6.0 Capital Improvements Program (CIP)

The overall goal of the storm drain pump station assessment was to develop a plan for the City to fund necessary improvements to the City's storm drain pump stations. This chapter presents the improvements that are recommended for incorporation in the City's Capital Improvements Program (CIP). A prioritization guidelines and summaries of proposed CIP projects are presented herein.

6.1 CIP Prioritization Guidelines

Prioritizing projects allows the City to determine which projects should be funded within the CIP planning time-frame, as well as the order in which projects should be pursued within that time frame. The prioritization was focused on identifying projects that should be funded in the short-term (high priority), those that should be implemented to improve pump station reliability, capacity, or safety (necessary projects), and those that should be implemented as funding becomes available (discretionary projects).

The projects are prioritized into three main categories (in order of high priority to low priority):

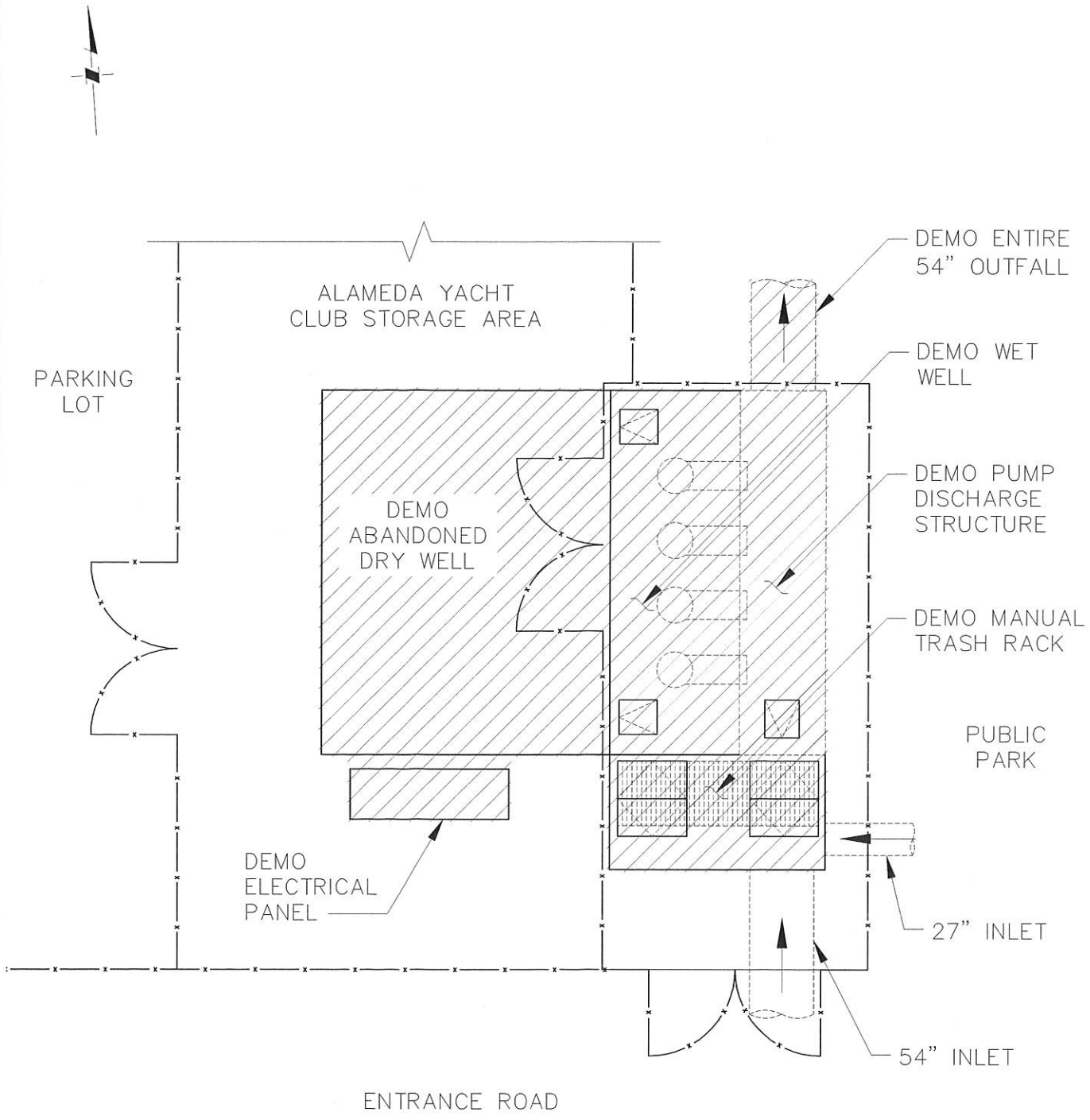
- Level 1 - High Priority – defined as projects which are necessary to prevent a significant risk of flooding from heavy storm water runoff events.
- Level 2 - Necessary Projects – defined as projects that must be done to improve pump station capacity and/or reliability or safety.
- Level 3 - Discretionary Projects – defined as those that are needed in the long-term, but where the City has a significant level of control as to when they should be implemented.

