

PRELIMINARY ENGINEERING REPORT

FOR THE PROPOSED

**SANITARY BOARD OF BLUEFIELD
MIDWAY SEWER REPLACEMENT PROJECT
MERCER COUNTY, WV**

JUNE 2023

PREPARED FOR:

**THE SANITARY BOARD OF BLUEFIELD
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Table of Contents

I.	INTRODUCTION.....	1
II.	CURRENT SITUATION	2
A.	Customers	2
B.	Collection.....	2
D.	Treatment.....	2
E.	Need for Project	3
III.	FUTURE SITUATION.....	4
A.	Population Projections	4
B.	Flow Projections.....	4
C.	Permits / Certifications Required.....	4
IV.	ALTERNATIVES.....	5
A.	Alternative #1 – Do Nothing.....	6
B.	Alternative #2 – Replace Existing Distribution System	7
V.	PLAN SELECTION AND PUBLIC PARTICIPATION	9
VI.	ENVIRONMENTAL INFORMATION	10
VII.	PROJECT SUMMARIES.....	10
A.	ENGINEERING SUMMARY	10
B.	COST SUMMARY.....	11
i.	Project Costs.....	11
ii.	Operation and Maintenance Costs.....	11
iii.	Existing Debt	12
iv.	Proposed Project Financing.....	12
v.	User Rates Projected	12
C.	PROJECT SCHEDULE.....	13
D.	LANDS AND RIGHT-OF-WAY.....	13
E.	PUBLIC HEALTH BENEFITS	13

Tables

Table 1 - Mercer County Population Projections 2020-2040	4
Table 2 - Plan Selection Summary Table.....	9
Table 3 - Project Cost Estimate Summary.....	11
Table 4 - Existing Debt Information	12
Table 5 - Existing Sewer Rate Information.....	12

Figures

Figure 1: Mercer County Project Location Map.....	1
Figure 2: Map of Alternative #2 Project Layout.....	7

Appendices

Appendix A	2022 PSC Annual Report
Appendix B	2020 Census MHI Information
Appendix C	Proposed Project Drawings
Appendix D	WVDEP Administrative Order and Responses
Appendix E	Sanitary Sewer Study and Report
Appendix F	Population Information
Appendix G	Operation and Maintenance Calculations
Appendix H	Present Worth Analysis
Appendix I	Environmental Review Letters
Appendix J	Project Cost Estimate
Appendix K	Sanitary Board of Bluefield Tariff
Appendix L	Proposed Project Schedule

I. INTRODUCTION

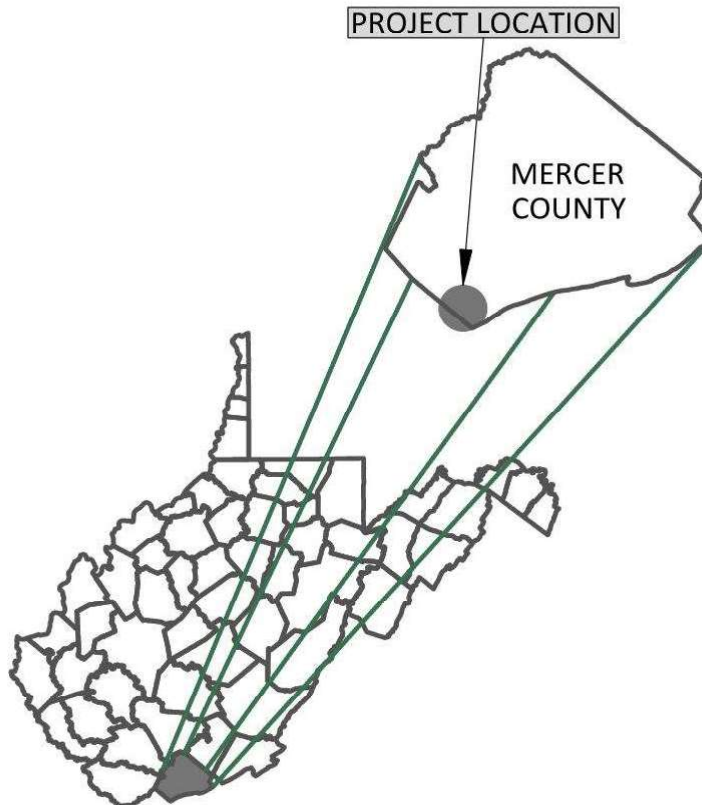
This Preliminary Engineering Report (PER) was prepared for the Sanitary Board of Bluefield (SBB) to propose a replacement of their gravity sewer collection system in the Midway area. The purpose of this report is to include information on providing improvements to the existing wastewater collection system. The scope of the PER includes the following:

