The Basics About the Future of Steelton's Water System

In an effort to inform all residents about the basic issues surrounding the potential sale of the Steelton Water System, we are providing the primer below to get you up to speed before the public input meetings on August 13th and 16th. Please refer any questions to Doug Brown at 717-939-9842 ext. 5030.

What is the Steelton Borough Authority? The Steelton Borough Authority is a five (5) member board appointed by Steelton Borough Council whose members serve staggered fixed terms. The Authority Board is an independent body from Council that votes on all policy decisions related to the operation of the Steelton Water System. The Steelton Authority Board is the body that will vote to sell or keep the water system.

Where does Council fit in? Steelton Borough Council appoints members to the Authority Board. However, Council DOES NOT and cannot legally make policy decisions related to the water system. A decision to keep or sell the system is subject to a vote of the Authority.

Why is the Steelton Borough Authority considering selling the plant and distribution system? The past year has presented a number of alarming trends for the Steelton Water System including mounting capital needs, compliance issues, an aging water plant and system, and a water fund that is stretched to its maximum under existing rates.

While the water system is in full compliance with current Pennsylvania Department of Environmental Protection (DEP) regulations, the Authority Board is planning for the future of the water system, including taking stock of its current physical condition, the significant age of the water plant, the reliance on one large user for revenue, the status of our finances related to debt, and the prospect of additional environmental regulations. As a small water system (2,400 accounts), it is becoming harder and harder to spread the costs of staying in business while meeting existing and future water quality standards.

There are a number of financial and practical reasons a sale is being explored. They include, but are not limited to, the major factors below:

- **The Water Fund is not sustainable under its current model.** With $11.6 million of debt to pay off and mounting capital needs, the Authority initially faced a deficit of over $700,000 in 2018. The deficit was closed by eliminating (for a second year) a water main replacement project and using transfer of funds from reserves. We are projecting a 20% increase in 2019 to balance the budget. This financial model is not sustainable.
- **The Steelton Water System relies too heavily on the steel mill for its revenue.** The ArcelorMittal mill generates 60% to 65% of the water system's operating revenue every year. That means if the steel mill reduces usage or closes in the future the revenue loss will have to be made up by customers through an astronomical rate increase. Recent reductions in mill usage have led to a decline of over $400,000 in Water Fund revenue. We cannot rely on one customer as a long-term strategy and must consider the benefit of selling to a system that can absorb any future losses related to the mill.
- **The Steelton Filtration Plant is 45 years old (built in 1973) and its design is obsolete**. The Steelton Water Plant is one of the only remaining plants of its age and design in the state. Unlike the past, we can no longer rely on a patch work approach to meet compliance and quality standards. DEP made it clear in its recent Filter Plant Performance Evaluations that the Authority must consider a new plant in order to meet future standards. A recent capital needs study completed by the Authority and Borough's independent third party consulting engineer, Herbert, Rowland, and Grubic, Inc. (HRG), found that the water plant will need to be replaced within the next 7 to 10 years at a cost of $14 million. Financing this project will require significant rate increases.
- **Keeping the system and maintaining it properly means a 55% or more rate increase over the next ten years.** Based on a conservative capital needs analysis prepared by HRG, Inc., the Authority will have to raise rates by 55% or more over the next ten years to keep up with existing capital needs. If the steel mill reduces operations or closes, the rate will be even higher by a significant margin. A company with a large customer base can absorb these types of costs with much less of a direct rate impact on Steelton.
- **The system is in need of long term planning.** Steelton has been reactive in upgrading its water system, which has led to the recent water quality violations about which customers have received notices. We need to begin planning long term for the benefit of our customers.

What Would a Sale Look Like?

In early 2018, after over a year of research, analysis, and planning, the Authority prepared a Request for Proposals that specified to potential bidders what factors the Authority valued in any proposal and its evaluation criteria. In June, the Authority received proposals from three potential buyers of the system. One proposer was disqualified due to not complying with the conditions of the request for proposals. Two proposers had qualifying bids with the highest offer being $22.5 million for purchase of the water system and plant. The highest qualifying bidder also committed to the following:

- All existing water employees will be offered employment with similar employment conditions.
- $24 million investment in capital improvements to Steelton's water system over the next 10 years.
- Monthly billing to allow customers more predictable budgeting.
- Provide a Customer Assistance Program for customers of low-income.

Will Rates Go Up?

Yes. Whether we keep the water system or sell, rates will go up over the next ten years. The question the Authority Board faces is which scenario provides the greater net benefit for residents and customers.

If we keep the system: 2019: 20% increase **2020:** 6% increase **2023:** 12% increase **2028:** 17% increase

If we sell the system: In 2019,the buyer would keep current Steelton rates until its next rate case before the Pennsylvania Public Utility Commission (PUC), which is typically every 3 to 4 years. The buyer can also charge an annual Distribution System Investment Charge (DSIC) of approximately 2% between cases. Based on projections, ***monthly*** rates including base rate and DSIC charges are estimated to be as follows (Note: These are projected estimates that are subject to change):

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Steelton	$40.87	$43.32	$43.32	$43.32	$48.52	$48.52	$48.52	$48.52	$48.52	$56.77
Buyer	$34.74	$35.59	$36.61	$52.29	$53.31	$54.34	$55.10	$78.69	$80.23	$81.78

IMPORTANT NOTE: The Steelton rate projections above ARE NOT adequate enough to pay off General Fund Debt or compensate for reduced usage or closure of the steel mill. It is projected that if the mill were to close and Steelton retains its water system, customers may see a rate increase of at least 200%.

How Can Sale Proceeds be used to Our Benefit?