6.2 Level 1 - High Priority Projects

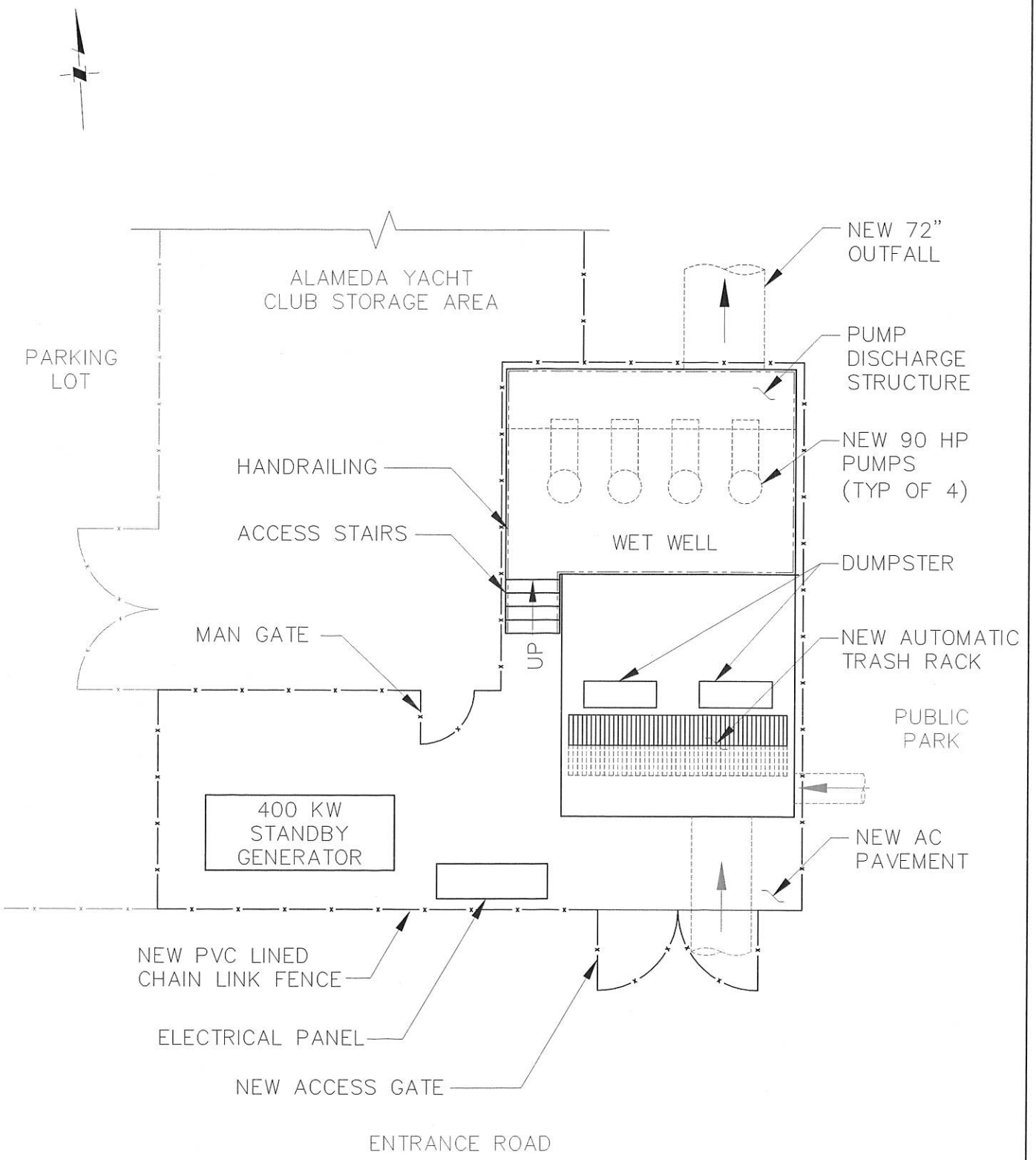
Level 1 or high priority projects are summarized in Table 6-1. For more information concerning the estimated costs for improvements at each station, refer to Appendix D.

Table 6-1 Summary of Level 1 High Priority Projects

Pump Station	Summary of Recommended Improvements	Project Cost
Arbor	Complete Pump Station Replacement. Outfall replacement. Install Standby Generator and Automatic Trash Rack. The Existing Arbor Pump Station and Proposed Station are shown in Figures 6-1 and 6-2 respectively.	$3,891,000
Central/Eastshore	Complete Pump Station Replacement. Outfall Replacement. Install Standby Generator and Automatic Trash Rack. The Existing Central/ Eastshore Pump Station and New Proposed Pump Station are shown in Figures 6-3 and 6-4 respectively.	$2,805,000
Northside	Improvements to Northside constructed per the Northside Pump Station Upgrades Project No. PW 02-10-06.	$900,000[1]



PSOMAS	CITY OF ALAMEDA STORM DRAIN PUMP STATION ASSESSMENT REPORT	EXISTING ARBOR PUMP STATION	FIGURE NO. 6-1 JOB NO. 6ALA010100



PSOMAS	CITY OF ALAMEDA STORM DRAIN PUMP STATION ASSESSMENT REPORT	PROPOSED ARBOR PUMP STATION	FIGURE NO. 6-2 JOB NO. 6ALA010100

FIGURE 3-1
ARBOR PUMP STATION
PUMP AND SYSTEM CURVES (ALL PUMPS)

