Appendix E
Water System Supply and Capacity Evaluation

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Water System Supply and Capacity Evaluation
Whitmore Park Track and Sports Field Project

INTRODUCTION

The Whitmore Park Track and Sports Field Project ("Project") includes the construction and operation of a high-performance, all-weather track and field facility, sports field, and associated amenities, including a concessions building, terraced seating, a covered open-air pavilion, walkways and plaza, fitness trails, workout stations, and landscaping. The Project would be located within the existing Whitmore Regional Park, which is situated Southeast of the Mammoth-Yosemite Airport.

PURPOSE

The purpose of this report is to evaluate the existing water supply and distribution system to determine if the water system is adequate to service and identify any upgrades or further analysis that may be recommended for the increased use. The Whitmore Park Track and Sports Field Project ("Project") includes the co

PROJECT LOCATION

The park is a 23.75-acre site located on the west side of Benton Crossing Road, near U.S. Highway 395, within the Whitmore Regional Park area; refer to Exhibit 2-2, *Local Vicinity*. The Project site is within a larger property addressed as 575 Benton Crossing Road (Assessor Parcel Number 060-080-002).

EXISTING CONDITIONS

The Project site is within the boundary of the Whitmore Regional Park, a facility operated by the Town of Mammoth Lakes ("Town") on land leased from the Los Angeles Department of Water and Power (LADWP). Although the Town operates Whitmore Regional Park, the facility lies outside of the Town's Municipal Boundary, within unincorporated Mono County. The Whitmore Regional Park currently contains three ball fields, the Mono County animal shelter, a restroom building, and gravel and dirt access drives and parking areas (see Exhibit 2-3, *Aerial Photograph of Site*). The water system currently supplies all of these facilities and single-family house for LADWP employee housing located near Whitmore Pool.

An evaluation of the existing water system was performed to review the water supply, water demand, and existing water storage at the park. In addition, the pump system was evaluated for the required fire flows for the site. The water system consists of a well, storage tanks, and two booster pumps. One booster pump is a 10-horse horse power multistage turbine pump, which is not currently working. The pump is designed to provide low flows for domestic use. The other pump is a 40-horse power centrifugal pump that supplies irrigation water and high flows such as fire flows.

The water system supplies the Mono County Animal Control building, one house for LADWP employees, public restrooms, four drinking fountains, and irrigation of the three ball field and perimeter trees at the park.

The existing water demand is shown in Table 1. The total demand is estimated to be 54,200 during the peak summer months. Over 90 percent of the demand is for irrigation which occurs primarly at night or evening hours.

The water supply summary is shown in Table 2. A well yield test was performed which indicated the average flow rate for the well is 190 gallons per minute with a well draw down of 7 feet. The existing well was drilled in the 1990s. A sketch of the well included for information. The depth is about 240 feet and pump is set at 100 feet. A submersible Berkeley pump model 6T10-450 with a 10 horse power motor is set in the well.

Table 3 provides a summary of the water storage capacity. The well pump pumps into the three storage tanks that have a common header system so they work in parallel to provide 57,450 gallons of

water storage. Long Valley Fire District has determined that 30,000 gallons of fire storage is required for this facility. This leaves 27,450 gallons for operational demands. In addition, there are two pressure tanks that are intended to supply low flows and minimize pump cycling.

A pump test for the 40-horse power pump was performed and is attached. Various flow rates were used to develop a water system curve and evaluate the efficiency of the system. There is a Cla-Valve down stream of the pump to regulate system pressure to a maximum of 75 pounds per square inch. A review of the pump test summary table indicates the system is not very efficient with a maximum efficiency of 60 percent. The test produced a maximum flow rate of 387 gallons per minute with a residual pressure of 34 feet and 300 gallons per minute with a residual pressure of 115 feet. The Long Valley Fire District requires a fire flow of 250 gallons per minute.