If the water system sold for $22.5 million, the first order of business would be to pay off existing water debt of approximately $11.6 million. After paying water debt and dissolving the Authority, the remaining $10.9 million would be transferred to the Borough General Fund.

Proceeds could then be used to reduce net costs to residents, provide budget reserves, and invest in needed capital projects.

Public Input Meeting #1: August 13th at 6pm—IW ABEL HALL

Public Input Meeting #2: August 16th at 7pm—STEEL HIGH AUDITORIUM

- **The main goal of a sale is to ensure a stable future for our water system that includes adequate investments in infrastructure, anticipating and meeting new environmental regulations, shielding residents from changes with our largest user, and using proceeds to generate a net savings for residents.**
- PAY OFF ALL GENERAL FUND DEBT resulting in lower Borough property taxes. The only way to pay off our debt, meet capital needs, and mitigate against reductions in mill usage is to sell.
- REDUCE SEWER RATES by paying off Sewer Fund debt.
- INCREASE BOROUGH RAINY DAY FUNDS by placing $600,000 to $1 million in a reserve account .
- NEW INFRASTRUCTURE PROJECTS like paving or storm water system repairs.
- FULLY FUND the Borough Non-Uniform Pension Plan thus reducing annual General Fund expenses.

STEELTON BOROUGH SINCE 1880

The Future of Steelton Water Assets

August 13, 2018

Scott Madden Appraisal of Water Assets

	W/ 6 Yr Stay Out	W/O Stay Out
WATER	$18,788,673	$19,658,755

Future Capital Investment Needs by Priority

WATER SYSTEM

YEARS 2019 - 2023				
Project Description	**Estimated Project Cost**	**Implementation Schedule**	**Need Category**	**Notes:**
Water Treatment Plant - Source Water Monitoring	$21,000	2019	3O	Work will assist with operations and operational changes during various river condition. Project was identified in the November 2016 Water Distribution System Evaluation Report.
Water Treatment Plant - Pre-Oxidant System Optimization ($KMNO_4$)	$15,000	2019	3O	Work will assist with continued DBP removal and improved operations. Project was identified in the November 2016 Water Distribution System Evaluation Report.
Automatic Flushers	$22,500	2019	1R	Work is anticipated to assist in compliance with new Disinfection Requirements Rule. Actual needs to be confirmed after additional testing data and investigations. This Project would also assist with DBP removal and overall water quality by decreasing water age.
SCADA/Process Control	$150,000	2020	2C	Work is necessary due to limited PLC, communication system infrastructure and software reporting capabilities a the WTP. Operators are limited in their ability to record and trend numerous process control variables necessary to make real time process control decisions. The initial phase of work was completed this year.
High Service Distribution Investigation	$6,000	2020	2C	Work is necessary for proper system operation due to ongoing pumping issues.
Mixing/Aeration and Additional DBP Removal Work	$250,000	2019 - 2021	3O	Work includes additional DBP removal work at either the WTP, distibution system or storage tanks. Further testing data and investigations are required to confirm scope of work.
Miscellaneous Distribution System Improvements	$1,250,000	2019-2023	3O	The estimated project cost of $250,000/Year equates to 0.83% of Total System Replaced/Year. The industry recommended average is 1.0% Replaced/Year.

5 Year Total = $1,714,500

1R = Regulatory Requirement / 2C= Immediate Capital Need Due to Condition / 3O = Needed for Responsible System O&M

Future Capital Investment Needs by Priority

WATER SYSTEM

Project Description	Estimated Project Cost	Implementation Schedule	Need Category	Notes:
Water Treatment Plant Upgrade	$14,000,000	2025-2028	1R	The Water Treatment Plant (WTP) is 45 Years Old. The WTP is deficient in many current design standards (i.e. no filter to waste, insufficient backwashing, etc.) and presents operational issues relative to sludge blanket management, etc. associated with antiquated technology. Anticipated additional regulations, age and condition of the system and limits of technology will require an upgrade in the next 10 years. PADEP has documented the same concerns as outlined most recently in the February 2017 Filter Plant Performance Evaluation.
Miscellaneous Distribution System Improvements	$1,250,000	2024-2028	3O	The estimated project cost of $250,000/Year equates to 0.83% of Total System Replaced/Year. The industry recommended average is 1.0% Replaced/Year.

5 Year Total = $15,250,000

10 Year Total = $16,964,500

1R = Regulatory Requirement / 2C= Immediate Capital Need Due to Condition / 3O = Needed for Responsible System O&M

Estimated Water Rate Increases---Keep Assets

YEAR	% RATE INCREASE
2018	0%
2019	20%
2020	0%
2021	5%
2022	0%
2023	4%
2024	0%
2025	0%
2026	8%
2027	0%
2028	17%
Total Cumulative Increase	**67%**

PROPOSALS---Non-Financial Considerations

- **Employee Security**
- **Rates**
  - 6 Year Stay Out
  - No Stay Out
- **Capital Improvement Plans**
  - 10-year plan with average annual investment ranging from $653,900 - $3.57 million
- **Customer Assistance Program**
  - Discounted monthly water service charges
  - 26% of Borough residents are defined as at or below poverty level which may qualify them for the programs
- **Conversion to Monthly Meter Reading**

Financial Impact to Borough of Steelton Sale of Only Water Assets

How Much	What	Impact
$11.6M	Pay Off Water Debt	Eliminates Water System Debt Service
$.6-.9M	Transaction Costs	Produces Sale Proceeds
$4.9M	Payoff General Obligation Debt	Reduces G.O. Debt Service by $300,000 resulting in 2mill decrease in Real Estate Taxes ($175/yr. on a house valued at $88,400)
$1.9M	Payoff Sewer Debt (Will also use $1.9M from sewer reserve fund)	Reduces sewer debt service and sewer bills by 15-18%*
$.05M	Public Hydrant Rates	Borough to pay public hydrant fees
Net Proceeds		Reduce other borough obligations/economic development/cash reserves