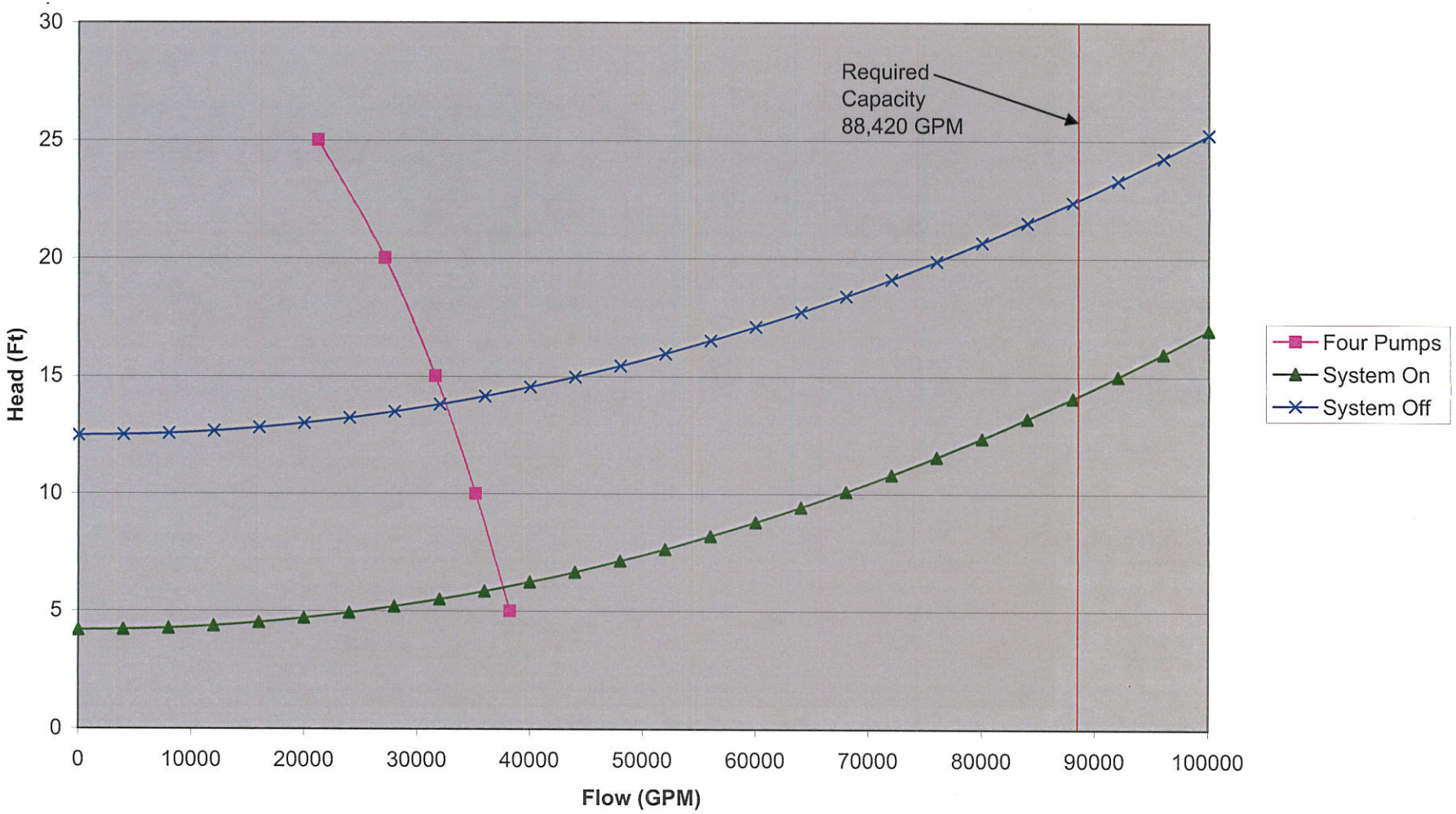


FIGURE 3-2
ARBOR PUMP STATION
EXISTING 54-INCH OUTFALL

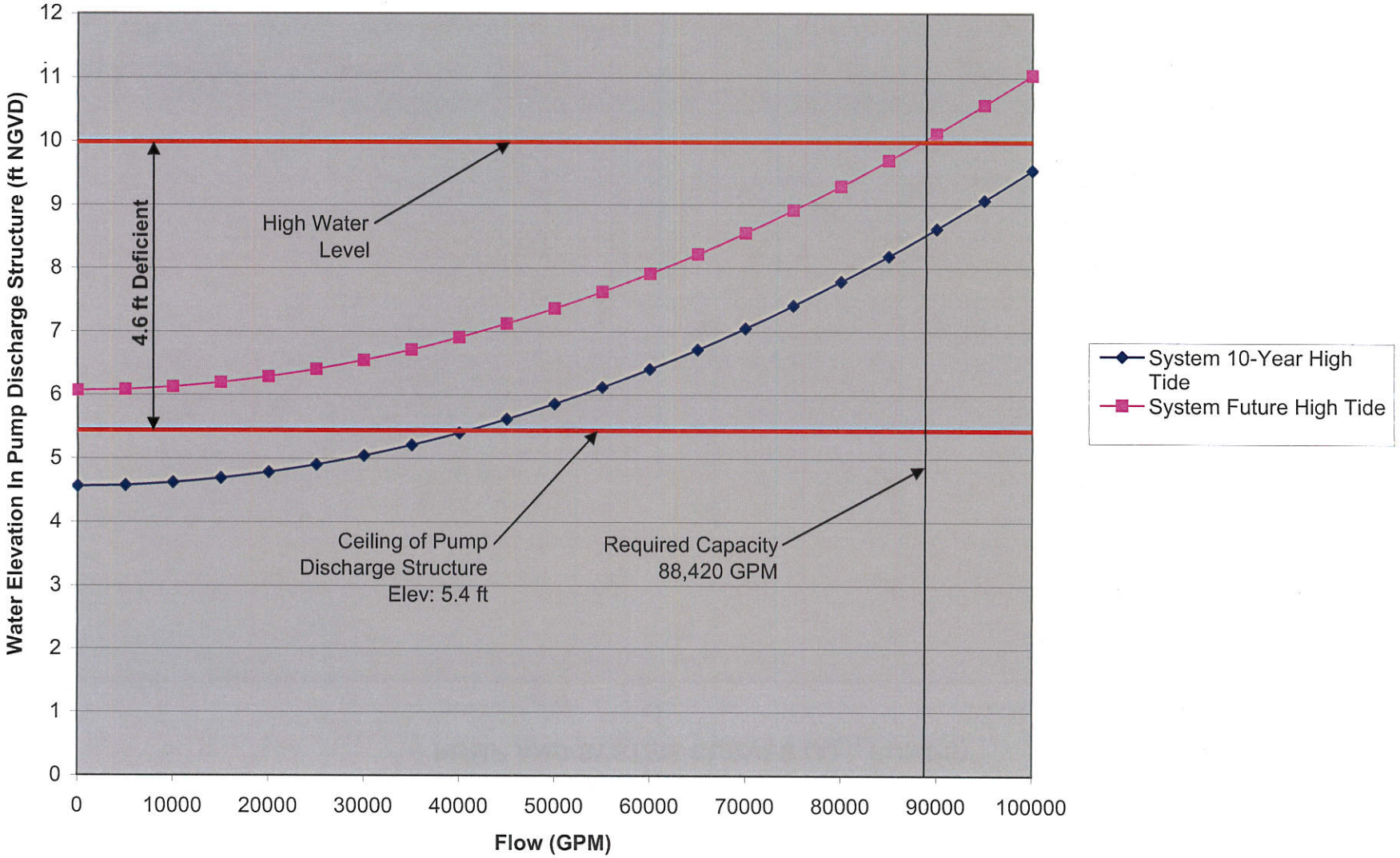
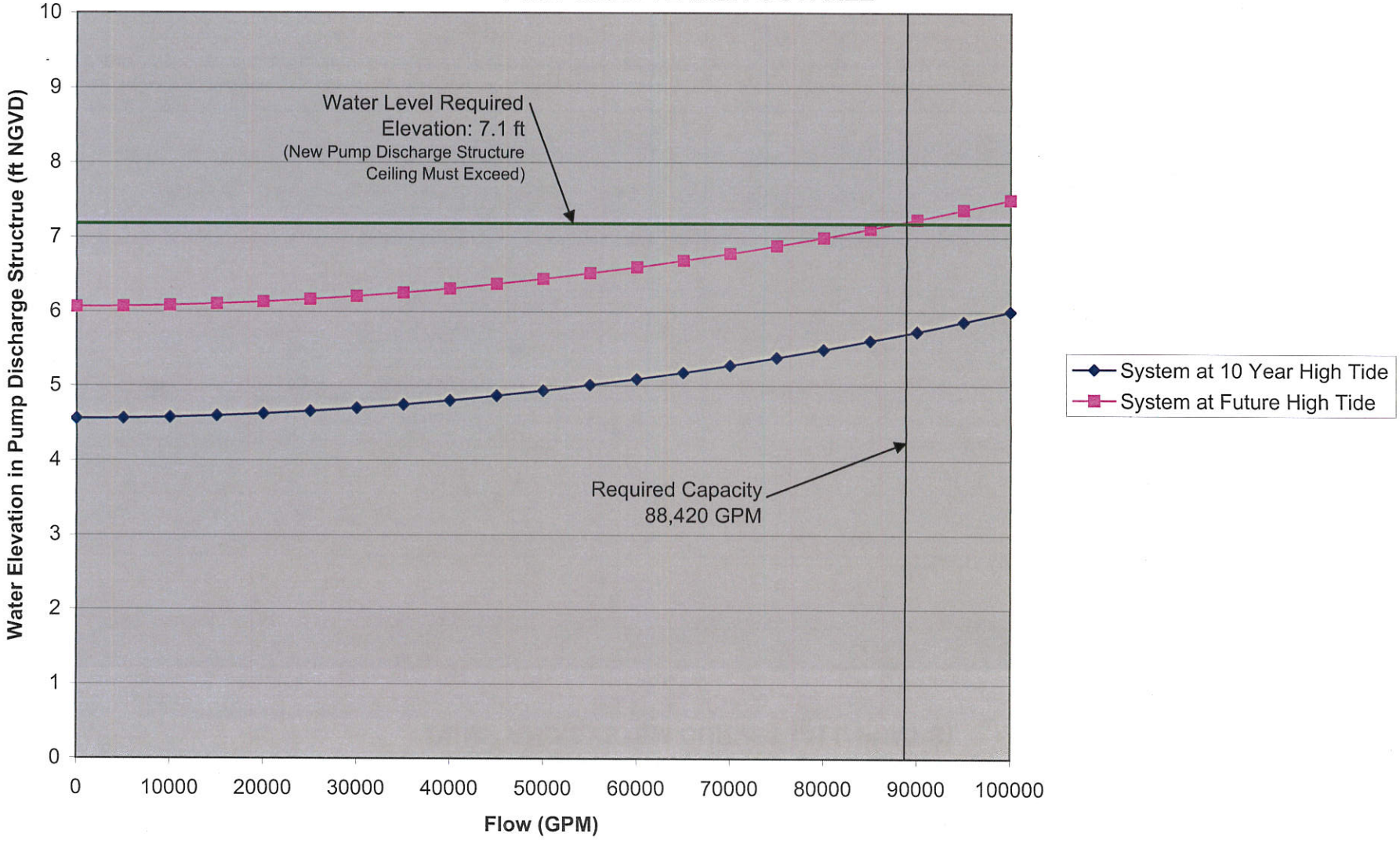


