

**TOWN OF PLYMOUTH CAPITAL IMPROVEMENT PLAN REQUEST
FY24 FALL ANNUAL TOWN MEETING**

Department: Plymouth Public Schools	Priority #:	2
Project Title and Description: Redesign and construction of South Elementary School well	Total Project Cost:	\$240,000.00

Department/Division Head: Matthew Durkee

Check if project is: New ☒ Resubmitted ☐ Cost estimate was developed: Internally ☐ Externally ☒

For project re-submittals, list prior year(s):

List any funding sources and amounts already granted: _____

Basis of Estimated Costs (attach additional information if available)			If project has impact on 5 Year Plan and future operating budgets, insert estimated amounts.		
Capital:	Cost	Comments	Fiscal Year:	Capital	Operations & Maintenance
<i>Planning and Design</i>			FY23		
<i>Labor and Materials</i>	\$175,000.00		FY24		
<i>Administration</i>	\$65,000.00		FY25		
<i>Land Acquisition</i>			FY26		
<i>Equipment</i>			FY27		
<i>Other</i>					
<i>Contingency</i>					
Total Capital	\$240,000.00				

Project Justification and Objective: South Elementary School well holding tank is located in a cement bunker. There have been numerous times when the school was without water. The MASSDEP has cited the district due to water system issues and have requested a redesign of the water system. This will bring the holding tanks into the building

and add a new treatment system. This redesign will abandon the underground water tank and bunker. _____

For Capital Project Requests:

Will this project be phased over more than one fiscal year? If yes, enter it on the 5 Year Plan Yes ☐ No ☒
Can this project be phased over more than one fiscal year? Yes ☐ No ☒

For Capital Equipment Requests:

☐ Check if equipment requested is replacement and enter the year, make & model, VIN and present condition of existing equipment

What is the expected lifespan of this new/replacement equipment: 10+ years

Attach backup information, estimates, or justification to support this request.



Design Basis Summary - South Elementary School Water System

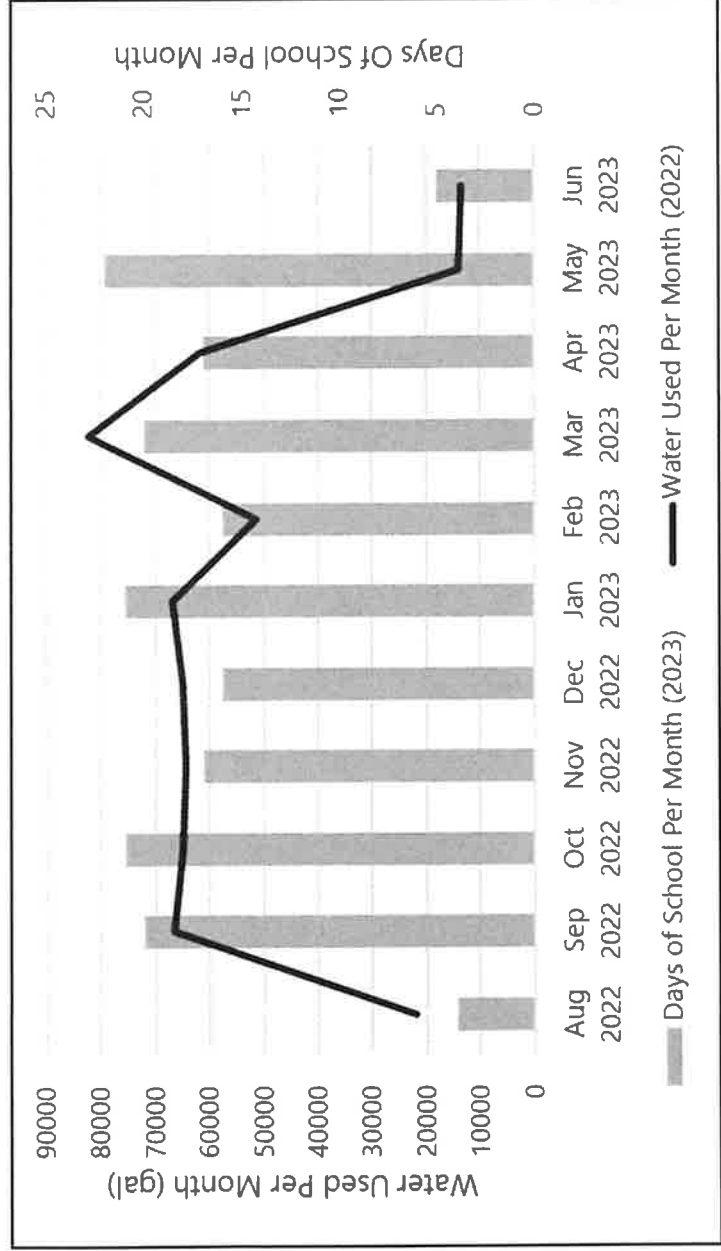
Plymouth Public Schools
October 2nd, 2023



