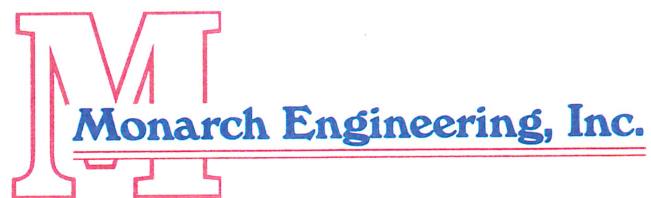


**PRELIMINARY ENGINEERING REPORT
FOR THE
U.S. 60 WATER DISTRICT**

2021 WATER SYSTEM IMPROVEMENTS

FEBRUARY 2021



**PRELIMINARY ENGINEERING REPORT
2021 WATER SYSTEM IMPROVEMENTS
U.S. 60 WATER DISTRICT
BAGDAD, KENTUCKY**

I. GENERAL

This Preliminary Engineering Report is intended to analyze the proposed water system improvements that are being planned by the U.S. 60 Water District. The improvements The proposed project will upgrade, replace, and/or supplement various aging, undersized, and inadequate infrastructure components throughout the District's water distribution system.

Rural Development "Kentucky Guide 7A" will be submitted at a later date and will serve as the Summary Addendum to this report. The Summary Addendum will further analyze the capability of the District to execute this project through an evaluation of its financial standing and overall system operation.

II. PROJECT PLANNING AREA

GENERAL

The areas to be affected by construction will generally lie adjacent to existing transportation routes. The topography of these areas is generally un-level, varying from gently rolling hills to narrow ridges with steep ravines. The land use in this area is mainly agricultural with intermittent areas of residential development. Both the topography and land use within the project area are typical for this region of Kentucky. Within the proposed project area there are no major new commercial or industrial businesses expected in the next decade. Both the topography and land use within the project area are typical for this region of Kentucky.

Attached as a part of this report are location and topographic maps which depict the location of all proposed project components. This includes the location of the proposed water storage tank rehabilitation, booster pump station replacement, and the general area of the proposed radio read meter replacements.

POPULATION

The U.S. 60 Water District serves primarily southeastern Shelby and southwestern Franklin Counties. A small portion of southeastern Spencer County and a minimal portion of Anderson County are also included in the service area. Those customers outside of Shelby and Franklin Counties comprise less than 15% of the total customer base. Therefore, the population trends examined herein will focus on only Shelby and Franklin Counties.

According to data from the 2010 U.S. Census, Shelby County Kentucky had a total population of 42,074 distributed into 15,321 households. The U.S. 60 Water District provides potable water service to 2,515 residential customers, of which approximately 1,633 are located in Shelby County. Accordingly, it is estimate that North Shelby serves nearly 10% of the population in Shelby County. This translates into a population of 4,485 Shelby County residents being served.

Again, per 2010 U.S. Census data, Franklin County Kentucky had a total population of 49,285 distributed into 20,662 households. North Shelby supplies approximately 470 of these households, or an estimated 2% of the population in Franklin County. This translates into a population of 1,120 Franklin County residents being served.

According to U.S. Census Bureau estimates the population of Shelby County is increasing by 1.5 % annually. This compares to an annualized increase of nearly 2.5% between the 2000 and 2010 U.S. Census. Similarly, the Census Bureau estimates the population of Franklin County is increasing by 0.75 % annually. Which compares to an annualized increase of nearly 0.33% between the 2000 and 2010 U.S. Census.

Considering the above data, it is estimated that the population served by U.S. 60 Water District increases by nearly 1.4% annually. This translates into approximately 35 new customers per year.

DEMAND

Considering the 2019 calendar year, the average daily demand for the U.S. 60 Water District distribution system was 494,000 gallons. Over the same period, the maximum daily demand was 691,000 gallons, which occurred on 9/7/2019.

Considering the overall demand growth of the system, the previous 20 year period was examined, extending from the 1999 to 2019. The annual system demand for 1999 was 127,970,000 gallons. This increased to 180,069,000 in 2019. This represents an annualized demand growth of a nearly 2.0% over that period. This corresponds to the annualized system wide population increase of 1.4%.

The estimated useful life of the proposed project is 40 years. Considering a demand growth of a 2.0% annually over that period, yields a projected annual system demand of 324,124,200. This corresponds to an average daily demand of nearly 888,000 gallons.