Resident Impact from Sale of Water Assets

- **$175/yr reduce real estate tax by 2 mills**
  - Based on median house value of $88,400
- **$115-$150/yr reduction of sewer rates**
- **Gradual water rate increases every 3-4 years**

Resident Impact from Sale of Water Assets

Steelton Borough - Water and Sewer Rate Analysis (11,981 Average Quarter consumption - Residential)

Comparing Qaurterly Charges, as of 7/1/18

With HRG projected increased for Steelton Borough 65.59% over 10 years)

Assumes Two 40% increases in 2022 and 2026 if Water System is sold

With projected 9% rate increases in 2022 and 2026

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
DSIC Factor		2.00%	4.50%	7.50%	2.00%	4.00%	6.00%	7.50%	2.00%	4.00%	6.00%
Steelton Borough -Current Rates - (44.35 + (8.26 x7)) = $102.17 per Qtr.											
Water Rate (a)	102.17	122.60	122.60	128.73	128.73	133.88	133.88	133.88	144.59	144.59	169.18
Sewer Rate(b)	158.01	167.49	167.49	167.49	167.49	167.49	167.49	167.49	167.49	167.49	167.49
Steelton Borough Total	260.18	290.09	290.09	296.22	296.22	301.37	301.37	301.37	312.08	312.08	336.67
Steelton Borough - Sell Water Only											
Water Rate	102.17	102.17	102.17	102.17	153.77	153.77	153.77	153.77	231.42	231.42	231.42
DSIC		2.04	4.60	7.66	3.08	6.15	9.23	11.53	4.63	9.26	13.89
Sewer Rate (d)	158.01	134.31	134.31	134.31	134.31	134.31	134.31	134.31	134.31	134.31	134.31
Steelton Borough - Sell Water Only	260.18	238.52	241.08	244.14	291.15	294.22	297.30	299.61	370.35	374.98	379.61

Insulates Customers from Industrial Reduction in Use

- **The Borough's largest Industrial customer currently provides approximately 60% of water revenue**
- **Reduction in Industrial water use would reduce water revenues, but without significant reductions in operational expenses**
- **Result would be significantly increased rates to all residential and commercial customers to cover shortfall from lost Industrial revenues**

Insulates Customers from Industrial Reduction in Use

- **Even now, the 2018 Authority Budget initially projected a $745,496 deficit due to combination of higher expenses and decreased revenues**
- **Authority had to cut Third Street Project ($500,000) for second consecutive year *AND* use $228,540 in "Transfer from Reserves" for first time to make up the shortfall**
- **A larger company would be better positioned to absorb the risk of reduced revenues**

THANK YOU

WE WILL NOW PROCEED WITH PUBLIC COMMENTS

REVISED WATER SYSTEM CAPITAL IMPROVEMENTS SUMMARY

BASED ON 7-26-2018 MEETING WITH OPERATIONS STAFF

YEARS 2019 - 2023				
Project Description	**Estimated Project Cost**	**Implementation Schedule**	**Need Category**	**Notes:**
Water Treatment Plant - Source Water Monitoring	$21,000	2019	3O	Work will assist with operations and operational changes during various river condition. Project was identified in the November 2016 Water Distribution System Evaluation Report.
Water Treatment Plant - Pre-Oxidant System Optimization ($KMNO_4$)	$15,000	2019	3O	Work will assist with continued DBP removal and improved operations. Project was identified in the November 2016 Water Distribution System Evaluation Report.
Automatic Flushers	$22,500	2019	1R	Work is anticipated to assist in compliance with new Disinfection Requirements Rule. Actual needs to be confirmed after additional testing data and investigations. This Project would also assist with DBP removal and overall water quality by decreasing water age.
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High Service Distribution Investigation	$6,000	2020	2C	Work is necessary for proper system operation due to ongoing pumping issues.
Mixing/Aeration and Additional DBP Removal Work	$250,000	2019 - 2021	3O	Work includes additional DBP removal work at either the WTP, distibution system or storage tanks. Further testing data and investigations are required to confirm scope of work.
Miscellaneous Distribution System Improvements	$1,250,000	2019-2023	3O	The estimated project cost of $250,000/Year equates to 0.83% of Total System Replaced/Year. The industry recommended average is 1.0% Replaced/Year.
5 Year Total =	**$1,714,500**			

YEARS 2024 - 2028				
Project Description	**Estimated Project Cost**	**Implementation Schedule**	**Need Category**	**Notes:**
Water Treatment Plant Upgrade	$14,000,000	2025-2028	1R	The Water Treatment Plant (WTP) is 45 Years Old. The WTP is deficient in many current design standards (i.e. no filter to waste, insufficient backwashing, etc.) and presents operational issues relative to sludge blanket management, etc. associated with antiquated technology. Anticipated additional regulations, age and condition of the system and limits of technology will require an upgrade in the next 10 years. PADEP has documented the same concerns as outlined most recently in the February 2017 Filter Plant Performance Evaluation.
Miscellaneous Distribution System Improvements	$1,250,000	2024-2028	3O	The estimated project cost of $250,000/Year equates to 0.83% of Total System Replaced/Year. The industry recommended average is 1.0% Replaced/Year.
5 Year Total =	**$15,250,000**			
10 Year Total =	**$16,964,500**			

Notes:

1. **Needs Category Descriptions:**
   - **1R = Regulatory Requirement**
   - **2C= Immediate Capital Need Due to Condition**
   - **3O = Needed for Responsible System O&M**