Presentation Outline

1. Water Usage
2. Design Flow Rates & Fire Service Requirements
3. Pump Performance
4. Existing Conditions
 1. Basement
 2. Underground Storage Tank Vault
5. Proposed Conditions
 1. Cartridge Filter
 2. Control Valve
 3. Hydropneumatic Tank
 4. Soda Ash Injector and Chemical Feed Rates
 5. Sketch of System
6. Cost Analysis
 - A. Underground Vault Abandonment
 - B. Construction Costs
 - C. Procurement

Water Usage



Design Flow Rates & Fire Service Requirements

Month	Meter Readings				Days of School Per Month (2023)
	Left Hand Dial (CF, Flows Above 10 GPM)	Right Hand Dial (CF, Flows Below 10 GPM)	Sum of Meter Readings (CF)	Chemical Addition Report Water Usage (gal)	
Jul 2022				23250	0
Aug 2022				22010	4
Sep 2022				66700	20
Oct 2022				65100	21
Nov 2022				64500	17
Dec 2022				65100	16
Jan 2023	6711	2240	8951	66958	21
Feb 2023	1600	5265	6865	51354	16
Mar 2023	2470	8528	10998	82271	20
Apr 2023	1420	6850	8270	61864	17
May 2023	20	1837	1857	13891	22
Jun 2023	1364	420	1784	13345	5
Jul 2023	318	40	358	2678	0