FIGURE 3-3
ARBOR PUMP STATION
PROPOSED 72-INCH OUTFALL

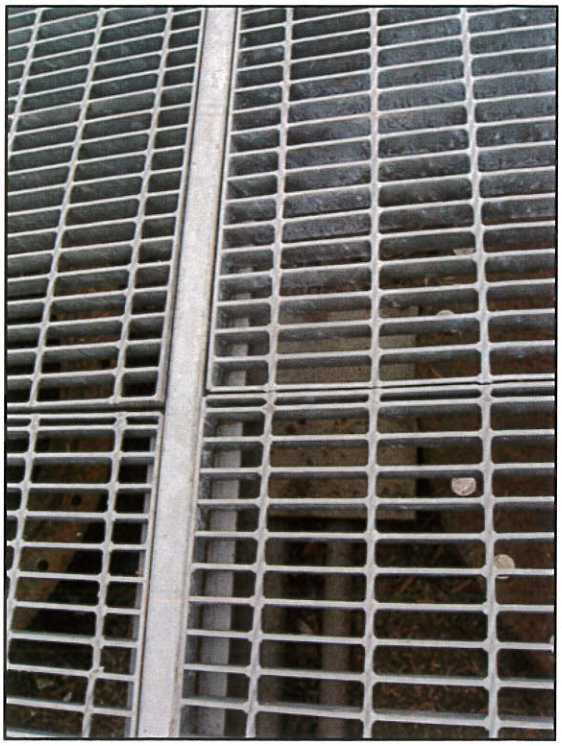


ARBOR PUMP STATION

Pump Control Panel, in shared area with Alameda Yacht Club.

54-inch outfall into San Francisco Bay.

Pump barrels under heavy steel grating.



Electrical junction box between pump 3 and pump 4 barrels. Difficult access.

Manual trash rack in confined space.

Heavy steel hatches.

Hatch near pump 4 is difficult to open.

ARBOR PUMP STATION

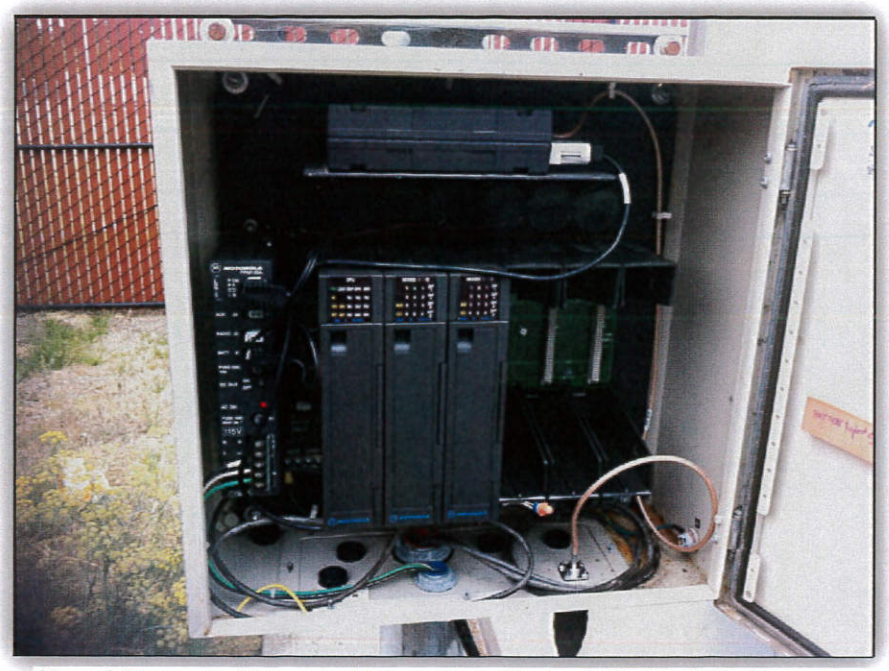
Abandoned dry well remains on-site.