III. EXISTING FACILITIES

The U.S. 60 Water District owns a water distribution system which serves the rural population of southeastern Shelby and southwestern Franklin Counties. A small portion of southeastern Spencer County and a minimal portion of Anderson County are also included in the service area. The system is operated and maintained through a long-standing contract with the North Shelby Water Company. The District purchases all water for resale from the Frankfort Plant Board, and the City of Shelbyville. The combination of which has sufficient water treatment capacity to serve the District's approximately 2,500 existing residential, commercial and institutional customers.

The District operates the water system through a Board of Commissioners, and the previously mentioned operational agreement with the North Shelby Water Company. The water distribution system consists of a network of water supply and distribution mains along with a series of water tanks and booster pump stations. This includes various size water lines ranging from 2-inch to 12-inch, three pumps stations, and six water storage tanks rated at 950,000 gallons. The majority of the system has been in place for less than 50 years. Pipe material within the system consists of cast iron and asbestos cement for the older lines along with ductile iron and plastic for the newer ones.

Information regarding the current rate structure, annual operating and maintenance data, a tabulation of monthly users and revenue, and a list of the outstanding bonds can be found in the Summary Addendum to this Report which will be submitted at a later date.

IV. NEED FOR THE PROJECT

The proposed project will upgrade, replace, and/or supplement various aging, undersized, and inadequate infrastructure components throughout the District's water distribution system. These components include an existing booster pump station, storage tank, and customer metering equipment. The improvements will ensure that the system can meet the demands of existing and future customers in safe and efficient manner.

The existing 200,000-gallon Driscoll water storage tank is in need of a major renovation. The existing interior and exterior tank coating systems have reached the end of their useful life. Failures of the existing coating system are located sporadically throughout all surfaces. A few areas on the tank are beginning to show signs severe pitting and metal loss, however metal loss has been minimal up to this point. The piping arraignment for the tank is such that water enters and exits both from the tank floor. This results in poor tank turn-over and negatively impacts the systems overall water quality.

The existing Grafenburg booster pump station serves to fill the Driscoll water storage tank. The pump station is aging, deteriorated, and lacks the capacity needed to effectively supply the area. In addition to these capacity constraints, the existing station is below grade and subject to being inundated by runoff during periods of heavy rain. Given these various issues, the existing station should be replaced with an above ground structure.

According to District records and system operators, many of the existing customer water meters have been in the system for over ten (10) years, with some estimated to be in excess of fifteen (15) years. It is likely that these older meters are not effectively or accurately measuring customer usage. As meter's age, it is universally accepted that accuracy suffers almost always in the favor of the customer, not the utility. The resulting outcome is a decrease in revenue and an increase in water loss or unsold water for the system. Therefore, the project proposed to replace a portion the District's existing meters, with modern metering equipment including radio read technology. In addition to the actual meters, a portion of the District's customer meter boxes or vaults are deteriorated or otherwise inadequate. This situation is estimated to represent approximately 40% of the total. These deficient boxes and lids should also be replaced at this time.

V. ALTERNATIVES CONSIDERED

Based on the need for potable water due to the continued demand for service and also the growth within the project area, the U.S. 60 Water District must take the necessary steps to continue to provide service as required by the Kentucky Division of Water and the Kentucky Public Service Commission. The final project scope determination was centered on meeting existing and future customer demands without significantly burdening the District's ability to meet its current and future financial obligations. Accordingly, viable project alternatives were limited and focused largely on determining the most efficient use of limited funds to achieve the most benefits.

The primary alternative explored was the replacement of all existing customer meters at this time, in lieu of a phased approach as selected. It was determined that this additional work should be delayed so to decrease the debt service impact of project. However, additional meter replacements may be completed though the project if the as-bid construction costs are less than anticipated herein.

VI. PROPOSED PROJECT

In order to correct the above-described deficiencies, the proposed project includes a complete replacement of the existing Grafenburg Booster Pump Station, a full-scale rehabilitation of the District's existing Driscoll Water Storage Tank, and the replacement of 1,000 existing conventional customer meters with radio read meters.