2. **The Following Projects Were Removed Based On Operator Input At The July 26, 2018 Meeting:**
   - **A. TOC Monitoring & Removal ($20,000)**
   - **B. Improved Process Control - Chlorine Feed System ($25,000)**
   - **C. Additional Chlorine Injection Points ($450,000)**
   - **D. Elimination of Dual Mains to east End ($25,000)**
   - **E. Finished Water Pump VFD Optimization ($60,000)**
   - **F. Water Meter Installation ($50,000)**

3. **The SCADA/Process Control Cost Has Been Revised Based On Work Completed To Date.**

4. **All Costs Are In 2018 Construction Dollars With No Inflation For Construction Year.**

5. **No Miscellaneous Improvements Costs Included For Water Treatment Plant, Storage Tanks Or Booser Station.**

6. **No Construction Costs Included For Follow-up To High Service Distribution Investigation.**

Steelton Borough Authority

2018 - 2028 Water System Estimated Revenues & Expenses

Water Revenue Requirements

(Revised 8-3-2017)

EXISTING STRUCTURE WITH RATE INCREASES [1]

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028 [5]
Expenses [2]											
Administrative and Billing Costs	505,235	484,543	497,085	510,192	523,470	537,241	551,203	565,765	580,447	595,750	611,284
Operating Costs	1,574,965	1,498,573	1,548,418	1,600,830	1,654,410	1,710,614	1,769,205	1,830,805	1,893,889	1,960,244	2,029,512
Maintenance and Repair Costs	137,100	126,028	129,278	132,408	135,818	139,111	142,689	146,153	149,907	153,552	157,491
Capital and Debt Service Costs [3]	851,351	1,214,684	1,152,614	1,145,990	1,185,076	1,164,227	1,164,397	1,078,969	1,192,229	1,192,229	1,790,193
Interfund Transfer	-	-	-	-	-	-	-	-	-	-	-
Total Revenue Requirement	**3,068,651**	**3,323,827**	**3,327,396**	**3,389,419**	**3,498,774**	**3,551,192**	**3,627,493**	**3,621,691**	**3,816,472**	**3,901,775**	**4,588,481**
Less Non Rate Income											
Interest Income	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Interest/Penalty Charges	28,420	28,420	28,420	28,420	28,420	28,420	28,420	28,420	28,420	28,420	28,420
Property Fees - Sewer	14,700	14,700	14,700	14,700	14,700	14,700	14,700	14,700	14,700	14,700	14,700
Miscellaneous	20,475	20,475	20,475	20,475	20,475	20,475	20,475	20,475	20,475	20,475	20,475
Non-Rate Income Subtotal	*76,095*	*76,095*	*76,095*	*76,095*	*76,095*	*76,095*	*76,095*	*76,095*	*76,095*	*76,095*	*76,095*
Total Revenue Required from Rates	**2,992,556**	**3,247,732**	**3,251,301**	**3,313,324**	**3,422,679**	**3,475,097**	**3,551,398**	**3,545,596**	**3,740,377**	**3,825,680**	**4,512,386**
Rate Increase Implemented this Year [4]	**0%**	**20%**	**0%**	**5%**	**0%**	**4%**	**0%**	**0%**	**8%**	**0%**	**17%**
Meter Size Quarterly Rates											
5/8 inch and 3/4 inch	$ 44.35	$ 53.22	$ 53.22	$ 55.88	$ 55.88	$ 58.12	$ 58.12	$ 58.12	$ 62.77	$ 62.77	$ 73.44
1 inch	$ 97.13	$ 116.56	$ 116.56	$ 122.38	$ 122.38	$ 127.28	$ 127.28	$ 127.28	$ 137.46	$ 137.46	$ 160.83
1.25 inch and 1.5 inch	$ 174.87	$ 209.84	$ 209.84	$ 220.34	$ 220.34	$ 229.15	$ 229.15	$ 229.15	$ 247.48	$ 247.48	$ 289.55
2 inch	$ 252.60	$ 303.12	$ 303.12	$ 318.28	$ 318.28	$ 331.01	$ 331.01	$ 331.01	$ 357.49	$ 357.49	$ 418.26
3 inch	$ 573.19	$ 687.83	$ 687.83	$ 722.22	$ 722.22	$ 751.11	$ 751.11	$ 751.11	$ 811.20	$ 811.20	$ 949.10
4 inch	$ 748.56	$ 898.27	$ 898.27	$ 943.19	$ 943.19	$ 980.91	$ 980.91	$ 980.91	$ 1,059.39	$ 1,059.39	$ 1,239.48
6 inch	$ 1,197.69	$ 1,437.23	$ 1,437.23	$ 1,509.09	$ 1,509.09	$ 1,569.45	$ 1,569.45	$ 1,569.45	$ 1,695.01	$ 1,695.01	$ 1,983.16
8 inch	$ 1,739.91	$ 2,087.89	$ 2,087.89	$ 2,192.29	$ 2,192.29	$ 2,279.98	$ 2,279.98	$ 2,279.98	$ 2,462.38	$ 2,462.38	$ 2,880.98
Volumetric Rates											
Volumetric Charge: 5,001 to 60,000 gallons	$ 8.26	$ 9.91	$ 9.91	$ 10.41	$ 10.41	$ 10.82	$ 10.82	$ 10.82	$ 11.69	$ 11.69	$ 13.68
Volumetric Charge: 60,001 to 150,000 gallons	$ 9.12	$ 10.94	$ 10.94	$ 11.49	$ 11.49	$ 11.95	$ 11.95	$ 11.95	$ 12.91	$ 12.91	$ 15.10
Volumetric Charge: over 150,000 gallons	$ 7.88	$ 9.46	$ 9.46	$ 9.93	$ 9.93	$ 10.33	$ 10.33	$ 10.33	$ 11.15	$ 11.15	$ 13.05
Total Minimum Charge Collected	$ 748,057	$ 904,808	$ 904,808	$ 950,048	$ 950,048	$ 988,050	$ 988,050	$ 988,050	$ 1,067,094	$ 1,067,094	$ 1,248,500
Total Volumetric Charge Collected	$ 2,006,545	$ 2,407,987	$ 2,407,987	$ 2,528,386	$ 2,528,386	$ 2,629,521	$ 2,629,521	$ 2,629,521	$ 2,839,883	$ 2,839,883	$ 3,322,663
Delinquencies (assumes 1%)	$ (27,546)	$ (33,128)	$ (33,128)	$ (34,784)	$ (34,784)	$ (36,176)	$ (36,176)	$ (36,176)	$ (39,070)	$ (39,070)	$ (45,712)
Transfer from Reserves [6]	$ 265,496	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Revenue from Rates	2,992,553	3,279,667	3,279,667	3,443,650	3,443,650	3,581,396	3,581,396	3,581,396	3,867,908	3,867,908	4,525,452
Surplus (Deficit)	**$ -**	**$ 31,935**	**$ 28,366**	**$ 130,326**	**$ 20,971**	**$ 106,299**	**$ 29,998**	**$ 35,800**	**$ 127,531**	**$ 42,227**	**$ 13,066**