- Evaluation of Current Wastewater Collection System
- Evaluation of Current and Future Population / Wastewater Demand
- Review of Regulatory Issues
- Proposed Upgrades / Improvements

The proposed Midway Sewer Replacement Project is being implemented by the Sanitary Board of Bluefield and is necessary to provide an upgraded gravity collection system to replace the current failing system in the Midway area of Bluefield, West Virginia. This project is located primarily along Old Bramwell Road (Rt. 11), Upshur Street and Harry Street.

The SBB has the authority to implement the recommendations contained herein.

Figure 1: Mercer County Project Location Map



II. CURRENT SITUATION

The SBB owns and operates a wastewater treatment and collection system throughout parts of Bluefield in Mercer County, West Virginia and Bluefield in Tazewell County, Virginia. The system consists of approximately 250 miles of gravity collection mains, 18 miles of force collection mains (force mains), 10 pumping stations, 11 grinder pumping stations, 2 wastewater treatment plants and other related appurtenances.

A. Customers

The Sanitary Board of Bluefield currently owns and operates a wastewater collection and treatment system serving approximately 7,690 residential customers. This information can be found in the 2022 Public Service Commission (PSC) Annual Report located in **Appendix A**. The average residential wastewater produced provided by the 2022 PSC Annual Report is approximately 4,271 gallons per month.

The Median Household Income (MHI) for The City of Bluefield, West Virginia was **\$35,650** in 2020. This information was found on the US Census Data website. This website uses the US Census data from the American Community Survey 5-year estimate. This information can be found in **Appendix B**.

B. Collection

The 250 miles of collection lines extend sanitary sewer service to the communities of Bluefield WV, Bluefield VA, Brush Fork, Cumberland heights and the surrounding areas. The area of interest for this project is the existing gravity collection system in the Midway area located just west of Bluefield WV. The locations of these areas are shown on the Project Drawings located in **Appendix C**, and on Figure 2 below.

D. Treatment

The SBB operates two treatment plants. The Westside Treatment Plant is located on Parsley Street and the Ada Treatment Plant is located on Rt 112. The Westside Treatment Plant is designed to treat approximately 8.3 million gallons day (MGD). The Ada Treatment Plant has a capacity of 1.2 MGD. Together the SBB has a combined treatment capacity of approximately 9.5 MGD.

WVDEP Permit I.D.: WV0023141

E. Need for Project

WVDEP Administrative Order

On July 12, 2014, the SBB was issued an order under the Water Pollution Control Act Administration (Order No: 8084) requesting compliance to various issues, among these was a Plan of Action to ensure proper operation and maintenance of the wastewater treatment system (see **Appendix D**). In response the SBB hired outside consultants to do evaluations and studies of the existing system. As a result, target areas were established, and projects identified to correct these areas (Evaluations and Studies included in **Appendix E**). The Midway area was identified as one of the main problem areas for the SBB.

Poor Condition of Collection System

The gravity sewer collection of the Midway area has been a known problem area for the SBB. The system was part of a Sanitary Sewer Evaluation in which SBB hired Thrasher Engineering to complete and Chapman Technical assembled the report. The study consisted of smoke testing and camera investigation of the area. During the study the board was notified that lines were running at nearly half capacity at times and many of the lines had obstruction, separations, sags, root penetrations, incorrect laterals and various other issues. The 2022 Annual report states that the inflow and infiltration (I&I) rate is 76.97%. Below is a brief summary of the I&I issues included in the Thrasher Report, more information can be found in **Appendix E**.

- 23 Broken Lateral Lines
- 2 Broken Main Lines
- 6 Storm Drains
- 2 Connected Downspouts
- 4 Broken Cleanout
- 2 Abandoned House Connections

Health and Sanitation

The project is needed to reduce I&I which would greatly reduce inflows into the Midway pump station. The project is needed to comply with the WVDEP Administrative order stated above for the development and implementation of measures to reduce the number of upsets and spills to the overall system. Due to the high rate of I&I, the Midway pump station is unable to keep up with inflows during larger precipitation events and has been known to back up and cause spillage. Replacing the collection lines in the area would eliminate many of these problems.