The new booster pump station will be an above ground structure equipped with modern high-efficiency equipment, pumps, and controls. This will include Variable Frequency Drives (VFD's) and an electromagnetic flow meter, both of which are lacking at the existing station. The capacity will be increased by approximately 150 GPM, with a total proposed pumping capacity of 400 GPM.

The tank rehabilitation will include various structural and other repairs, safety improvements, along with the complete removal and replacement of all interior and exterior coatings, a new control valve vault and piping modifications. The piping and control valve arraignment will be modified such that the tank will fill near the top and drain from the bottom of the bowl. This will greatly improve the turnover and reduce the production of disinfection byproducts.

The existing convention meters to be replaced with new radio read meters are located throughout the District's water system. The meter replacements included in the project represent the initial phase of meter replacements, with subsequent phases to follow in the future until all meters are upgraded to radio read technology. The proposed meters will be electromagnetic type which have no moving parts and high accuracy at all flow ranges.

An itemized cost estimate is included in this report and outlines all of the individual construction items along with their associated estimated unit costs. A summary cost estimate recaps all of the project costs and outlines the funding scheme for the project, is also included in this report. The total cost of the project is estimated to be \$1,300,000 with full funding being provided by USDA Rural Development loan funds.

VII. OPERATION & MAINTENANCE COST COMPARISON

When considering the Operation and Maintenance (O&M) cost associated with the existing system and the proposed project, the analysis is being done based solely on the components being impacted by this project. Additionally, the maintenance cost associated with water storage tanks is very cyclical and has therefore been considered as an annualized average over a 20 year period.

EXISTING SYSTEM

DRISCOLL WATER STORAGE TANK

The existing 200,000 gallon Driscoll storage tank to be replaced by this project was constructed in 1999. Accordingly, the condition of the structure is beginning to decline, and should it continue to remain in service, a significant rehabilitation will need to be done within the next 1-2 years. Based on similar rehabilitation projects conducted in recent years it is anticipated the total cost of these measures would be on the order of \$300,000. Once completed, the rehabilitated structure would be virtually maintenance free for 20 years. This cost would be considered a maintenance item and would therefore correspond to an average annual cost of \$15,000. Additional maintenance items for the structure are minimal, these include primarily mowing the site and graffiti removal. It is estimated that these cost are \$1,000 per year. Accordingly, the total annual average maintenance cost is approximately \$16,000.

Like all water storage tanks, the operational cost of the existing structure is minimal. A minor tank inspection is required every year, with a major inspection and tank washout required every 3 years. The minor inspection is performed by District personnel and can be conducted in a just a few hours. Accordingly the cost is minimal, being estimated at approximately \$250. The major inspections and tank washouts are conducted by outside firms with specialized expertise. The cost varies minimally based on the tank size and is estimated at \$3,500 for the existing structure. Accordingly, the annual average operational cost is approximately \$1,225.

Considering the above data, it is estimated that the annual O&M cost of the existing tank are approximately \$17,225 per year.

GRAFENBURG BOOSTER PUMP STATION

The existing Grafenburg pump station to be replaced by this project was constructed in 1999. Accordingly, the condition of the structure is beginning to decline, and should it continue to remain in service, a significant rehabilitation will need to be done within the next 1-2 years. This would include a complete replacement of the pumps, motors, and control systems and blasting cleaning/repainting of the buried enclosure. Based on similar rehabilitation projects conducted in recent years it is anticipated the total cost of these measures would be on the order of \$150,000 and be required at approximately 20 year intervals. This would therefore correspond to an average annual cost of \$7,500. Other limited maintenance would be required during this period, including rebuilding the pumps and motors and replacement of select components within the control systems. It is estimated that these costs equate to approximately \$2,000 per year. Accordingly, the total annual average maintenance cost is approximately \$9,500.

Like all booster pump stations, the operational cost of the existing station is largely a consequence of power consumption, which for this station currently cost approximately \$6,000 annually. Routine weekly inspections also a contributing cost component. These inspections are performed by District personnel and can be conducted in a just a few minutes. Accordingly, the cost is minimal, being estimated at approximately \$2,500 annually. Therefore, the annual average operational cost is approximately \$8,500.

Considering the above data, it is estimated that the annual O&M cost of the existing pump station are approximately \$18,000 per year.