Shared access with Alameda Yacht Club.

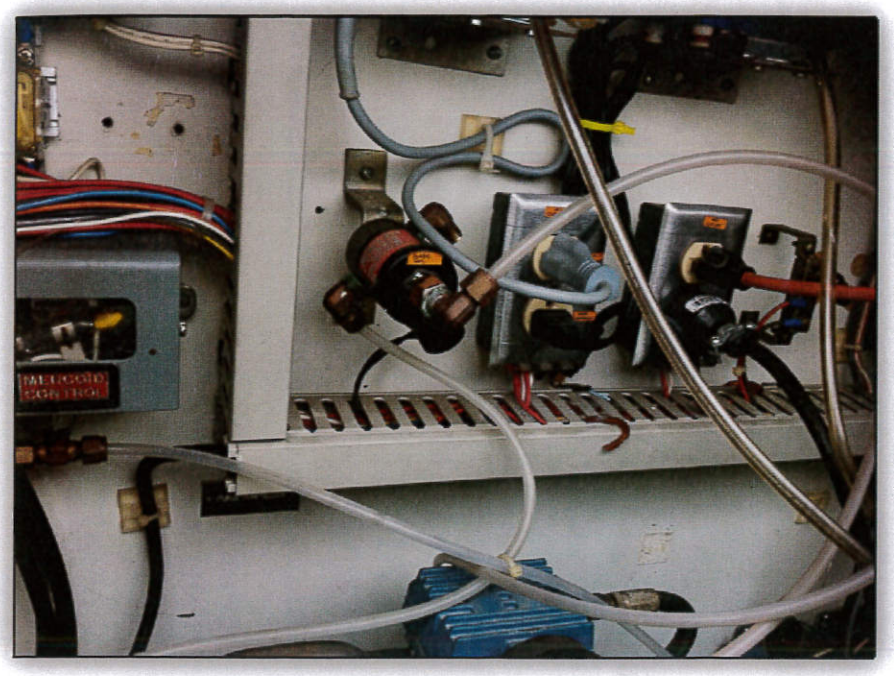
SCADA SYSTEM

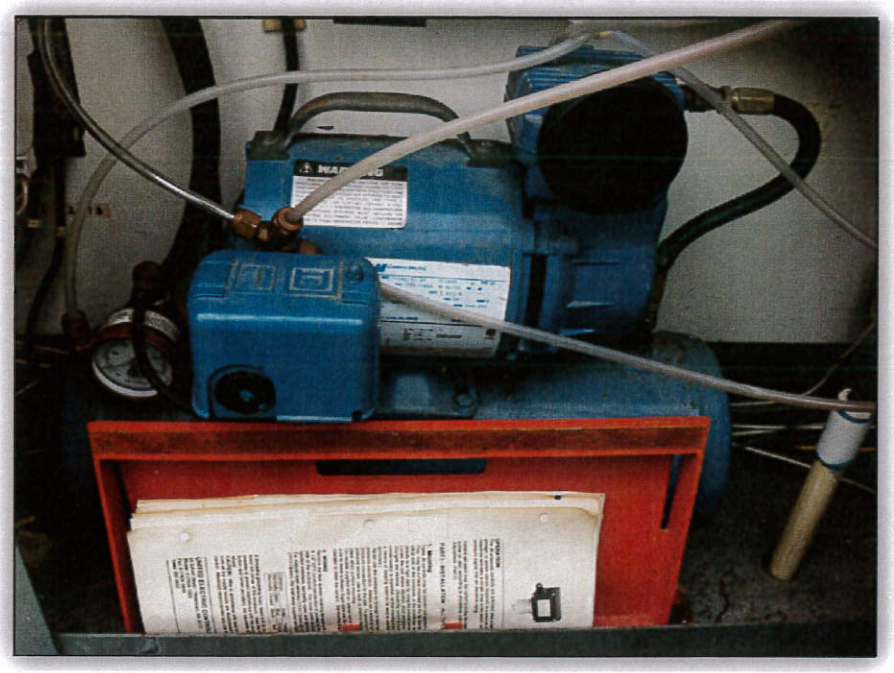
SCADA

City of Alameda Pump Vision Installation

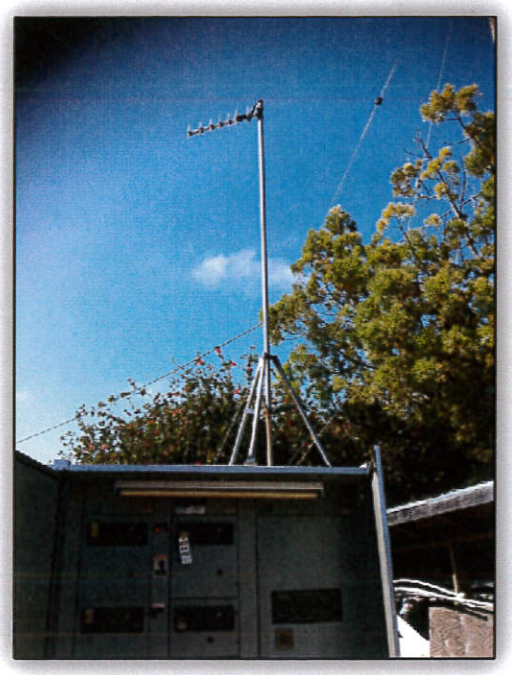


City of Alameda Motorola Moscat Installation with MDS Radio





City of Alameda Bubbler System Installation for level control. Many of these have been changed out and replaced with a level transmitter.



All stations have well mounted yagi antennas for radio communication. The control enclosures for all of the stations, even this particular one with the older control hardware are in reasonably good condition.