III. FUTURE SITUATION

A. Population Projections

Table 1 contains a summary of the population trends and projections in Mercer County from 2020 to 2040. The information was obtained from the West Virginia University College of Business and Economics and is contained in **Appendix F**.

Table 1 - Mercer County Population Projections 2020-2040

<u>Mercer County Population Projections 2020-2040</u>					
<u>Year</u>	<u>2020</u>	<u>2025</u>	<u>2030</u>	<u>2035</u>	<u>2040</u>
Population	59,664	58,332	57,131	55,716	54,453
% Growth (From 2020)	-	-2.23	-4.25	-6.61	-8.73
Released October 2022 by The West Virginia University College of Business and Economics					

The West Virginia University College of Business and Economics has developed population projections for the state (2020-2040). According to their projections, the population of Mercer County is expected to decrease by 8.73% from 2020 to 2040. For this project it was assumed that the population of Bluefield and surrounding areas would remain constant.

B. Flow Projections

The proposed project does not plan on adding additional customers, however with the significant reduction in I&I, reasonable future expansion would be possible.

C. Permits / Certifications Required

The agencies that are expected to require approved permits or environmental clearances for the proposed project are the following:

- West Virginia Department of Health and Human Resources
- West Virginia Public Service Commission
- West Virginia Department of Highways
- West Virginia Department of Environmental Protection
- United States Army Corps of Engineers
- West Virginia Division of Natural Resources

- United States Fish & Wildlife Service
- West Virginia Division of Culture & History

IV. ALTERNATIVES

The items evaluated in this study can be classified into the following general categories:

- i. Improvements/Changes to the Sewer Collection System
- ii. Determination of project costs, including operation and maintenance (O&M)
- iii. Correction of the WVDEP Administrative Order

Please see the following pages for Alternative information.

*Alternative 2 includes the replacement of the gravity collection system in the Midway area.

A. Alternative #1 – Do Nothing

i. Improvements/Changes to the Wastewater Collection System

This alternative will involve no changes to the existing wastewater collection system. The system will continue to have repeated failures, high rates of I&I, and spillages during precipitation events. Due to the age of the system the frequency of issues would be expected to increase.

ii. Determination of project costs, including operation and maintenance (O&M)

This alternative would not involve any additional project cost. The SBB would continue to incur increased O&M costs associated with making repairs and have excessive I&I. O&M costs can be assumed to increase as the system continues to age.

iii. Correction of the WVDEP Administrative Order

This alternative would not fix the issue to which the order was written. Spillage would continue to occur and would be expected to happen more often as the existing system would continue to deteriorate.