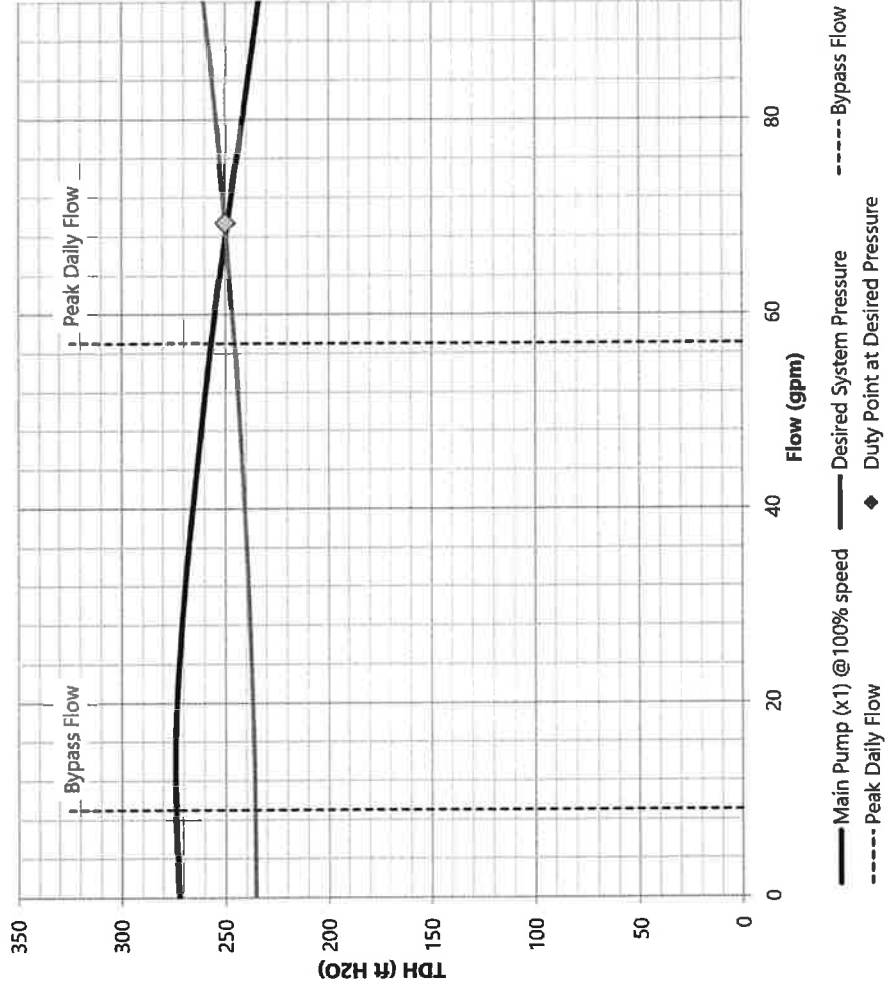
► Design Flow Rates

2023 Max Day Demand (March 2023, gal)	12-Hour Period Flow Rate at Max Day Demand (GPM)	Peaking Factor	Design Peak Flow Rate (gpm)
4113.5	5.71	10	57.1

- ## ► Fire Service Flow Requirements:
- Water supply system must provide minimum 34 GPM for 8 hours
 - NEPA 22 Standard