Arbor Pump Station

Capital Improvements Cost Estimate

Deficiency	Action Required	Cost Estimate
Insufficient Pump Capacity, Operations and Maintenance Issues, Safety Issues	Demo Existing Station and Abandoned Dry Well	$54,000
	Construct New Station Structure (wet well, discharge, and trash rack structure)	$367,000
	Install new pumps	$464,000
	Install New Pump Barrels, Piping, and Flap Gates. Install Backflow Preventer and Hose for Wash down	$111,000
	Install A.C Paving, Entire Site	$7,000
Insufficient Outfall Capacity	Install new 72-inch RCP outfall	$112,000
Lacks Backup Power	Install New Standby Generator and ATS	$155,000
Labor intensive manual trash rack	Install Automatic Trash Rack	$450,000
Lacks Private Fence Around Entire Station	Install New Site Fence	$20,000
Electrical, Instrumentation, SCADA required for New Equipment	Install new conduit, wiring, control panel, PLC, MCCs, site lighting (plus programming, testing and training)	$363,000
	Subtotal:	**$2,103,000**
	30% Estimating Contingency:	$631,000
	55% for Contingency, Admin., CM, and Engr:	$1,157,000
	Total w/ Contingency:	**$3,891,000**

1. Cost estimate in April 2011 dollars.

Appendix E

Proposed Pumps

PERFORMANCE CURVE

PRODUCT	PL 7101 /735
TYPE	
DATE	2011-02-09
PROJECT	Arbor PS Alemeda
CURVE NO	63-505N4
ISSUE	5

	1/1-LOAD	3/4-LOAD	1/2-LOAD
POWER FACTOR	0.60	0.53	0.42
EFFICIENCY	89.5 %	89.0 %	87.0 %
MOTOR DATA	---	---	---

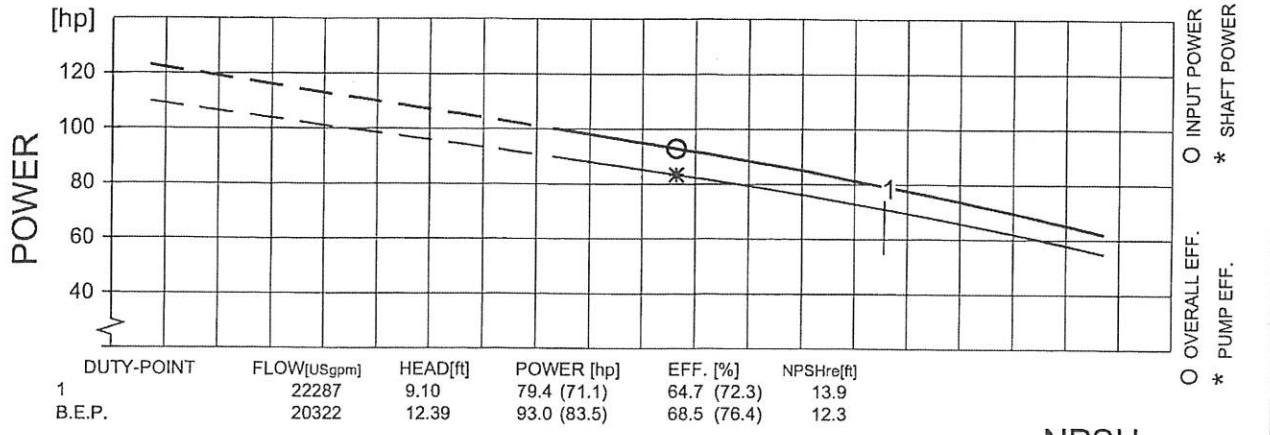
RATED POWER	90	hp
STARTING CURRENT ...	515	A
RATED CURRENT ...	157	A
RATED SPEED	500	rpm
TOT.MOM.OF INERTIA ...	7.7	kgm2
NO. OF BLADES	4	

BLADE ANGLE	8 deg
IMPELLER DIAMETER	755 mm
MOTOR #	43-44-14AA
STATOR	01D
REV	13
FREQ.	60 Hz
PHASES	3
VOLTAGE	460 V
POLES	14
GEARTYPE	---
RATIO	---