Steelton Borough Authority

2018 - 2028 Water System Estimated Revenues & Expenses

Water Revenue Requirements

(Revised 8-3-2017)

EXISTING STRUCTURE WITH RATE INCREASES [1]

NOTES:

[1] Assumes no growth. Revenues and expenses for 2019 through and including 2028 are based on the 2018 adopted budget.

[2] After 2018, all expenses assumed to increase 2.50% per year except for healthcare costs and wages, which increase by 7.00% and 3.00%, respectively.

[3] Projected capital project costs to water system are per the 10-Year Capital Improvement Plan dated March 2018 prepared by Herbert, Rowland and Grubic, Inc., but modified per discussions with the operators on July 26, 2018. Existing debt service amounts were provided by the Borough. Estimated future debt service includes PENNVEST loan for the construction to upgrade the water plant ($14 million), the mixing/aeration system ($250,000) and the SCADA system ($150,000). The term of the loans are estimated for 20 years at 1.626% county cap rate for first 5 years.

[4] The rate increases shown are one of several potential rate increase scenarios. The objective of the rate increases is to provide a surplus at the end of each year. In 2019, a 20% rate increase is estimated so that a deficit does not occur similar to the previous year (Refer to Note 6), and to cover the non-borrowing financed capital costs that are planned in 2019, which includes the source water monitoring ($21,000), the pre-oxidant system optimization ($15,000), the automatic flusher ($22,500) and the distribution system improvements ($250,000).

[5] Principal loan payments are forecasted to begin in year 2028 for a proposed PENNVEST loan to upgrade the water treatment plant. The estimated principal amount is $826,000 per year based on a $14 million loan, which will require the rates to increase approximately 17%.

[6] As shown, in 2018 the Authority will need to use reserve funds to offset the deficit The exact amount of reserves will depend on actual revenue received and expenses incurred.

Steelton Borough Authority

10-Year Capital Improvement Plan
Water Treatment and Distribution System
Borough of Steelton, Dauphin County, PA

March 2018

BUILDING RELATIONSHIPS.
DESIGNING SOLUTIONS.

369 East Park Drive • Harrisburg, Pennsylvania 17111 • 717.564.1121 [phone] • 717.564.1158 [fax]

10-Year Capital Improvement Plan
Water Treatment and Distribution System

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1.0 – EXECUTIVE SUMMARY

The primary intent of the Capital Improvement Plan (CIP) is to identify areas and/or specific facilities within the Authority's water treatment and distribution system that require future rehabilitation and/or improvements to maintain satisfactory operation over the next ten (10) years.

Herbert, Rowland & Grubic, Inc. (HRG) has prepared the CIP based on site visits with Borough staff, identified historical operations issues, a review of existing reports and operational data, regulatory compliance requirements and our general understanding of the water treatment and distribution systems through our involvement in numerous Authority projects.

The individual project cost estimates provided in Table 1.1 below are conceptual and were developed based upon available record drawings, GIS mapping and attribute data available at the time of this report. These cost estimates are intended to provide an order or magnitude of total project costs for budgeting/planning purposes. It should be noted that costs may be reduced through combining like improvements into a single project or contract. As individual studies are prepared, as a component of project design, costs identified in the CIP may increase or decrease based upon further definition of project scope, design criteria, and identification of actual asset conditions. Table 1.1 presents the estimated project cost estimates based on 2018 dollars for each recommended project.