Pump Performance

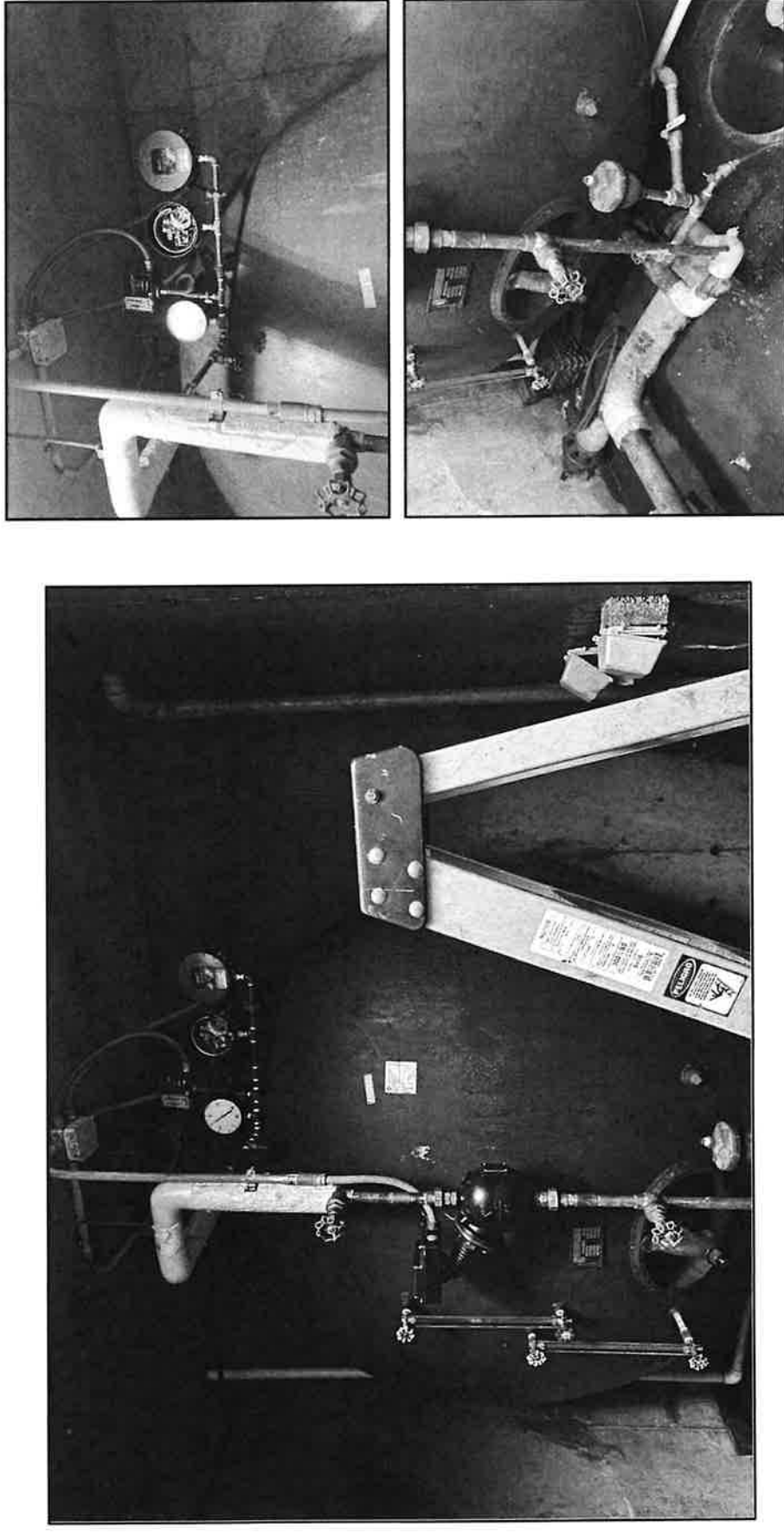
Operating Points



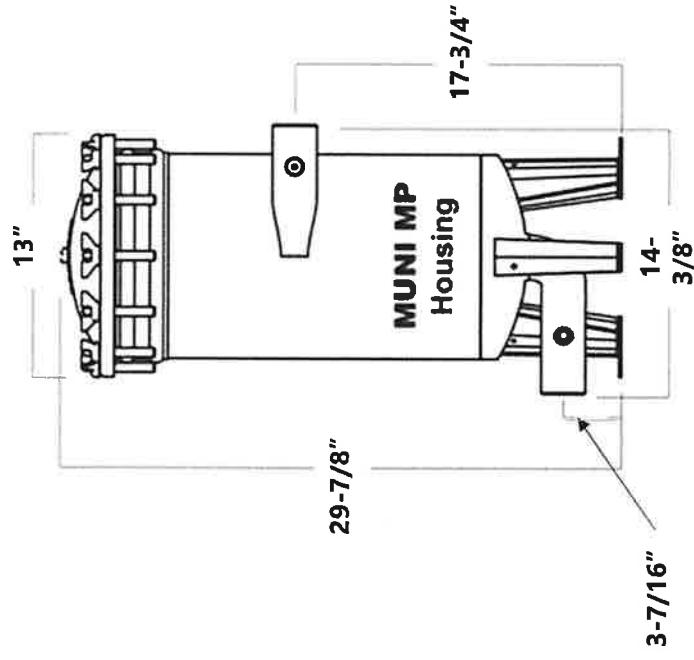
Existing Conditions - Basement



Existing Conditions – Underground Storage Tank Vault



Proposed Conditions - Cartridge Filter



Harmsco MUNI 90 MP

Proposed Conditions – Control Valve

MANUAL C

Model CIN101 FLOMATIC[®]
Flomatic Corporation

Installation Instructions

CYCLE GARD C1 PIPING SCHEMATIC

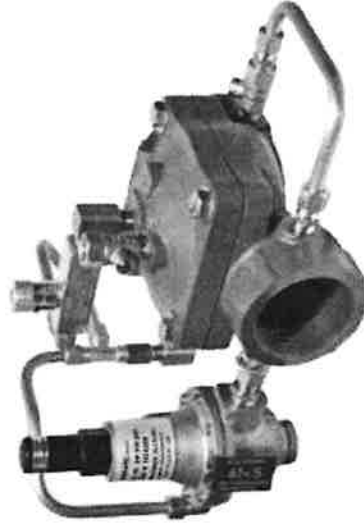
PART #	DESCRIPTION	QUANT.
1	SHUT-OFF VALVE	2
2	7-1/2" STRAINER	1
3	ORFEE	1
4	AC20 - FLOW CONTROL	1
5	PRP - PUMP SWICH	1
6	SHUT-OFF VALVE	2

NOTE: All Cycle Gard® type of valves need to be located within close proximity to the tank and pressure switch