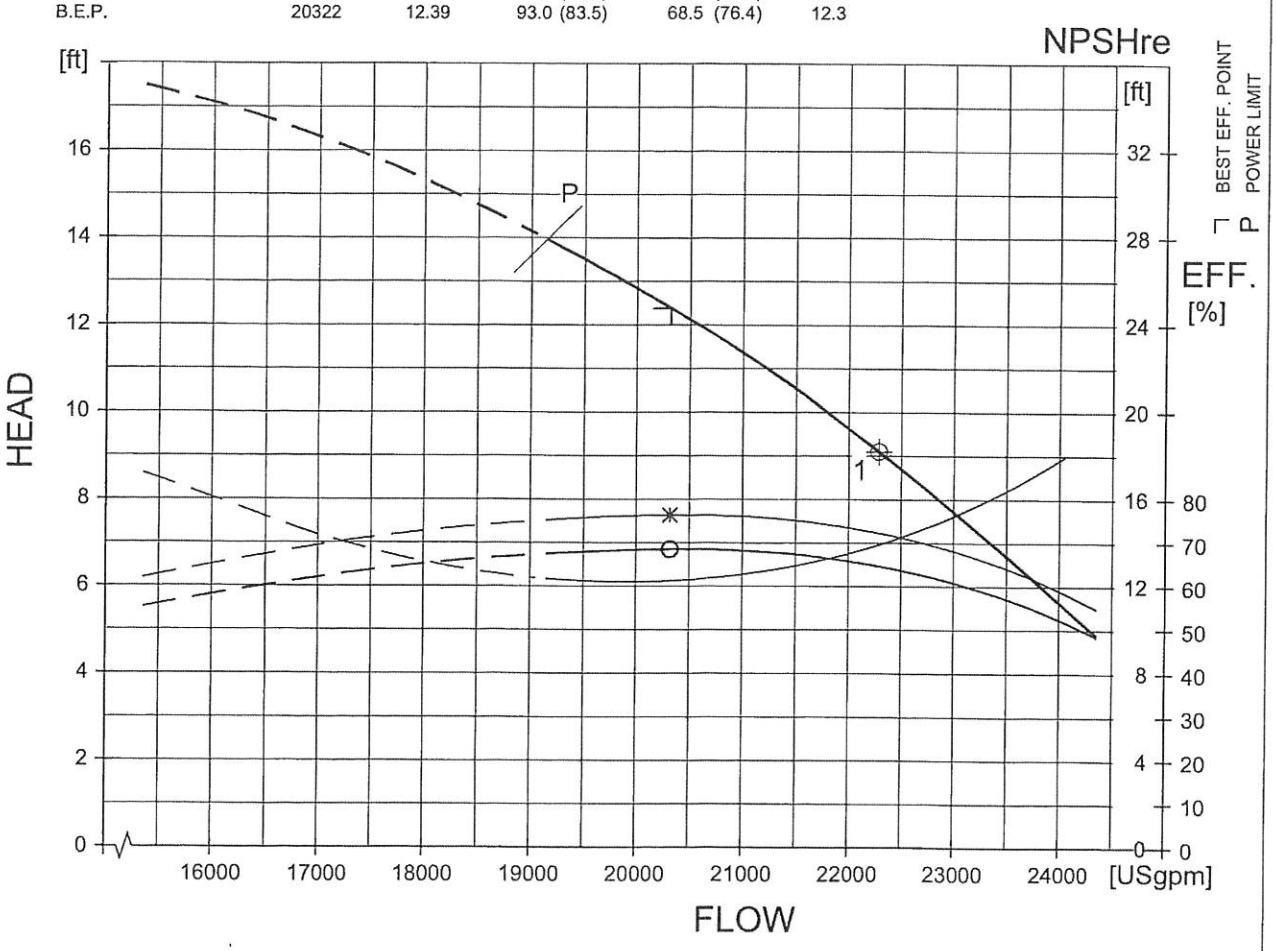
COMMENTS

INLET/OUTLET: -/-

IMP. THROUGHLET: ---



DUTY-POINT	FLOW[USgpm]	HEAD[ft]	POWER [hp]	EFF. [%]	NPSHre[ft]
1	22287	9.10	79.4 (71.1)	64.7 (72.3)	13.9
B.E.P.	20322	12.39	93.0 (83.5)	68.5 (76.4)	12.3

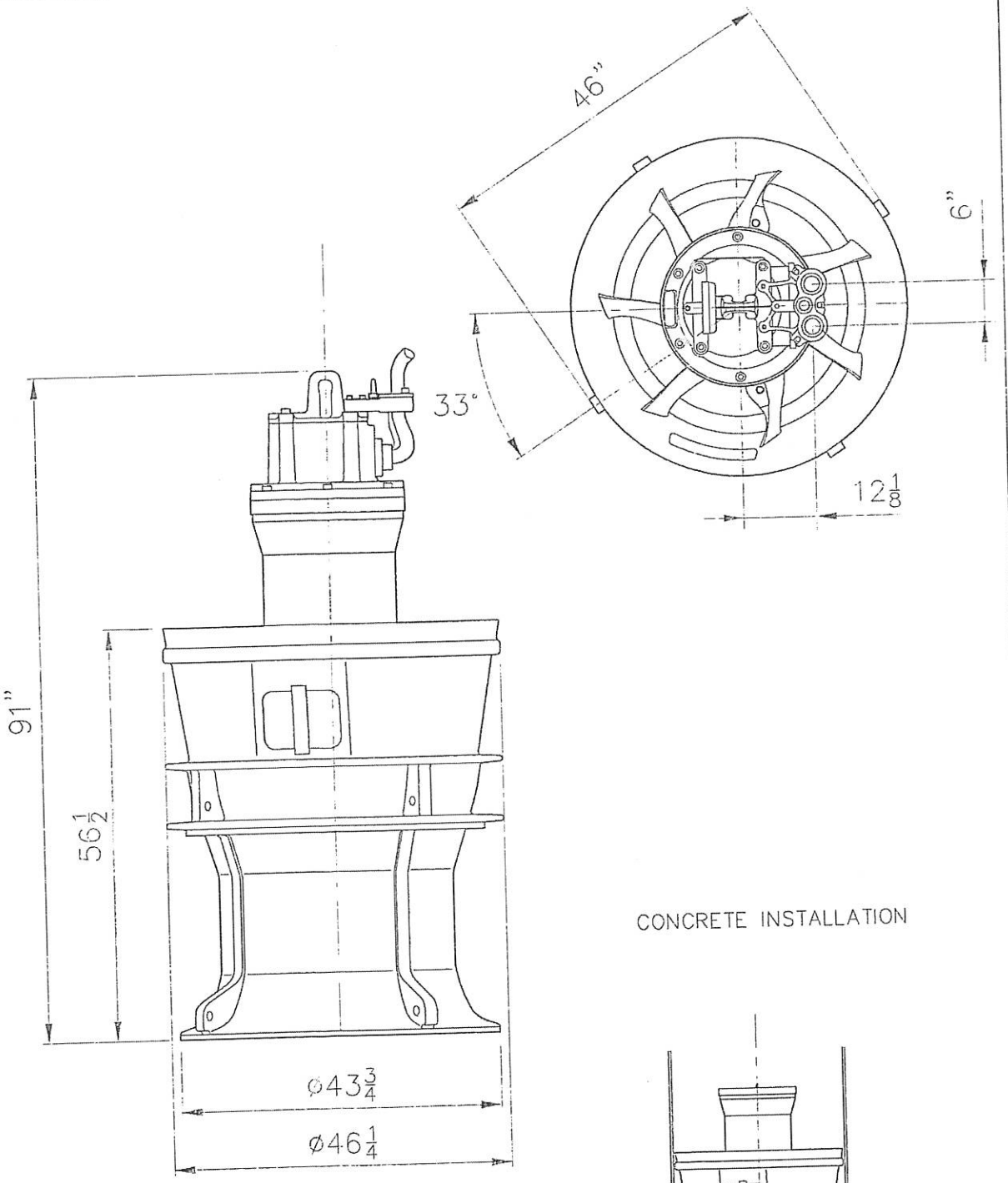


NPSHre = NPSH3% + min. operational margin

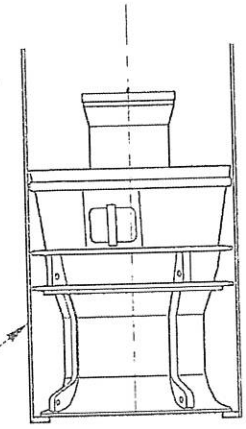
Performance with clear water and ambient temp 40 °C

HI B Curve

FLYPS3.1.6.6 (20090313)



CONCRETE INSTALLATION



SEE "FLYGT SYSTEM AND APPLICATION ENGINEERING BULLETIN"

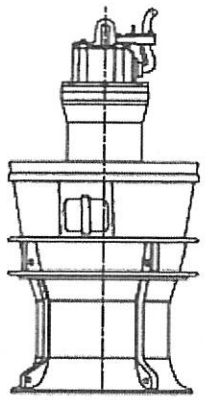
Weight (lbs)
Total
4965

AUTOCAD DRAWING	Description: Dimensional drwg PL 7101 735/745	Drawn: K	Checked: AK
		Date: 04-1202	
		Scale	Page no: 5709
	6445700		1