The estimated peak demand for the new running track and incremental increase for the new replacement restroom and concession facility are show on Table 4. The water demand for the running track is only to cool the surface on very hot days. Other uses may include cleaning but both uses would not be performed on the same day. It is estimated that irrigation would be applied for about 15 minutes with a 1/8-inch water application. The water supply would require an additional 45 minutes of pumping each peak day for total of about 5.5 hours each peak day.

Summary And Recommendations

The water supply pump system is adequate to meet the current and proposed demands and the existing system meets the Long Valley Fire District requirement for fire storage and fire flows. There are several recommendations that require further study. There may be grant funds to assist with funding some of the work from Southern California Edison, California Energy Commission, and Department of Water Resources.

1. It is recommended that a water system design report be prepared to analyze the system for several improvements.
2. Review pumping system including an evaluation of a Variable Speed Drive Pump System.
3. Review and map out the existing piping network to understand piping capacity and efficiency.
4. Review the storage tanks connecting manifold to reduce friction and improve flow between tanks.
5. Add a chlorination system for disinfection.

6. Review the opportunity to provide potable water to the Whitmore Pool Facility.
7. Review drafting opportunities for the LVFD to obtain water from the storage tanks in lieu of installing a standby generator or complete electrical improvement for connection to the Town owned portable standby generator.
8. Perform an operational storage study that includes the new uses and irrigation scheduling. .
9. Replace the high pressure (365 psi) multi stage domestic water pump with a appropriate sized pump for the system.

Attachments
Table 1, 2, 3, and 4, 1 page
Well section from T&T Earth Services, 1 page
Well pump curve, 1 page
Centrifugal Pump Test for the Goulds 40 hp booster pump, 1 page

Table 1

Whitmore Ball Field Park Existing Water Demand

Facility	Unit	Water Demand
Base Ball Fields/trees	5.7 acres	49902 gpd
Restroom		1556 gpd
Mono County Animal Control	4200 sf	2000 gpd
LADWP Employee Housing	1 Du	738 gpd
		54196 gpd

Table 2

Water Supply And Recovery Summary

Description	Flow Rate or Volume
Well Avg Flow Rate	190 gpm
well capacity	91200 gpd for 8 hour pumping time
Daily Pumping Time	4.8 hours

Maximum observed well drawdown was 7 feet.

Table 3

Water Storage

Existing Capacity		
Horizontal Steel Plastic Lined Tanks	3 ea	57,450 gal
3 each 19,150 gal tanks		