B. Alternative #2 – Replace Existing Distribution System

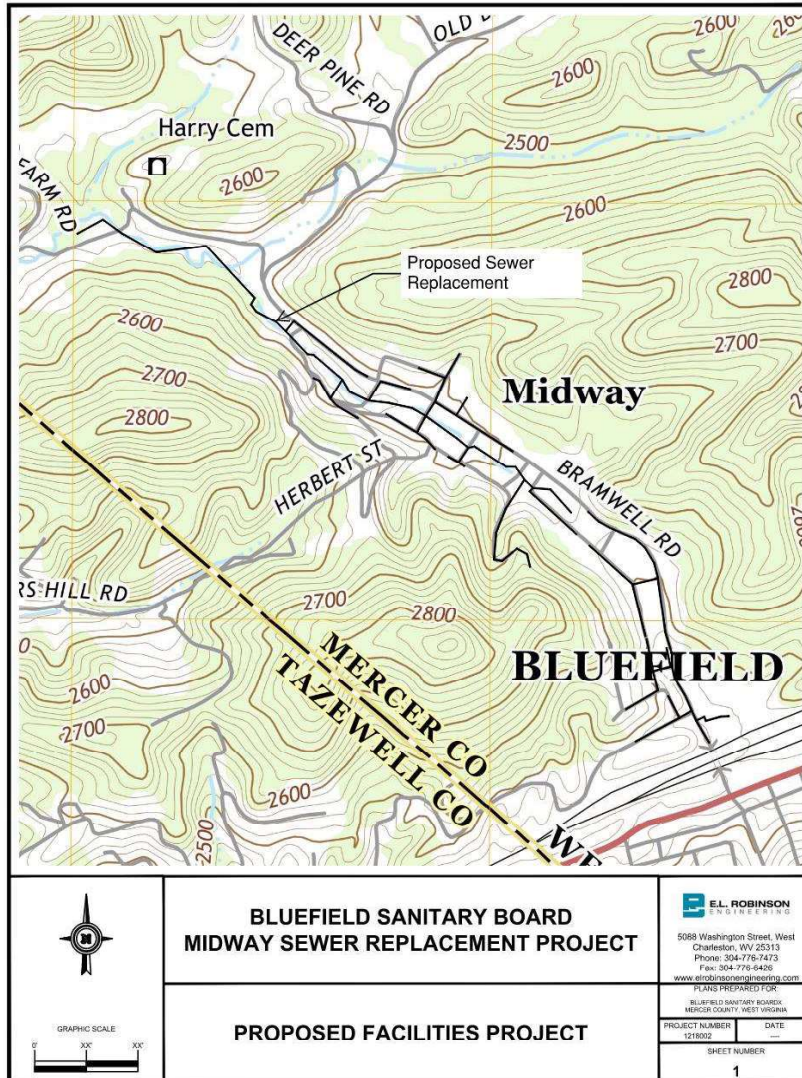


Figure 2: Map of Alternative #2 Project Layout

i. Improvements/Changes to the Wastewater Collection System

This alternative would consist of replacing the gravity collection system in the Midway area. The proposed project would include the installation of 16,700 linear feet (LF) of 10-inch and smaller gravity sewer line and all of the related appurtenances.

ii. Determination of project costs, including operation and maintenance (O&M)

Due to the excessive amounts of I&I currently present in the existing collection system, replacement of the system would result in a reduction in the total

amount of wastewater pumped and treated. A new system would require less maintenance; therefore, the O&M costs would be expected to decrease, however for the purposes of this report O&M costs are to remain the same.

The operation and maintenance cost calculations are provided in **Appendix G**. Present Worth Analysis calculations are provided in **Appendix H**.

V. PLAN SELECTION AND PUBLIC PARTICIPATION

The district’s regularly scheduled meetings are public meetings, and this project will be discussed with the citizens in attendance as the project progresses. Items discussed include helping the community understand the need for the projects, the funding package, and other pertinent information.

Citizen participation and public input for the project will be obtained in accordance with state and federal funding agency requirements. Additional public meetings will be held during the various stages of the project.

The following criteria was used to help evaluate the alternatives in the previous section:

- Construction Cost
- O&M Cost
- Present Worth Analysis
- Addressed Problems

Table 2 - Plan Selection Summary Table

-	Construction Cost	Annual O&M Cost	Present Worth Analysis	Addressed Problems
Alternative #1	None	-	-	Does not address existing issues
Alternative #2	\$4,700,000	-	\$4,700,000 (\$117,500 per year)	Will address existing issues

Alternative #2 was chosen as the proposed project. Implementing this project will address the issues discussed in Section II-E. The proposed alternative was determined to be the best option due to the reduction of I&I, and the expected reduction of the O&M cost due to reduced I&I. the proposed alternate will also address and correct issues identified in the administrative order and will significantly reduce or eliminate at the Midway pumping station.

VI. ENVIRONMENTAL INFORMATION

An environmental review of the study area was performed by contacting the state and federal agencies that provide environmental overviews concerning archaeological and historical sites, endangered species, wetlands, and other related items. A copy of the environmental responses received to date are included in **Appendix I**.

The results of these contacts are to be determined. The list of agencies can be found below:

- US Fish and Wildlife Service
- WV Division of Culture and History
- Army Corps of Engineers, Huntington District
- WV Division of Natural Resources
- WV DEP – Division of Air Quality

Adverse environmental impacts of the projects will be minimal. Unavoidable adverse impacts such as erosion and sedimentation will be minimized using silt fence and other sediment control devices. Disturbed areas will be graded, seeded, and mulched as soon as practical after construction. Dust, mud, and other conditions will be minimized by regularly sweeping and damping roadways. Noise pollution will be controlled as much as possible through the proper operation and maintenance of equipment and scheduling of work.