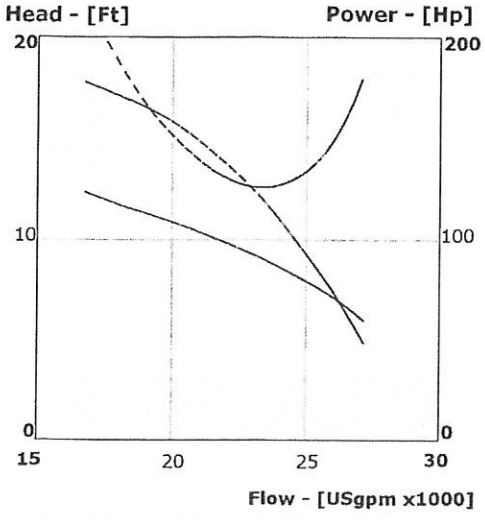
FLYGT

PRODUCT: PL 7101 / 735

Product picture



Curves ⊕ **Enlarge** Available blade angle: 10° *



Pump Data

Curve id: 63-505B4 Propeller: 505 Poles: 14 - pole Motor: 43-44-14AA Frequency: 60 Hz

Motor Data

Rated output power Hp (kW)	Ø	Nominal voltage (V)	Full load current (A)	Locked rotor current (A)	Locked rotor kVA	Locked rotor code letter kVA/Hp	Poles/rpm
90 (67)	3	460	157	515	410	E	14/500

Pump motor Hp	Efficiency			Power factor		
	100% load	75% load	50% load	100% load	75% load	50% load
90	89.5	89	87	0.6	0.53	0.42

Cable Data

HP	Cables	Volts	Max. length (Ft)	Cable size/Nominal OD.	Conductors (In one cable)	Type	Part number
90	1	460	515	4 G 70 1.85"-(47mm)	(3) 70 mm² (PWR) (1) 70 mm² (GND)	STD	942067
Pilot cable				S12 X 1.5 30.0 mm (1.18")	(12) 1.5 (CTRL)		94 08 94

Engineered for life

DO Monitoring at Stormwater Pump Stations July 8, 2010

Regulatory Background

Provision C.2.d.ii. (2) of the California Regional Water Quality Control Board San Francisco Bay Region MRP (Final Order No. R2-2009-0074) requires local municipalities to "inspect and collect DO data from all pump stations twice a year during the dry season after July 1, starting in 2010." Provision C.2.d.ii. (3) further states that "if DO levels are at or below 3 milligrams per liter (3 mg/L)", the municipality will " …apply corrective actions…." and "…verify that corrective actions were effective by increasing DO monitoring interval to weekly until two weekly samples are above 3 mg/L." The MRP further states that pump station discharges that remain in the stormwater collection system or that discharge into a dry creek are exempt from the monitoring program.

Equipment

The following equipment was used to measure dissolved oxygen: **Dissolved Oxygen Meter YSA 550A**

Objectives & Procedures

The objective of water sampling is to obtain samples that are most representative of the pump station discharge water prior to entering receiving waters. Therefore, pump station discharge samples were taken as follows:

a. Outfall(s) prior to entering receiving waters, if feasible (i.e., Webster Street pump station).
b. Contact Channel when collecting sample from outfall is not feasible (submerged outfalls or pump station does not have an outfall)
c. Pump station wetwell only if options collecting sample from outfall or obtaining a reading from contact channel are not feasible (i.e., golf course pump station).

With exception of the Golf Course, pump stations were intentionally activated to obtain discharge for the purpose of DO monitoring.

DO Monitoring Results

1. Third Street Pump Station Date: 7/8/2010 Time: 10:00 am

   DO reading from contact channel[1]: 6.8
   DO reading from pump station wetwell 5.75
   Receiving water: Oakland Inner Harbor from storm drain system.

   No trash rack present.

   Note: Since discharge flows into storm drain system, (from there gravity flow into Oakland Inner Harbor), pump station is exempt from DO monitoring program.

2. Main Street Date: 7/8/2010 Time: 10:30 am

   DO reading from contact channel: 7.7
   DO reading from pump wetwell: 5.4
   Receiving water: Oakland Inner Harbor

[1] Contact channel is located downstream of pump wetwell.

Trash rack present.

3. Webster Street Date: 7/8/2010 Time: 10:45 am

DO reading from wetwell (no contact channel): .65
DO reading from outfall (used bucket to collect water): 4.41
Receiving water: Oakland Inner Harbor

Note: There is no contact channel – discharged is pumped directly into Oakland Inner Harbor. No water gets discharged without running the pump(s). At the time of sampling there were about 12 feet of water in the wetwell. However, the pump has not been operating for over 3 weeks because 2 motors (out of 3 motors) are down and need to be replaced. Usually, (when all 3 motors work) pump station is kept on auto-pilot and pump comes on as soon as there are 5 feet of water in the wetwell. Repair and pump station cleaning is scheduled for August 2010.

Trash rack present.

4. Arbor Street Date: 7/8/2010 Time: 11:00 am

DO reading from contact channel: 6.31
From contact channel water flows (gravity flow) to outfall. Outfall was under water.
Receiving water: Oakland Inner Harbor

No trash rack present.

5. Northside Date: 7/8/2010 Time: 11:30 am

DO reading contact channel: 4.30
From contact channel water flows (gravity flow) to outfall. Outfall was under water.
Receiving water: Oakland Inner Harbor

Trash rack present

6. Eastshore/Central Date: 7/8/2010 Time: noon

DO reading contact channel: 8.6
From contact channel water flows (gravity flow) to outfall. There is no flow without running pump.
Receiving water: San Leandro Channel

No trash rack present.

7. Golf Course Date: 7/8/2010 Time: 12:15 pm

DO reading from pump station wetwell: 13.5
Receiving water: San Leandro Channel

Note: Reading from pump station contact channel was not feasible.

No trash rack present.

Stormwater Pump Station: Dry Weather DO Sampling

Date: 8/12/10 **Time:** 11:15 AM

Name/s: Kurt Maire (PBSomas)

Pump Station: Arbor Street

Sample #: 4

DO Value (mg/L): 7.45 mg/L **Method Used:** YSI 550A D.O. meter

Notes:

From contact channel after running pumps for several seconds.