Does not include domestic pressure tanks. 1 each 150 gal and 1 each 250 gal

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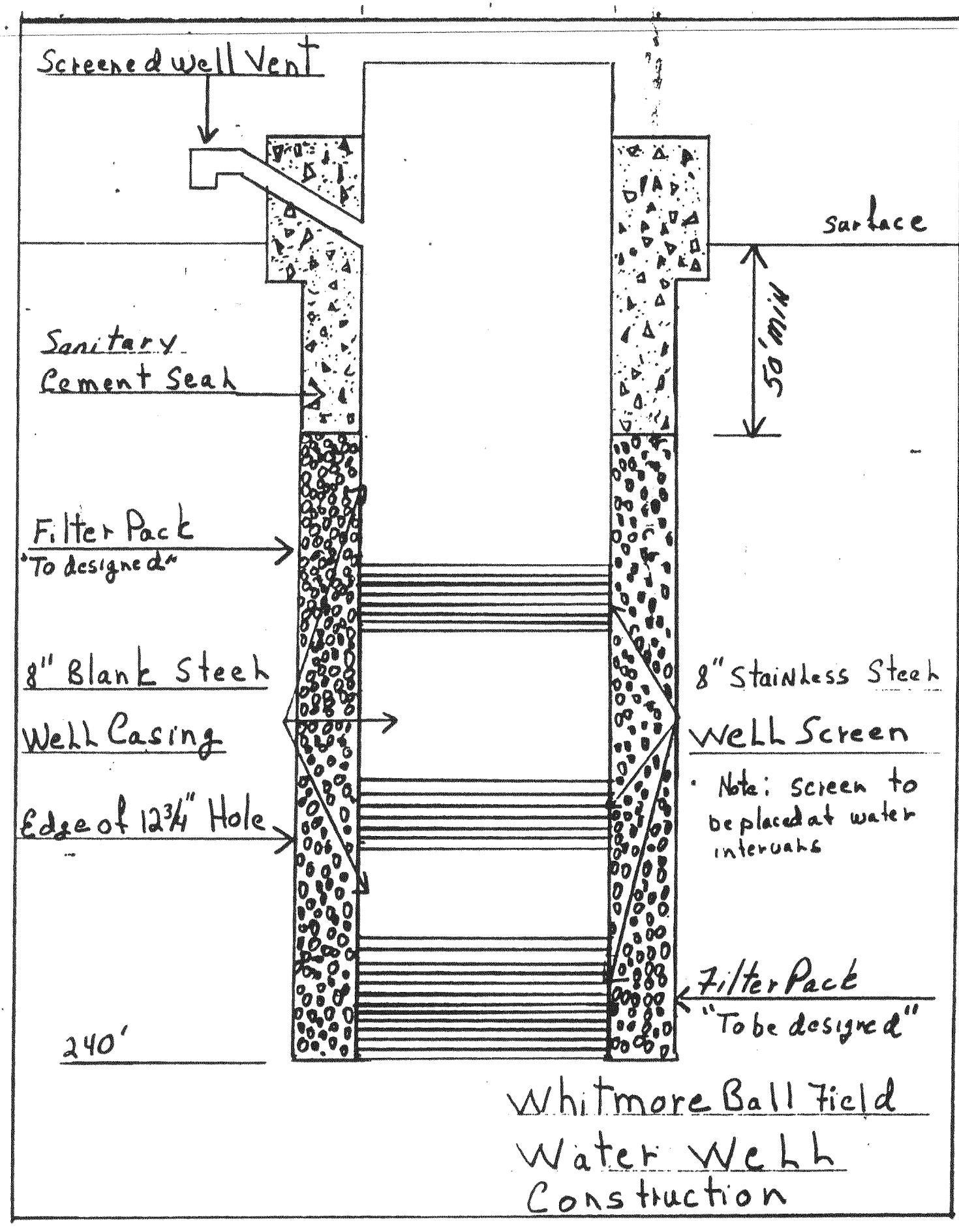
Table 4