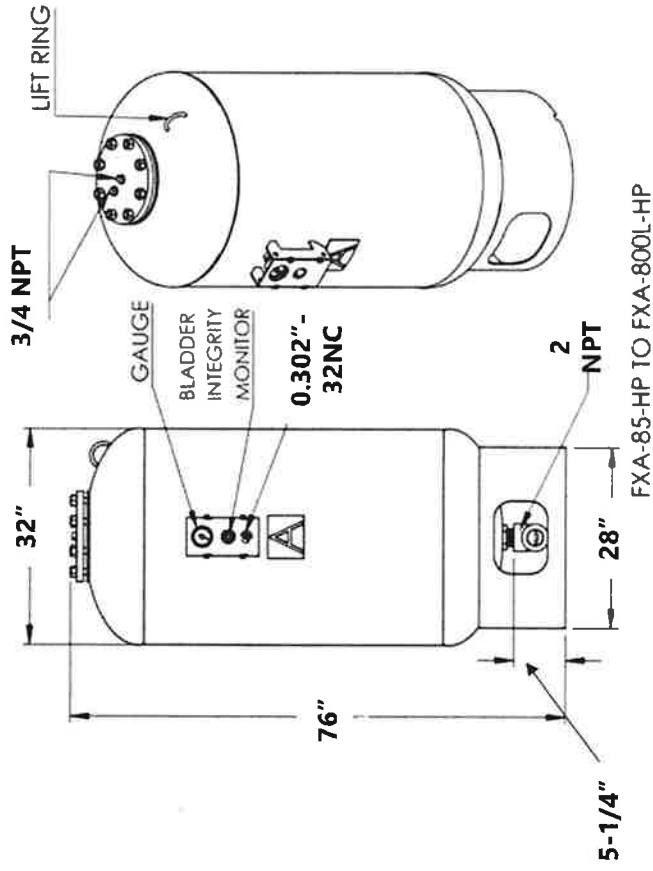
WARNING: INSTALL PRESSURE RELIEF VALVE IN SYSTEM PIPING

DO NOT SHOW THE SHUT-OFF VALVE LOCATED ON BACK OF VALVE (ADJUSTABLE BY-PASS LINE)

