	LS	\$	-	\$ 95,395.60	\$ 190,791.00	\$ 190,791	\$ 190,791
	Well Yield and Aquifer Testing	1	LS	\$	-	\$ 26,558.82	\$ 26,559.00	\$ 26,559	\$ 26,559
	Traffic Control	1	LS	\$	-	\$ 500.00	\$ 500.00	\$ 500	\$ 500
	Trench Excavation Safety	1	LS	\$	-	\$	\$	\$1,000	\$ 1,000
	Pavement - restoration	1,650	SY	\$ 21.00	\$ 34,650.00	\$	\$	\$ 34,650	\$ 34,650
	Pipeline, incl excav, bedding, backfill								
	12-inch diameter HDPE	12,500	LF	\$ 34.50	\$ 431,250.00	\$ 16.34	\$ 204,270.83	\$ 635,521	\$ 635,521
	Discharge point - boulder cascade	1	LS	\$ 1,000.00	\$ 1,000.00	\$ 3,000.00	\$ 3,000.00	\$ 4,000	\$ 4,000
3	CONCRETE								
	Cast-in-place concrete	4	CY	\$ 325.00	\$ 1,300.00	\$	\$	\$ 1,300	\$ 1,300
	Valve vault at well head	2	EA	\$ 3,250.00	\$ 6,500.00	\$ 1,625.00	\$ 3,250.00	\$ 9,750	\$ 9,750
5	METALS								
	Misc Metals	1	LS	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 1,000	\$ 1,000
11	EQUIPMENT								
	Submersible Well Pump & Discharge Head	2	EA	\$ 45,000.00	\$ 90,000.00	\$ 11,250.00	\$ 22,500.00	\$ 112,500	\$ 112,500
13	SPECIAL CONSTRUCTION								
	Instrumentation System	1	EA	\$	\$	\$	\$	\$10,000	\$ 10,000
15	MECHANICAL								
	Piping								
	Ductile - well field pipe and fittings	150	LF	\$ 42.00	\$ 6,300.00	\$ 36.00	\$ 5,400.00	\$ 11,700	\$ 11,700
	Valves								
	Clk-Val 8-inch Pump Control Valve	2	EA	\$ 11,800.00	\$ 23,600.00	\$ 1,180.00	\$ 2,360.00	\$ 25,960	\$ 25,960
	Butterfly, 4-inch	2	EA	\$ 675.00	\$ 1,350.00	\$ 337.50	\$ 675.00	\$ 2,025	\$ 2,025
	Butterfly, 8-inch	2	EA	\$ 1,525.00	\$ 3,050.00	\$ 305.00	\$ 610.00	\$ 3,660	\$ 3,660
16	ELECTRICAL								
	Electrical	1	LS	\$	\$	\$	\$	\$10,000	\$ 10,000
	SUBTOTAL							\$ 1,122,200	\$ 1,122,200
	CONTINGENCY							15.0%	\$ 168,400
	Contractor Overhead, Profit & Field Admin.							17.5%	\$ 225,900
	TAX							8.0%	\$ 135,200
	ESTIMATED CONSTRUCTION BID								\$ 1,651,500
	Present Worth Energy Costs (20 years)								\$68,000
	TOTAL ESTIMATED COST								\$ 1,719,500

This planning-level cost estimate assumes a 12-inch pipeline will be used to convey water from wells to discharge points. Pilot testing will be conducted to confirm actual pipeline diameter that may increase costs.

TABLE 3: Planning-level Long-term Operations and Maintenance Costs

Annual Volume Pumped (afy)	Annual Pumping Cost (at 1000 gpm)	Annual Maintenance/Operating Labor	Contingency (20%)	Total Annual O and M Cost (w/contingency) (1,000 gpm)
550	\$12,000	\$43,000	\$11,000	\$66,000