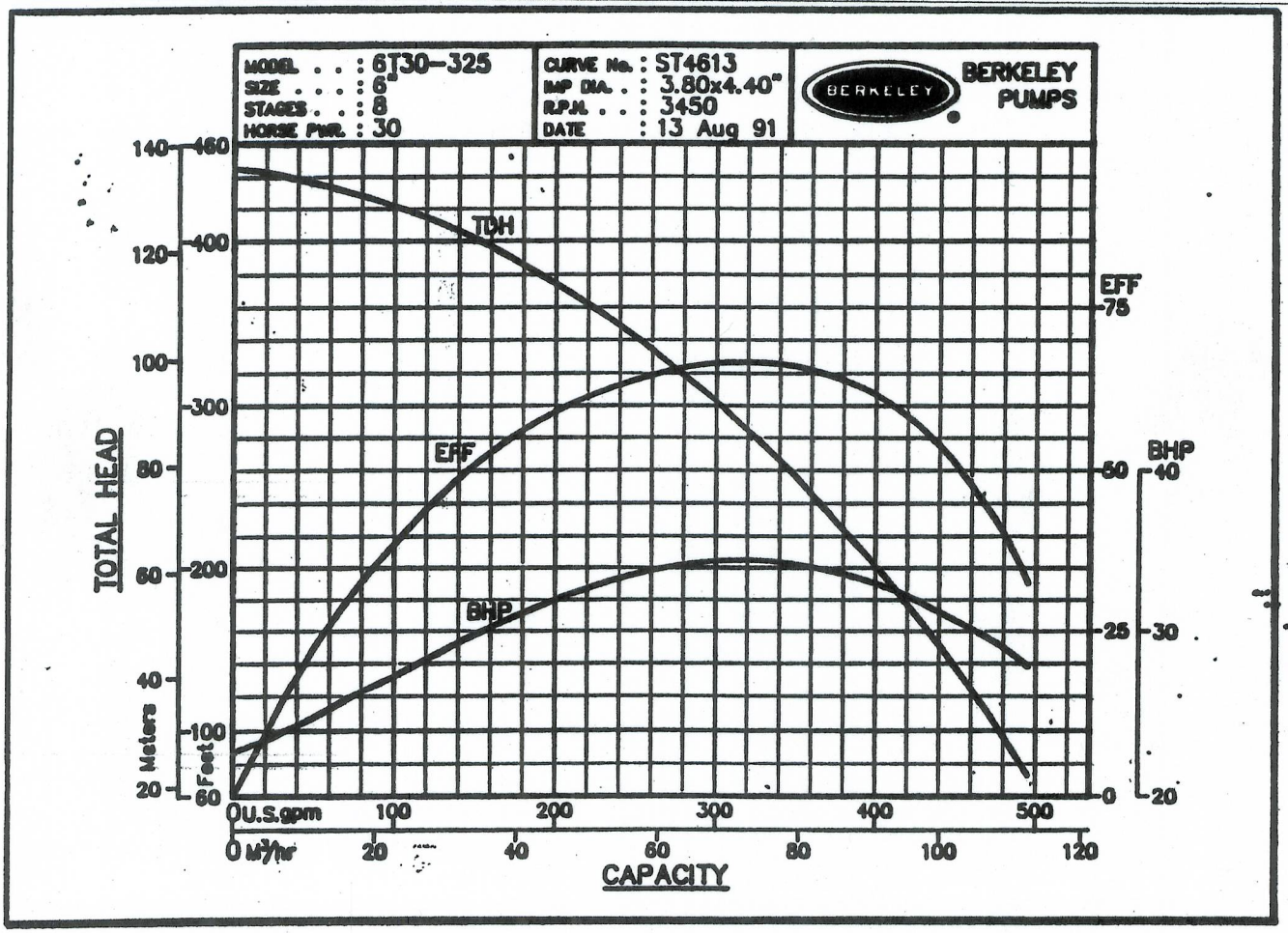
Whitmore Track Project Demand

Facility	Unit	Water Demand
Track Fields/trees	2.1 acres	7920 gpd
Restroom n et increase		650 gpd
		8570 gpd
Additional well recovery pumping is	45 minutes	



Whitmore Ball Field Water Well Construction

Submersible Turbine Model 6T30-325



Specifications

LIQUID END WEIGHTS

DESCRIPTION	MOTOR FLANGE	WEIGHT LBS.
Standard Motor	6	137.50
Wye-Delta Motor		
Standard Motor		
Wye-Delta Motor		

BOWL DATA

Bowl No. L06755 Type: THREADED

Material: CAST IRON Discharge Size: 3"F/4"M NPT

IMPELLER DATA

Type ENCLOSED

Thrust Constant K 2.65 Lbs./Ft. of Head

Eye Area: 6.28 Sq. In.

Number Stages: 8

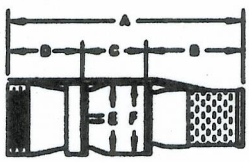
Impeller No. L06951

Impeller Diameter 4.40 x 3.80

Material Type: BRONZE

Pump Shaft Diameter 1"

OUTLINE DIMENSIONS



A – Liquid End Length
B – Suction Connection Length
C – Stage Length
D – Discharge Connection Length
E – Bowl Diameter
F – Diameter Across Lead Guard

DESCRIPTION	MOTOR FLANGE	A	B	C	D	E	F
Standard Motor	6	53.54	10.88	4.88	3.62	5.38	5.81
Wye-Delta Motor							
Standard Motor							
Wye-Delta Motor							

All dimensions shown in inches.