Table 1.1 10 Year Capital Improvements Estimated Project Cost

Water Treatment Plant (WTP)			
Project	**Description**	**Estimated Project Cost**	**Implementation Schedule**
WTP-1	Source Water Monitoring	$21,000	2019-2020
WTP-2	TOC Monitoring/Removal	$20,000	2019-2020
WTP-3	Pre-Oxidant System Optimization (Potassium Permanganate)	$15,000	2019-2020
WTP-4	Improve Process Control of Chlorine Feed Systems	$25,000	2019-2020
WTP-5	Water Treatment Plant Upgrade	$14,000,000	2023-2028
Distribution System (DS)			
Project	**Description**	**Estimated Project Cost**	**Implementation Schedule**
DS-1	Automatic Flushers	$22,500	2020
DS-2[1]	Additional Chlorine Injection Point	$450,000	2021-2022
DS-3	Elimination of Dual Mains	$25,000	2020
DS-4	Distribution System Improvements	$250,000 (per year)	2019-2028

Finished Water Storage Tank (T)			
Project	**Description**	**Estimated Project Cost**	**Implementation Schedule**
T-1[2]	Mixing/Aeration System	$250,000	2020-2021
Additional Work (AW)			
Project	**Description**	**Estimated Project Cost**	**Implementation Schedule**
AW-1	Finished Water Pump VFD Optimization	$60,000	2019-2020
AW-2[3]	High Service Distribution Investigation	$6,000	2019-2020
AW-3	SCADA/Process Control	$200,000	2019-2020
AW-4	Water Meter Installation	$50,000	2021-2022

Notes:
[1] Chlorine injection station projects should be implemented after analysis of post-clearwell tank project operational data and in accordance with the Disinfection Requirements Rule (DRR) implementation schedule.
[2] This project may be implemented at either the water treatment plant or the finished water storage tanks. A determination will be made after post-clearwell tank project operational data has been collected and evaluated and all DRR compliance alternatives have been considered.
[3] The estimated project cost shown does not include any improvements determined to be necessary after completion of the investigation work.

2.0 – INTRODUCTION

2.1 – BACKGROUND

The Authority under permit PWSID 7220036 provides water to approximately 6,311 consumers through 2,421 metered service connections. The existing water system consists of two components, the water treatment plant (WTP) and the distribution system.

The Authority's WTP obtains all water from a raw water intake located on the Susquehanna River in Dauphin County. Constructed in 1973, the WTP serves the community of Steelton and some homes in Swatara Township. While the WTP's permitted capacity is 3.0 MGD (2,083 gpm), the WTP maintains a typical daily production rate of 1.6 to 2.4 MGD (1,111 to 1,670 gpm). The WTP is staffed 24 hours per day however, the time of operation is typically 13 to 16 hours per day, 7 days per week. The existing treatment process at the WTP currently consists of potassium permanganate for DBP control, alum for coagulation, flash mixing, two upflow sludge blanket clarifiers for flocculation and sedimentation, four multimedia filters and chlorine disinfection. A polymer is also added to the flash mixer to aid in clarifier blanket formation. The existing filtration system is manufactured by INFILCO and was originally installed in 1973. Various upgrades to the filtration system have been performed over the years with the most recent upgrades being completed in 2017 (new clearwell).

Two (2) vertical turbine raw water pumps with variable frequency drives (VFD's) convey the water from the raw water pumping station to the up-flow clarifier rapid mix tank. From there, the water flows by gravity through the treatment process into the existing clearwell. Two (2) centrifugal finished water pumps with VFD's convey the water from the clearwell to the distribution system. Production at the WTP typically ends when the finished water storage tanks have been filled to their maximum operating levels. During the hours when the WTP is not in production, the distribution system is fed from the finished water storage tanks.

The existing Authority distribution system generally consists of a network of water distribution piping including approximately 28 miles of pipe ranging from 4 inch diameter to 20 inch diameter, one water booster station, two – 2 million gallon (MG) finished water storage tanks, and two interconnections that provide water service to various residential, commercial, institutional, and industrial properties throughout the Borough.

2.2 – Necessary Improvements to Comply with State and Federal Regulations

The water treatment and distribution system is regulated by the Safe Drinking Water Act enforced by the United States Environmental Protection Agency (USEPA) and the Pennsylvania Department of Environmental Protection (PADEP).

Currently, the major regulatory drivers faced by the Authority for compliance with the Safe Drinking Water Act include the following:

Stage 2 Disinfectants and Disinfection Byproducts Rule:

The purpose of the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR) is to increase public health protection by reducing the potential risk of adverse health effects associated with DBPs through the distribution system. The Stage 2 DBPR builds on the Stage 1 DBPR by focusing on monitoring for and reducing concentrations of two classes of DBPs – TTHM and HAA5 – in drinking water. The Authority was required to begin complying with monitoring requirements effective October 1, 2013. The Authority is required to meet the following requirements:

1. Monitor TTHM and HAA5 quarterly at two (2) distribution system locations as determined during previously approved sampling plan.

2. Comply with the Stage 2 DBPR Regulated Contaminants limits as summarized below in Table 2.1.

Table 2.1 Stage 2 DBPR Regulated Contaminants

Regulated Contaminants		MCLG (mg/L)	MCL (mg/L)
Total Trihalomethanes (TTHM)		-	0.080 LRAA
	Chloroform	0.07	-
	Bromodichloromethane	0	-
	Dibromochloromethane	0.06	-
	Bromoform	0	-
Five Haloacetic Acids (HAA5)		-	0.060 LRAA
	Monochloroacetic acid	0.07	-
	Dichloroacetic acid	0	-
	Trichloroacetic acid	0.02	-
	Bromoacetic acid	-	-
	Dibromoacetic acid	-	-

Revised Total Coliform Rule:

The Total Coliform Rule was revised to further protect human health through the reduction of potential pathways of entry for fecal contamination into distribution systems. The Revised Total Coliform Rule (RTCR) establishes a MCL for E. coli and uses E. coli and total coliforms to initiate a "find and fix" approach to address fecal contamination that could enter into the distribution system. The RTCR requires the Authority to perform assessments to identify sanitary defects and subsequently take action to correct them. The RTCR went into effect on April 1, 2016. Prior to April 1, 2016, the Authority was required to develop a written sample siting plan that identifies the system's sample collection schedule and all sample sites, including sites for routine and repeat monitoring.