CUSTOMER METERS

The existing customer meters are virtually maintenance free and for the purpose of this report are considered as such. However, the existing meters are required to be manually read. The District currently contracts out to outside company at a cost of \$1.30 per meter per month. This cost represents all of the operational cost for the meters. Considering 1,000 meters, the annual average operational cost is therefore approximately \$15,600.

EXISTING SYSTEM SUMMARY

Considering the above data, it is estimated that the annual O&M cost of all existing system components impacted by this project are approximately \$50,825 per year.

PROPOSED SYSTEM

DRISCOLL WATER STORAGE TANK

The proposed project will completely rehabilitate the existing 200,000-gallon Driscoll water storage tank. As described above, the rehabilitated storage tank will be virtually maintenance free for the first 20 years following completion. Accordingly, the maintenance items for the structure would be very minimal, including primarily mowing the site and graffiti removal. It is estimated that these cost are \$1,000 per year. Accordingly, the total annual average maintenance cost for the proposed project is approximately \$1,000.

Operational cost for the rehabilitated structure would also be minimal and be very similar to that described for the existing tank. The minor tank inspections conducted by North Shelby personnel could still be performed for \$250 per year. The major inspections and tank washouts would continue to be conducted by outside firms with specialized expertise and is estimated at \$3,500 for the existing structure. Accordingly, the annual average operational cost is approximately \$1,225.

Considering the above data, it is estimated that the annual O&M cost of the existing tank are approximately \$2,225 per year.

GRAFENBURG BOOSTER PUMP STATION

The proposed project will completely rehabilitate the existing 200,000-gallon Grafenburg pump station as described elsewhere herein. Given that all equipment, controls, etc. will be new, only limited maintenance will be required during the initial 20 years of service life. This includes rebuilding the pumps and motors and replacement of select components within the control systems as needed. It is estimated that these costs equate to approximately \$2,000 per year.

As previously noted, the operational cost of the proposed pump station will largely be a consequence of power consumption. Due to the high efficiency pumps, motors, and controls, it is expected that the new station will be slightly more energy efficient than the existing station, resulting in total electricity cost of \$4,500 annually. Routine weekly inspections also a contributing cost component. These inspections are performed by District personnel and can be conducted in a just a few minutes. Accordingly, the cost is minimal, being estimated at approximately \$2,500 annually. Therefore, the annual average operational cost is approximately \$7,000.

Considering the above data, it is estimated that the annual O&M cost of the existing pump station are approximately \$9,000 per year.

CUSTOMER METERS

The proposed customer meters are virtually maintenance free and for the purpose of this report are considered as such. However, the proposed meters will be read via radio read technology from a truck driving the posted speed limit. Therefore, the meters will be read by District personnel in a 4 hours every month. Given a single employee reading the meters and considering an average cost of \$30 per hour, the annual average operational cost is therefore approximately \$1,440.

PROPOSED SYSTEM SUMMARY

Considering the above data, it is estimated that the annual O&M cost of all proposed system components impacted by this project are approximately \$12,665 per year.

VIII. LIFE CYCLE COST ANALYSIS (LCCA)

CAPITAL COST

The total estimated construction cost for the proposed project \$1,155,000 with a corresponding total project cost of **\$1,350,000**.

DISCOUNT RATE

Per the current version of Appendix C of OMB Circular A-94, the real discount rates are as follows:

3-Year 0.3	5-Year 0.6	7-Year 0.8	10-Year 1.0	20-Year 1.2	30-Year 1.5
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PLANNING PERIOD

As recommend by USDA Rural Development, this LCCA utilizes a **20 year** planning period to compare the alternatives.

USEFUL LIFE

The useful life of the components included in the project is estimated to be 40 years.

SPPW & USPW FACTORS

i	N	SPPW (P/F)	USPW (P/A)
0.012	20	0.78775	17.68729
0.015	30	0.63976	24.01583
0.015	40	0.55126	29.91584
0.015	50	0.47500	34.99968
0.015	60	0.40929	39.38026

UNIFORM SERIES PRESENT WORTH (USPW) O&M COSTS

Proposed Project:

Annual O&M Costs = \$12,665/year (See above O&M cost calculation)

USPW Factor = 17.68729

$17.68729 \times \$12,665 = \mathbf{\$224,010}$

SINGLE PAYMENT PRESENT WORTH (SPPW) SALVAGE VALUE

Proposed Project:

Capital Costs = \$1,350,000

Useful Life = 40 Years

Annual Depreciation = $\$1,350,000 / 40 \text{ years} = \$33,750$

Salvage Value @ 20 years = $\$1,350,000 - (20 \times \$33,750) = \$675,000$

SPPW Factor = 0.55126

$\$675,000 \times 0.55126 = \mathbf{\$372,100}$

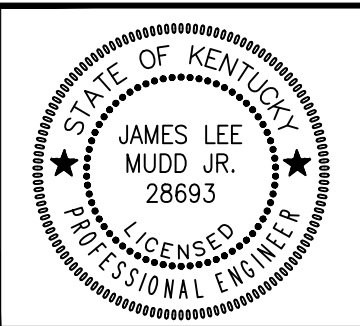
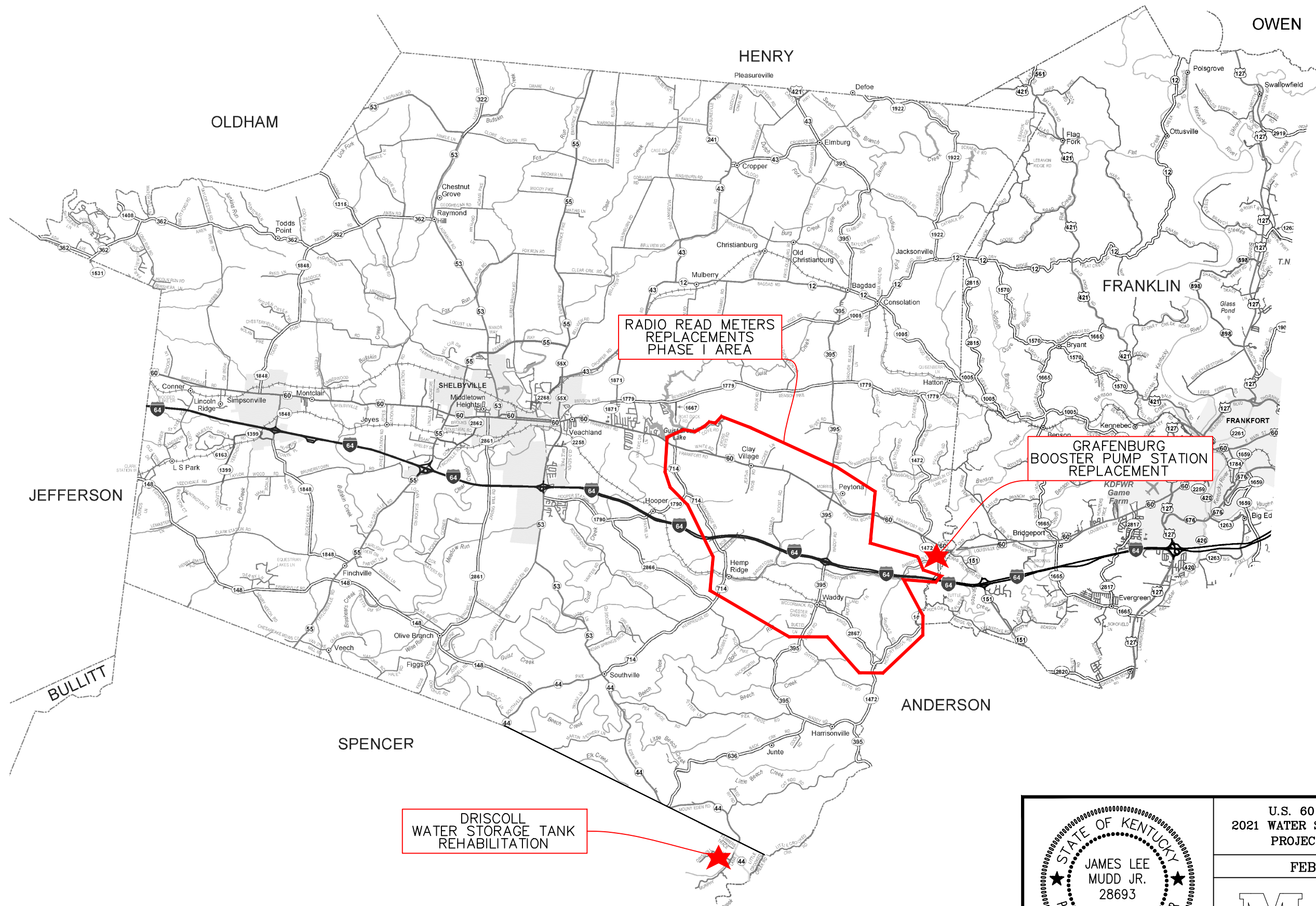
NET PRESENT WORTH CALCULATION