Cycle Guard CI CIN101

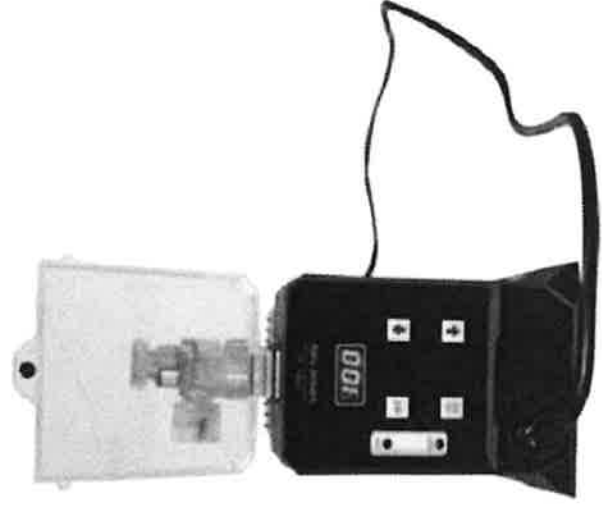


Proposed Conditions – Hydropneumatic Tank



Wessels Co. FXA-800L-HP

Proposed Conditions – Soda Ash Injector & Chemical Feed Rates

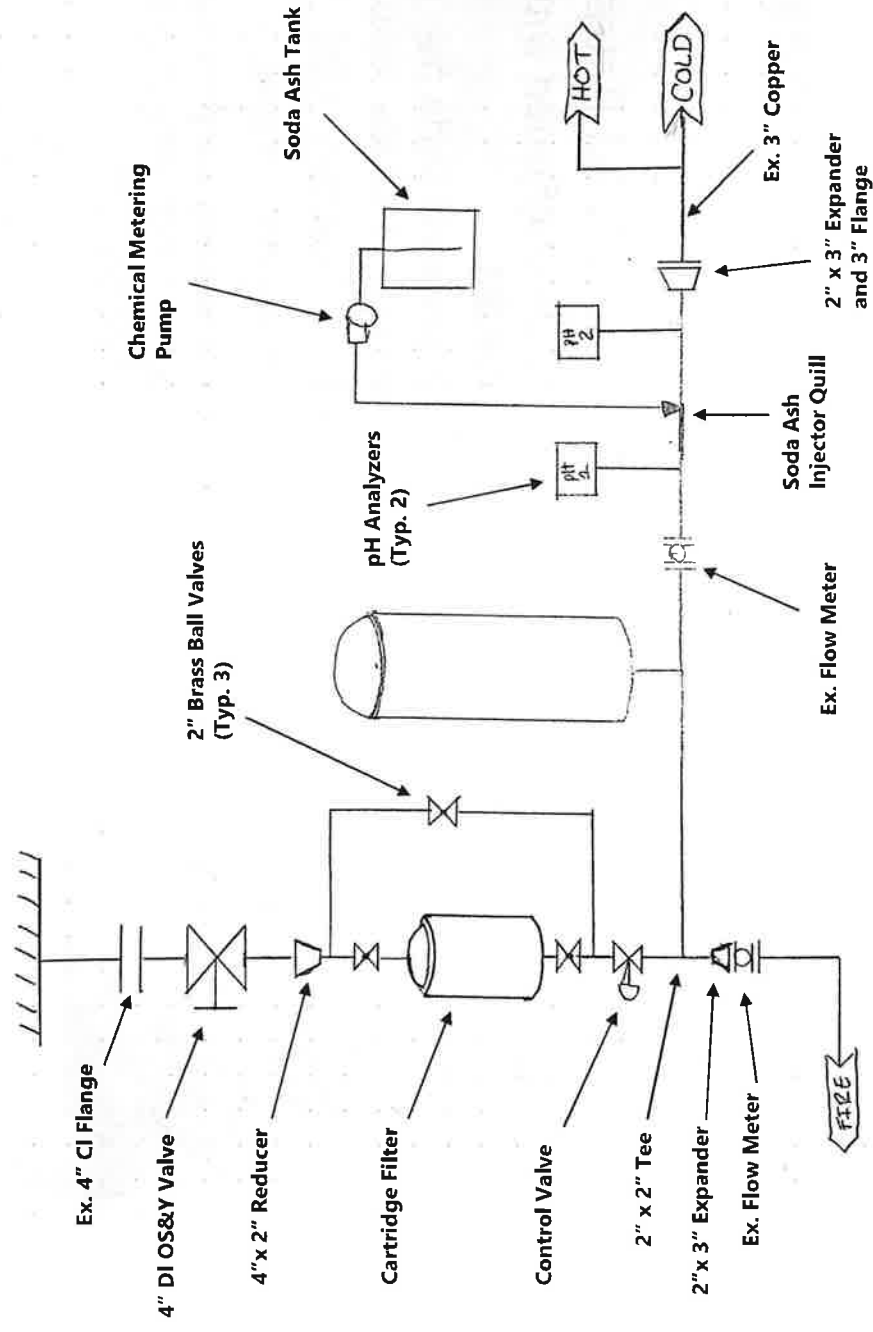


J-PRO-22 Metering Pump

► Chemical Feed Rates

- To be confirmed with water sampling results
- Estimated soda ash powder usage per month: 112 lbs (approx. 2 bags)
- Chemical tank size: 100 gallons
- Estimated chemical cost: \$1350/year
- Estimated current spend on limestone: \$2175 not including labor for changeouts
- Could add approx. 100 mg/L sodium to the water - > 4 8-oz. glasses of water = 1 bag of chips

Proposed Conditions – System Diagram



Cost Analysis – Underground Vault Abandonment

Keep the Vault: New Electrical Line From Service to Transformer in the Vault, New Sump Pump, Lights, Cables and Conduits	Abandon the Vault: Extend Well Casing to Ground Surface, Install Pitless Adapter, Extend Water Main to Well, Fill Vault with Lightweight Fill
Base Price: \$16,507	Base Price: \$9,800
General Conditions (15%): \$2,476	General Conditions (15%): \$1,470
Contingency (20%): \$3,797	Contingency (20%): \$2,254
Contractor Overhead (15%): \$3,417	Contractor Overhead (15%): \$2,029
Contractor Profit (20%): \$4,556	Contractor Profit (20%): \$2,705
TOTAL: \$30,753	TOTAL: \$18,257

Cost Analysis – Construction Costs

Item	Cost
School Basement – Water	\$30,707
School Basement – Electrical	\$14,350
Well Vault Abandonment	\$9,800
Hydropneumatic Tank Abandonment	\$2,400
General Conditions (15%)	\$8,589
Contingency (20%)	\$13,169
Contractor Overhead (15%)	\$11,852
Contractor Profit (20%)	\$15,803
TOTAL:	\$106,670

Procurement

- ▶ Ch 30 S39M
 - Construction contracts \$10,000 to \$50,000: written scope-of-work statement to solicit 3 quotes
 - Over \$50,000: sealed bids required.
 - Over \$150,000: DCAMM certification required.
- ▶ Ch 30B
 - Does not apply to contracts covered by Ch 30 S39M
 - Applies for purchase of "supplies" up to \$100,000 for schools.
 - Definition of "supplies" includes equipment and materials.
- ▶ Without Contingency, General Conditions, O&P (86.3%)
 - Electrical Materials: \$8,167
 - Electrical Labor: \$6,182
 - Water Materials: \$28,800 excluding fill material
 - Water Labor: \$9,507
 - Water Fill Materials: \$4,600

