

Labor Estimate for Development of Lompoc Water Treatment Plant SCADA System

Item	Description	Duration (Weeks)	Hours	Est. Cost
1	Detail Engineering Phase (Personnel x3 for 2 Months)	24	1200	\$150,000
1.1	Control hardware and system drawing package	8	400	\$50,000
1.2	Communication system (wired and wireless) design	6	300	\$37,500
1.3	Human machine interface, design and mockup	4	200	\$25,000
1.4	Alarming and annunciation system design	2	100	\$12,500
1.5	Data collection and analysis system design	4	200	\$25,000
2	System Development Phase (Personnel x3 for 3 Months)	33	1650	\$206,250
2.1	Control hardware testing	3	150	\$18,750
2.2	Control hardware programming	6	300	\$37,500
2.3	Communication system hardware programming, mockup and testing	4	200	\$25,000
2.4	Human machine interface programming	8	400	\$50,000
2.5	Alarming and annunciation programming	4	200	\$25,000
2.6	Data collection and analysis system programming	8	400	\$50,000
3	System Testing, Installation and Commissioning Phase (Personnel x3 for 2 Months)	28	1400	\$175,000
3.1	Control hardware Installation	4	200	\$25,000
3.2	Control hardware field testing	4	200	\$25,000
3.3	Control hardware program commissioning	4	200	\$25,000
3.4	Communication system commissioning	4	200	\$25,000
3.5	Human machine interface commissioning	4	200	\$25,000
3.6	Alarming and annunciation commissioning	2	100	\$12,500
3.7	Data collection and analysis system commissioning	6	300	\$37,500
3.8	Operator training	1	50	\$6,250
3.9	Training for data collection and analysis system	1	50	\$6,250
Totals (5 months for development and 2 months for installation):		86	4300	\$537,500

LWTP Hardware and Location Summary										Est. Cost
Item	Description	Location	Com Type	Control/Monitor	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs	Comments	
1	Filtration System	Plant	Modbus Plus	Control	0	0	0	0	Existing PLC System	\$0
2	Booster Pumps	Plant	Modbus Plus	Control	0	0	0	0	Existing PLC System	\$0
3	Flash Mixer	Plant	Wireless	Monitor	2	2	2	0	New Addition	\$2,500
4	Influent Flow	Plant	Wireless	Monitor	0	0	0	0	New Addition	\$2,500
5	Flash Mixer	Plant	Wireless	Monitor	2	2	3	0	New Addition	\$2,500
6	Lime Slaker System	Plant	Wireless	Control	5	9	2	1	New Addition	\$3,000
7	Chlorine Pumping System	Plant	Wireless	Monitor	2	2	4	2	New Addition	\$2,500
8	Caustic Soda Pumping System	Plant	Wireless	Monitor	4	2	3	4	New Addition	\$2,500
9	Flocculation Polymer System	Plant	Wireless	Monitor	2	2	0	2	New Addition	\$2,500
10	Flocculation Shaft 1	Plant	Wireless	Monitor	1	1	0	0	New Addition	\$2,500
11	Flocculation Shaft 2	Plant	Wireless	Monitor	1	1	0	0	New Addition	\$2,500
12	Clarifier Sweep Arm 1	Plant	Wireless	Monitor	1	1	0	0	New Addition	\$2,500
13	Clarifier Sweep Arm 2	Plant	Wireless	Monitor	1	1	0	0	New Addition	\$2,500
14	Carbon Dioxide Basin	Plant	Wireless	Monitor	2	0	6	0	New Addition	\$2,500
15	Sludge Pumps	Plant	Wireless	Monitor	10	2	2	2	New Addition	\$2,500
16	Centrifuge Polymer System	Plant	Wireless	Monitor	2	7	3	3	New Addition	\$2,500
17	Dewatering System	Plant	Wireless	Monitor	4	4	8	8	New Addition	\$2,500
18	Sludge Conveyor System	Plant	Wireless	Monitor	12	8	0	0	New Addition	\$2,500
19	Centrate Pumps	Plant	Wireless	Monitor	10	2	2	2	New Addition	\$2,500
20	Return Water	Plant	Wireless	Monitor	1	1	0	0	New Addition	\$2,500
21	Service Air	Plant	Wireless	Monitor	2	2	1	0	New Addition	\$2,500
22	Laboratory Temperatures	Plant	Wireless	Monitor	0	0	5	0	New Addition	\$2,500
23	Remote Well 1	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
24	Remote Well 2	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
25	Remote Well 3	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
26	Remote Well 4	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
27	Remote Well 5	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
28	Remote Well 6	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
29	Remote Well 7	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
30	Remote Well 8	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
31	Remote Well 9	Remote	Radio	Monitor	6	1	2	1	New Addition	\$3,500
32	Avalon Reservoir	Remote	Radio	Monitor	5	1	3	1	New Addition	\$3,500
33	Beatie Park Street Reservoir	Remote	Radio	Monitor	2	1	2	1	New Addition	\$3,500
34	Miguelito Reservoir	Remote	Radio	Monitor	5	1	3	1	New Addition	\$3,500
35	O Street Reservoir	Remote	Radio	Monitor	5	1	3	1	New Addition	\$3,500
36	Uplands Pump Station	Remote	Radio	Monitor	5	1	3	1	New Addition	\$3,500
37	Frick Springs Surface Water Treatment Plant	Remote	Radio	Monitor	15	15	5	0	New Addition	\$3,500
38	Central headend system	Main	Wired	Comms	0	0	0	0	New Addition	\$11,500
39	Central wireless communication HUB	Main	Wired	Comms	0	0	0	0	New Addition	\$12,500
40										
										\$127,000