Proposed Disinfection Requirements Rule:

The Proposed Disinfection Requirements Rule (DRR) in its final-form version was delivered by the PA Environmental Quality Board (EQB) to the PA House and Senate Environmental Resources and Energy Committee and IRRC for consideration at the IRRC's February 22, 2018 meeting and was approved by the IRRC. The DRR is intended to protect public health through a multiple barrier approach designed to guard against microbial contamination by ensuring the adequacy of treatment designed to inactivate microbial pathogens and the integrity of drinking water distribution systems. More information will be provided in 2018 relative to the DRR compliance deadlines including site sampling plan submission deadlines.

The proposed DRR includes the following:

1. New monitoring and reporting requirements for surface water and groundwater under the direct influence of surface water (GUDI) systems regarding the calculation and reporting of CT/log inactivation values.

2. A clarification that the minimum entry point chlorine residual for surface water and GUDI systems is 0.20 mg/L.

3. Increased disinfectant residual requirements in the distribution system from 0.02 mg/L to 0.2 mg/L at all points in the distribution system. Monitoring must be conducted on a weekly basis as per a sample siting plan.

4. New requirements for a nitrification control plan for systems that use chloramines.

3.0 – Necessary Improvements and Associated Costs

3.1 - Water Treatment Plant Process Projects (WTP)

Project WTP-1: Source Water Monitoring

The Authority currently relies on the Susquehanna River as its main source of water supply. The river is classified as a surface water source and as such, is highly vulnerable to accidental or intentional contaminants and weather related or seasonal changes. Because surface water is exposed to natural and man-made influences, it has a broader exposure to organic matter responsible for DBP formation. Source water precursor concentrations and temperatures can have significant effects on DBP formation. For the Authority, it may be beneficial to consider implementing a source water monitoring program to aid in process control and identifying the causes of future OEL exceedances. Currently, the Operators do not have a way to sample the

raw water prior to the addition of their pre-oxidant chemical (potassium permanganate). The installation of a source water monitoring system would provide the operators with information to:

1. Determine the best disinfection strategy based on changing water conditions.
2. Control their chemical feed process in real-time based on changing source water conditions.
3. Establish a baseline for tracking DBP removal.

Steelton staff have obtained a quote for the purchase of source water analytical equipment. This monitoring equipment includes measurement of the following parameters (pH, Oxidation Reduction Potential - ORP, Turbidity). The ability to add additional monitoring parameters could be considered as part of this improvement.

The estimated project cost is $21,000.

Project WTP-2: TOC Monitoring / Removal

The formation of DBP's is greatly influenced by the amount of precursors, such as natural organic matter (NOM) in the source water. Since NOM is difficult and expensive to measure, total organic carbon (TOC) is used as a substitute measurement and indicator of precursors to DBP formation. As part of the compliance with the Stage 1 DBP Rule, the Authority is required to maintain a TOC removal efficiency of 25% or greater. The March 2015 Optimized DBP Removal Study that was previously completed by HRG and the Authority reported the use of enhanced coagulation to improve DBP precursor removal proved to be effective based on the results of jar testing. The goal of achieving a TOC removal efficiency of greater than 25% was met consistently within a specific range of pH conditions.

This project includes development of further testing protocols that will help establish coagulation conditions to improve the removal of TOC at the WTP prior to chlorine addition.

The estimated project cost is $20,000.

Project WTP-3: Pre-Oxidant System Optimization (Potassium Permanganate)

The main goal of water treatment with sodium or potassium permanganate is to provide adequate pre-oxidation to remove organics and/or dissolved metals, such as manganese and iron, from the water. Surface water systems (such as the Authority) primarily rely on a pre-oxidation treatment process to improve the removal of NOM as a means to minimize formation of DBPs. Currently, the Operators have limited ability to monitor and control the pre-oxidation chemical feed system based on changing water conditions. In addition, improvement to the actual dosing location (such as mixing) have been identified during previous site visits and evaluations as a way to help improve the effectiveness of the chemicals.

This project includes development of further testing protocols that will help to optimize the pre-oxidation treatment process.

The estimated project cost is $15,000.

Project WTP-4: Improve Process Control of Chlorine Feed Systems

This project includes Operator development of real-time process control monitoring strategies (such as data trending) that will allow the Operators to control their chemical feed processes in real-time based on actual source water conditions. Improvements to be considered under this project include the addition of new PLC monitoring equipment and data trending software.

The estimated project cost is $25,000.

Project WTP-5 - Water Treatment Plant Upgrade

Anticipated upgrades to the existing WTP will be needed due to various limiting factors including; age of facility (the main process components are nearly 50 year old), the existing treatment technology, and pending regulations that may require more stringent regulatory requirements. In addition, various comments included in previous Filter Plant Performance Evaluations (FPPE) conducted by the PADEP continue to remain unaddressed due to physical limitations within the current treatment process.

This project includes replacing the existing up flow clarifiers and duel media filtration system with a new pressurized ultrafiltration treatment system. Work includes installation of the following new facilities: ultrafiltration feed pumps, ultrafiltration units, GAC vessels, backwash system, building modifications, chemical feed systems and demolition of existing equipment and structures, electrical and control work.

The estimated project cost is $14,000,000.

3.2 – DISTRIBUTION SYSTEM PROJECTS (DS)

Project DS-1: Automatic Flushers

Periodic flushing can be an effective tool to control TTHM and HAA5 peaks and maintain chlorine residuals by purging stagnant water to reduce water age and by cleaning pipes that exert chlorine demand. Automatic flushers are devices that induce continuous or automatic intermittent flow of water designed to remove old water from dead-end or stagnate zones and pull fresher water into these locations from other areas.

The project includes installation of automatic flushers in areas where there is high water age.

The estimated project cost is $7,500 per automatic flusher or $22,500 for installation of three (3) automatic flushers throughout the system.