$NPW = C + USPW(O\&M) - SPPW(SV)$

Option	Capital Cost	USPW (O&M)	SPPW (SV)	NPW
Proposed Project	\$1,350,000	\$224,010	\$372,100	\$1,201,910

IX. CONCLUSIONS AND RECOMMENDATIONS

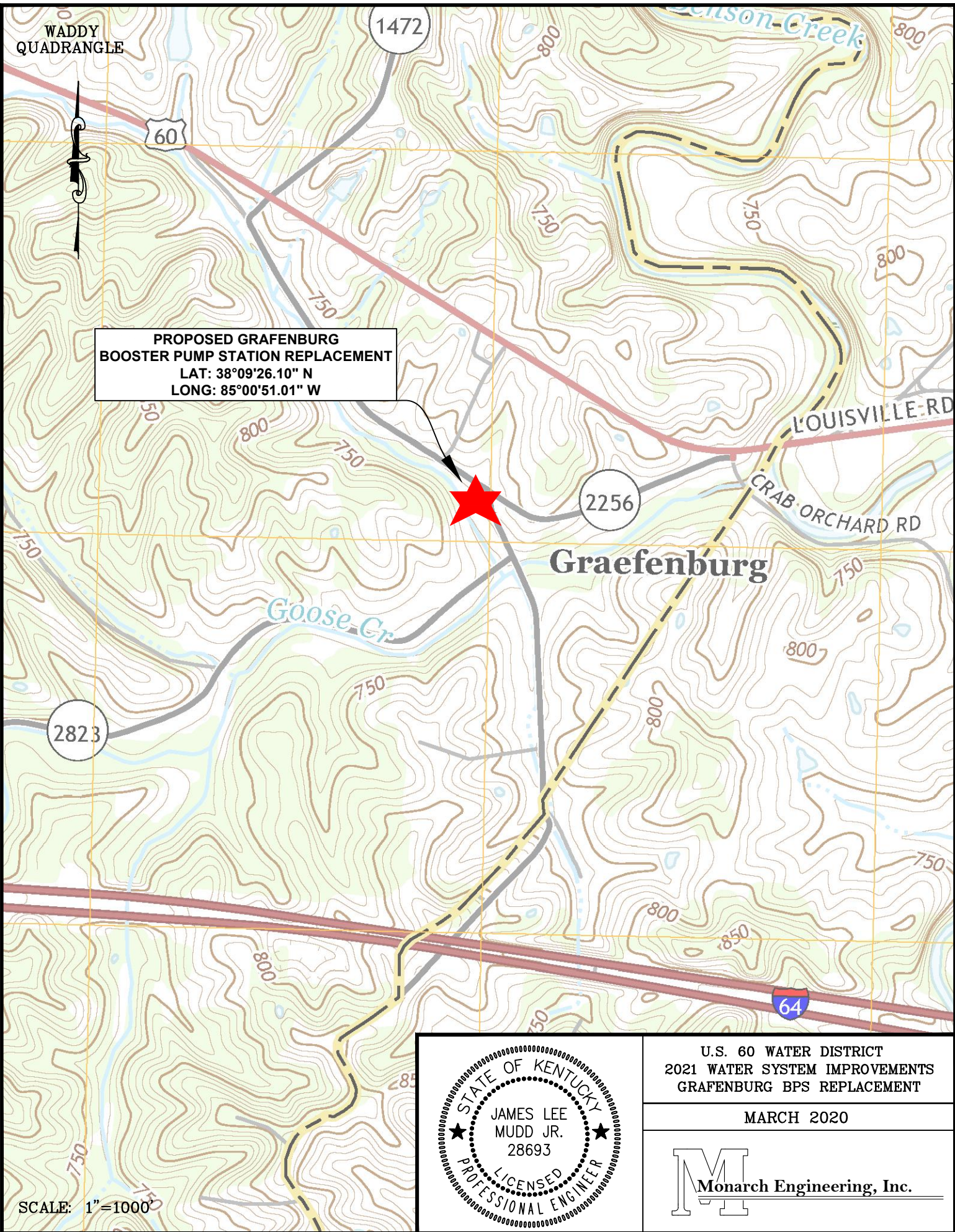
Based on the need for the U.S. 60 Water District to continue to supply their existing customers with a resilient and dependable potable water supply, it is recommended that the District pursue the financial assistance as outlined herein so that the proposed project can be implemented as soon as possible.