Centrifugal Pump Field Test Procedure (Suction & Discharge Gauge Measurement)

Manufacturer / Model # / etc	Gould Model 3196					
Job Name	Whitmore Park Ball Fields					
Date	10/12/2010	Witness				
Motor Serial Number	96-48	Specific Gravity		1.10	Water Temp	60 °F
Pump Serial Number	715C715-1	Q Measurement Method		Large Bucket & Stopwatch		
Time of Day	1:30 PM					
Ambient Temp	70	°F	°F	°F	°F	°F
Motor Temp		°F	°F	°F	°F	°F
Vibration (in/sec peak to peak)						
Pump						
Flow (GPM)	0	70	107	182	300	387
Suction Gauge Head ± (ft)	10.0	10.0	10.0	10.0	10.0	9.0
Suction Piping ID (in)	4.0	4.0	4.0	4.0	4.0	4.0
Discharge Gauge Head (ft)	161.7	161.7	161.7	150.2	115.5	34.7
Gauge to Gauge Distance (ft)	200.0	200.0	200.0	200.0	200.0	200.0
Discharge Elbow Friction (ft)	2.0	2.0	2.0	2.0	2.0	2.0
Discharge Elbow ID (in)	2.0	2.0	2.0	2.0	2.0	2.0
Suction Velocity (fps)	0.0	1.8	2.7	4.6	7.7	9.9
Suction Hv (ft)	0.0	0.0	0.1	0.3	0.9	1.5
Discharge Velocity (fps)	0.0	7.1	10.9	18.6	30.6	39.5
Discharge Hv (ft)	0.0	0.8	1.9	5.4	14.6	24.3
TDH (ft)	353.7	354.4	355.4	347.2	321.2	250.4
Motor - 3 Phase						
Voltage - Phase a to b	460	460	460	460	460	460
Voltage - Phase b to c	460	460	460	460	460	460
Voltage - Phase c to a	460	460	460	460	460	460
Amperage - Phase a	32	33.3	35	35	34.4	38
Amperage - Phase b	32	32	35	35	34.7	38
Amperage - Phase c	32	33	34	34	34.7	37
Motor Efficiency (0.XX)	88.5%	88.5%	88.5%	88.5%	88.5%	88.5%
Motor or Measured PF (0.XX)	1.15%	1.15%	1.15%	1.15%	1.15%	1.15%
KW Meter Reading (KW)	410.0	410.0	410.0	410.0	510.0	730.0
Average Voltage	492.3	493.1	495.0	631.6	494.9	460.0
Average Amperage	32.0	32.8	34.7	34.7	34.6	37.7
Motor HP @ Test Point	0.4	38.2	40.5	51.7	40.5	40.9
Hydraulic HP @ 100% Eff	0.0	6.3	9.6	15.9	24.3	24.5
Pump Efficiency @ Test Point	0.0%	16.4%	23.7%	30.8%	60.1%	59.8%

Printing - Set to landscape @ 75% of full size

Entered Data

Calculated Results

Calculations:

TDH = (Hd + GG + Fd + Hvd - Hs - Hvs)

Where Hd = discharge gauge pressure
GG = vertical distance between gauges
Fd = friction in the discharge elbow
Hvd= velocity head at the discharge
Hs = suction gauge pressure
Hvs= velocity head at the suction

Velocity (V) = (Q * 0.4085) / ID^2

Where Q = Flow
ID = pipe inner diameter
0.4085 conversion constant

Velocity Head (Hv) = V^2 / 2g

Where V= flow velocity
g = gravitational constant

BHP @ Test Point = (1.732 * Va * Aa * E * PF) / 746

Where Va = average voltage
Aa = average amperage
E = motor efficiency
PF = power factor
1.732 wye /delta constant
746 watts / hp @ 100%

Hydraulic HP = (Q * H) / 3960

Where Q = flow
H = head
3960 conversion constant

Pump Eff = Hydraulic HP / BHP