Project DS-2: Additional Chlorine Injection Point Locations (RTCR/DRR Compliance)

Chlorine dosage within the Authority's WTP must simultaneously inactivate microbes, provide maintenance of a residual at all points in the distribution system, and comply with all applicable regulatory requirements (RTCR/DRR Compliance, etc.) Currently, chlorination of the Authority's drinking water is provided only at the WTP. Distribution sampling results have indicated that the chlorine residual in portions of the distribution system (mainly the EED) may reach very low levels. In this case, one or more booster chlorination stations may need to be considered in the distribution system in order to observe higher chlorine residuals at all locations in the system or the 0.2 mg/L proposed by the DRR.

Network hydraulic values, tank water levels and chlorine concentrations may vary over the course of one day due to changes in consumer demand. For this reason, the optimum location of a booster chlorination station, injection rates and scheduling must be considered together. This project includes re-evaluation of the need for this improvement after analysis of post-clearwell tank project operational data and in accordance with the Disinfection Requirements Rule (DRR) implementation schedule.

The estimated project cost for the installation of each new chlorine injection point is $150,000 or $450,000 for installation of three (3) chlorine injection point locations.

Project DS-3: Elimination of Dual Mains

There are currently two (2) 10-inch diameter transmission mains (each approximately 4,400 feet in length) that convey water to the East End which equates to approximately 18,000 gallons of water in each pipe or 36,000 total gallons. The East End average daily demand is approximately 43,000 gallons per day. The purpose of the dual transmission mains was to provide back-up in order to continually provide water to the East End in case one of the transmission mains experienced a water break and needed to be shut down. The East End demand is not significant enough to create adequate turnover in the dual mains which is contributing to a higher water age in this area.

This project includes installation of a check valve on the 10-inch transmission main near McKinley Street.

The estimated project cost is $25,000.

Project DS-4: Distribution System Improvements

In order to properly maintain aging portions of the Authority's water system, a cost of $250,000 per year beginning in 2019 has been allocated to miscellaneous distribution system improvements within the Borough. These improvements include replacement of aging water main pipe and appurtenances and water system looping. The location of the improvements will be prioritized based on input from Borough Staff.

3.3 – FINISHED WATER STORAGE TANK PROJECTS (T)

Project T-1: Mixing / Aeration System

Research has shown that TTHMs are very susceptible to removal by aeration. In addition, aeration seems to be most effective on waters containing high TTHM levels including water systems with high water age, consecutive systems and systems relaying on surface water as the main source.

Based on the limited thermal stratification in the tank, the installation of a tank mixing system is not recommended at this time. However, it is likely that provisions for the installation of a mixing system would be included as part of the design concept for any aeration system that may be installed within the tanks.

The optimum location for a mixing/aeration system to serve the Authority system may be at the WTP prior to the entry point for additional TTHM removal. However, installation at the finished water storage tanks could assist with chlorine residual maintenance. A determination will be made after

post-clearwell tank project operational data has been collected and evaluated and all DRR compliance alternatives have been considered.

The estimated project cost is $250,000.

3.4 – ADDITIONAL WORK PROJECTS (AW)

Project AW-1: Finished Water Pump VFD Optimization

Operators continue to deal with on-going issues related to the finished water pump VFDs. Operators report that these issues seem to be worse during the summer months, when the temperature and humidity appear to cause the VFDs to fail. During this time, the Operators are often forced to run these pumps in Manual mode.

This project includes development of a permanent solution to address finished water pump VFD issues.

The estimated project cost is $60,000.

Project AW-2: High Service Distribution Investigation

It has been identified during the course of this evaluation that further investigation of the high service distribution system and booster pump station is necessary to determine the cause of the irregular pressure and flow values that were observed during the flow hydrant testing. Investigation of the check valves that separate the high service distribution and main service distribution system should be completed to verify the operation and settings during fire flow conditions. In addition, the Operators have reported in the past that the booster station pumps are unable to maintain the required system pressure during fire flow testing.

This project includes further evaluation of the high service distribution system check valve network and the booster station pumps to confirm proper operation and determine necessary improvements.

The estimated project cost is $6,000. This cost does not include any improvements determined to be necessary after completion of the investigation work.

Project AW-3: SCADA / Process Control

Due to the limited number of PLC's, communication system infrastructure and software reporting capabilities at the WTP, the Operators are limited in their ability to record and trend numerous process control variables that are necessary to make real-time process control decisions in response to changing source water quality conditions. In response to more stringent regulatory requirements, additional process instrumentation is continuing to be installed at the WTP.

This project includes SCADA system upgrades that can be installed at the WTP in an effort to stream-line the data trending and reporting process, and provide an additional means to back-up data required for regulatory compliance.

The estimated project cost is $200,000 and includes the following:

1. Two (2) new PLC's (one in raw water station and one in back of main instrument board).
2. Ethernet over fiber optics connection from raw water station PLC to main PLC.

3. New Ethernet connections in WTP.
4. Three (3) new PC with a graphic software package that includes alarms and trending.
5. Reporting software.
6. All necessary field devices, wiring, conduit, etc.
7. Programming, Training and Start-up assistance.

Project AW-4: Water Meter Installation

It has been identified that there appears to be discrepancies between the reported commercial user water demands and the actual commercial user water demands. Specifically, it appear that there is a significant, continuous water demand that is occurring overnight when the WTP is offline.

This project includes identification of the most ideal locations to install additional water meters throughout the distribution system, primarily on the service lines serving the significant commercial users. This information will provide more accurate, continuous flow data that can be used to monitor system wide water usage and to help identify any unaccounted water loss.

The estimated project cost is $50,000.