No flood sensitive components will be in the flood plain. Components such as sewer lines and manholes which may be located within the flood plain will be of such a design that potential flood damage will be minimal if not non-existent.

VII. PROJECT SUMMARIES

A. ENGINEERING SUMMARY

The proposed project includes replacing the aged existing gravity wastewater collection system through the installation of approximately 1,700 LF of 10-inch sewer pipe, 5,000 LF of 8-inch sewer pipe, 10,000 LF of 6-inch sewer pipe, 84 manholes, 180 lateral connections and related appurtenances.

The project aims to locate as much of the gravity sewer replacement line in WVDOH rights-of-way as feasible to minimize easements and disturbance to residents.

A preliminary layout of the proposed project can be found in the proposed project drawings in **Appendix C**.

B. COST SUMMARY

i. Project Costs

Please see the table below and **Appendix J** for Project Cost Information.

Table 3 - Project Cost Estimate Summary

Construction Cost	\$4,275,650
Construction Contingency	\$424,350
Engineering	\$447,000
Project Coordination	\$70,000
Accounting	\$25,000
Legal	\$20,000
Permits	\$30,000
Easements	\$20,000
Bond Council	\$22,000
Project Contingency	\$46,000
TOTAL	\$5,380,000

ii. Operation and Maintenance Costs

Existing O&M Cost: \$4,578,176 per year
Estimated Additional O&M Cost: \$0 per year

As stated above, and as taken from the 2022 PSC Annual Report in **Appendix A**, the current annual O&M costs for the SBB’s system is approximately \$4,578,000 per year including the Midway project area. O&M costs are expected to be reduced based on the reduction in pumping expenses due to the decrease in I&I. For the purposes of this report O&M costs will remain the same. The O&M cost calculations are included in **Appendix G**.

iii. Existing Debt

Existing Debt: \$12,890,187 (\$964,150 per year)

Currently, the SBB has three (3) long-term debt items identified in section 221 of the 2022 Annual Report. Please see below for the existing debt information:

Table 4 - Existing Debt Information

Debt Holder	Date of Maturity	Outstanding per Balance Sheet	Total Funding Required (Yearly)
Series 2013A	2044	\$1,016,223	\$50,094
Series 2020B	2041	\$9,082,357	\$682,948
Series 2020A	2040	\$2,802,283	\$231,108
Less Current Portion		(\$10,676)	

iv. Proposed Project Financing

The proposed funding sources and amounts for the Sanitary Board of Bluefield – Midway Sewer Replacement Project can be found below:

CDBG Grant	\$1,000,000
CWSRF Loan	\$4,380,000
TOTAL	\$5,380,000

v. User Rates Projected

The present wastewater tariff for the SBB was issued on January 30, 2023.

Table 5 - Existing Sewer Rate Information

Bluefield Sanitary Board Tariff	
Usage	Rate
First 10,000	\$13.50 per 1,000 Gallons
Next 115,000	\$12.25 per 1,000 Gallons
Next 375,000	\$12.25 per 1,000 Gallons
All over 500,000	\$8.00 per 1,000 Gallons

Example of Tariff Application: A customer that has used 3,400 gallons in one month will be charged \$45.90 for that month. The minimum charge for connected users is \$27 per month.

A copy of the current tariff is included in **Appendix K**.

C. PROJECT SCHEDULE

Please see **Appendix L** for the Project Schedule.

D. LANDS AND RIGHT-OF-WAY

Currently, no land or right-of-way acquisitions have been obtained, but no problems are expected from this aspect of the project. The project will be constructed in the WVDOH rights-of-way and along the same alignment of the existing sewer system to the extent feasible, to minimize disturbance to residents. Easements will be obtained for work located on private property. Approximately 83 easements are anticipated to ensure accessible service to customers.

E. PUBLIC HEALTH BENEFITS

Public health is an important aspect when considering any wastewater project. The improvements to the wastewater collection system will reduce the amount of I&I into the system which in turn will reduce the number of spillage and backups at the Midway pumping station. This will provide a cleaner watershed and healthier environment in the Midway area of Bluefield.