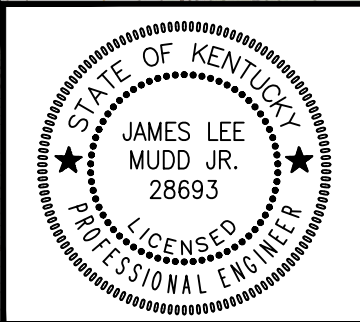
U.S. 60 WATER DISTRICT
 2021 WATER SYSTEM IMPROVEMENTS
 PROJECT LOCATION MAP

FEBRUARY 2021



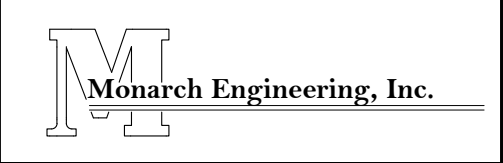


**PROPOSED GRAEFENBURG
BOOSTER PUMP STATION REPLACEMENT**
LAT: 38°09'26.10" N
LONG: 85°00'51.01" W



U.S. 60 WATER DISTRICT
2021 WATER SYSTEM IMPROVEMENTS
GRAEFENBURG BPS REPLACEMENT

MARCH 2020



SCALE: 1"=1000'

MT. EDEN
QUADRANGLE

GLENSBORO
QUADRANGLE

SHELBY CO
SPENCER CO

FARMERS TR

PROPOSED 200,000 GALLON
WATER STORAGE TANK REHABILITATION
LAT: 38°02'14.22" N
LONG: 85°07'25.49" W



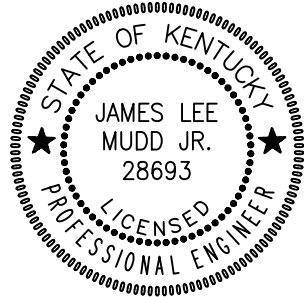
MURPHY LN

Little Beech Cr

44
53

SPENCER CO
ANDERSON CO

44



U.S. 60 WATER DISTRICT
2021 WATER SYSTEM IMPROVEMENTS
DRISCOLL WATER STORAGE TANK REHAB

MARCH 2020

M
Monarch Engineering, Inc.

SCALE: 1"=1000'

PRELIMINARY COST ESTIMATE
U.S. 60 WATER DISTRICT
2021 WATER SYSTEM IMPROVEMENTS
FEBRUARY 2021

PART I - GRAFENBURG BOOSTER PUMP STATION REPLACEMENT				
ITEM NO.	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	Site Work	1 LS	\$15,000.00	\$15,000.00
2	Yard Piping, Connections & Valves	1 LS	10,000.00	10,000.00
3	Foundation	1 LS	25,000.00	25,000.00
4	Factory Built Booster Pump Station	1 LS	200,000.00	200,000.00
5	Brickwork	1 LS	20,000.00	20,000.00
6	Electrical Service	1 LS	5,000.00	5,000.00
7	Telemetry Panel Upgrade	1 LS	20,000.00	20,000.00
8	Demolition of Existing Booster Pump Station	1 LS	5,000.00	5,000.00
			Subtotal	\$300,000.00
			Contingencies (10%)	30,000.00
			TOTAL	\$330,000.00
PART II - DRISCOLL ROAD WATER STORAGE TANK REHABILITATION				
ITEM NO.	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	Containment & Protection Measures	1 LS	\$20,000.00	\$20,000.00
2	Miscellaneous Minor Repairs & Modifications	1 LS	40,000.00	40,000.00
4	Complete Interior Coating System Replacement	1 LS	75,000.00	75,000.00
5	Complete Exterior Coating System Replacement	1 LS	155,000.00	155,000.00
6	Application of Basic Lettering/Logo	1 LS	5,000.00	5,000.00
7	Cleaning/Disinfection/Sampling	1 LS	2,000.00	2,000.00
8	Site Clean-up & Restoration	1 LS	3,000.00	3,000.00
			Subtotal	\$300,000.00
			Contingencies (10%)	30,000.00
			TOTAL	\$330,000.00
PART III - RADIO READ METER REPLACEMENT - PHASE I				
ITEM NO.	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	3/4" Sensus iPERL Meter	1,000 EA	\$130.00	\$130,000.00
2	Sensus Smart Point 520M Radio Read Transceiver	1,000 EA	130.00	130,000.00
3	Meter Box & Lid Replacement (18" Round Boxes)	400 EA	250.00	100,000.00
4	Installation Labor	1,000 EA	90.00	90,000.00
			Subtotal	\$450,000.00
			Contingencies (10%)	45,000.00
			TOTAL	\$495,000.00
TOTAL CONSTRUCTION				\$1,155,000.00
				Land/Easement Acquisition
				\$10,000.00
				Legal & Administration
				20,000.00
				PER & Environmental Assessment
				15,000.00
				Engineering Design
				92,000.00
				Construction Inspection
				58,000.00
TOTAL NON-CONSTRUCTION				\$195,000.00
TOTAL PROJECT				\$1,350,000.00

PRELIMINARY COST ESTIMATE
U.S. 60 WATER DISTRICT
2021 WATER SYSTEM IMPROVEMENTS
REVISED AUGUST 2022

PART I - GRAFENBURG BOOSTER PUMP STATION REPLACEMENT				
ITEM NO.	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	Site Work	1 LS	\$15,000.00	\$15,000.00
2	Yard Piping, Connections & Valves	1 LS	10,000.00	10,000.00
3	Foundation	1 LS	25,000.00	25,000.00
4	Factory Built Booster Pump Station	1 LS	225,000.00	225,000.00
5	Brickwork	1 LS	20,000.00	20,000.00
6	Electrical Service	1 LS	5,000.00	5,000.00
7	Telemetry Panel Upgrade	1 LS	20,000.00	20,000.00
8	Demolition of Existing Booster Pump Station	1 LS	5,000.00	5,000.00
			Subtotal	\$325,000.00
			Contingencies (10%)	32,500.00
			TOTAL	\$357,500.00
PART II - DRISCOLL ROAD WATER STORAGE TANK REHABILITATION				
ITEM NO.	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	Containment & Protection Measures	1 LS	\$20,000.00	\$20,000.00
2	Miscellaneous Minor Repairs & Modifications	1 LS	40,000.00	40,000.00
4	Complete Interior Coating System Replacement	1 LS	75,000.00	75,000.00
5	Complete Exterior Coating System Replacement	1 LS	155,000.00	155,000.00
6	Application of Basic Lettering/Logo	1 LS	5,000.00	5,000.00
7	Cleaning/Disinfection/Sampling	1 LS	2,000.00	2,000.00
8	Site Clean-up & Restoration	1 LS	3,000.00	3,000.00
			Subtotal	\$300,000.00
			Contingencies (10%)	30,000.00
			TOTAL	\$330,000.00
PART III - RADIO READ METER REPLACEMENT - PHASE I				
ITEM NO.	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
1	3/4" Sensus iPERL Meter	1,000 EA	\$175.00	\$175,000.00
2	Sensus Smart Point 520M Radio Read Transceiver	1,000 EA	200.00	200,000.00
3	Meter Box & Lid Replacement (18" Round Boxes)	400 EA	335.00	134,000.00
4	Installation Labor	1,000 EA	91.00	91,000.00
			Subtotal	\$600,000.00
			Contingencies (10%)	60,000.00
			TOTAL	\$660,000.00
TOTAL CONSTRUCTION				\$1,347,500.00
				Land/Easement Acquisition
				\$11,500.00
				Legal & Administration
				25,000.00
				PER & Environmental Assessment
				15,000.00
				Construction Interest
				30,000.00
				Engineering Design
				105,000.00
				Construction Inspection
				66,000.00
TOTAL NON-CONSTRUCTION				\$252,500.00
TOTAL PROJECT				\$1,600,000.00