PRELIMINARY ENGINEERING REPORT

Wintercreek Collection System Replacement

Bluefield, Virginia

Prepared for

The Sanitary Board of Bluefield

T&L Project No. 717270

May 16, 2023

THOMPSON & LITTON EST. 1956

PRELIMINARY ENGINEERING REPORT

FOR THE

WINTERCREEK COLLECTION SYSTEM REPLACEMENT PROJECT

PREPARED FOR

SANITARY BOARD OF BLUEFIELD

BLUEFIELD, VIRGINIA

THOMPSON & LITTON

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T&L Project No. 17270

May 16, 2023

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SECTION 1.0
INTRODUCTION

1.1 Purpose and Scope

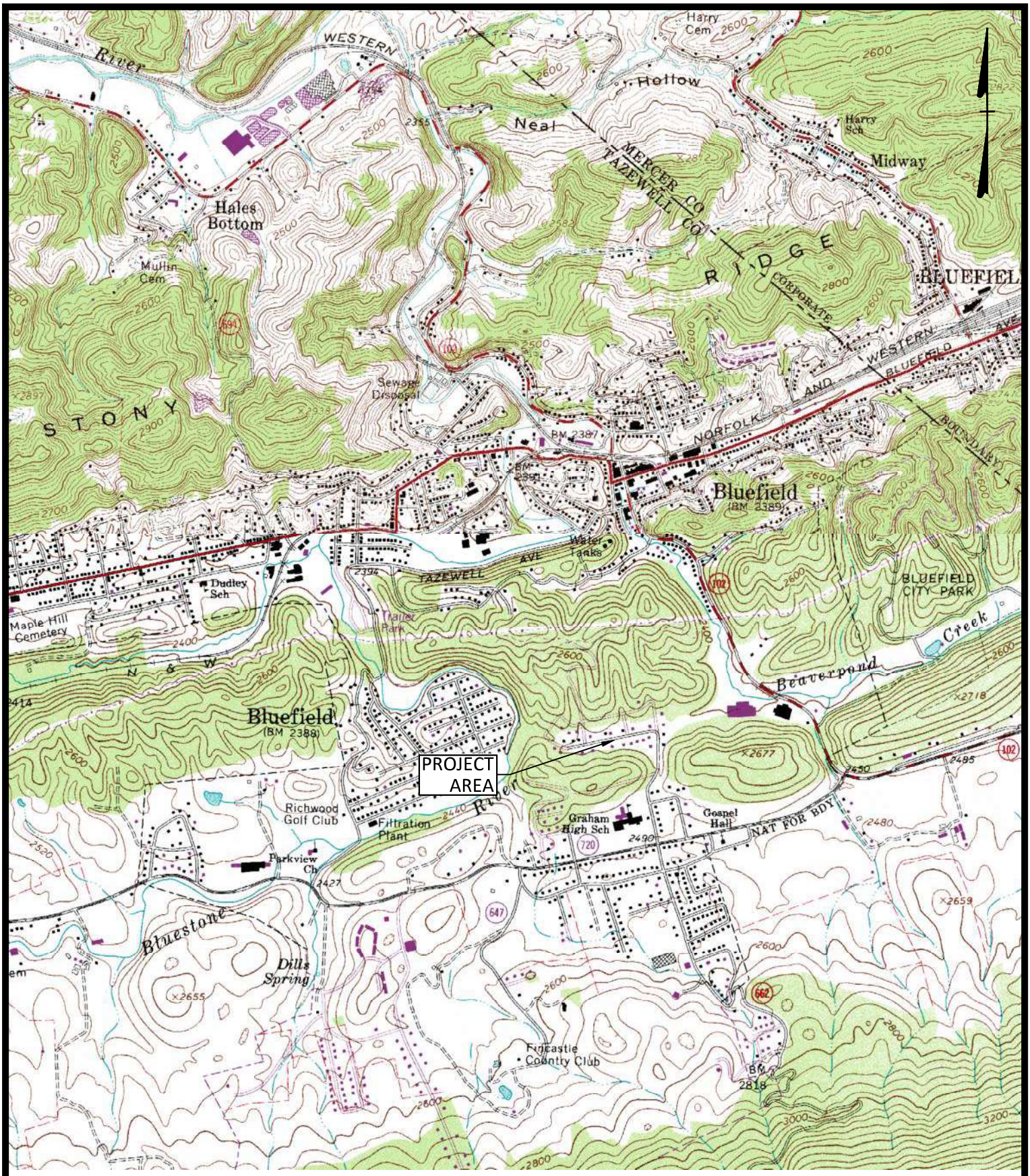
This Preliminary Engineering Report has been prepared in support of The Sanitary Board of Bluefield's. Collection System Replacement project for the area of Wintercreek in Bluefield, Virginia. This report describes the project area of interest for the collection system, establishes the need for the project, and provides construction and total probable project cost estimates.

The Sanitary Board of Bluefield, West Virginia owns and operates a traditional sanitary sewer collection system in Bluefield, West Virginia and leases the sanitary sewer collection system in Bluefield, Virginia through an ongoing franchise agreement (See Appendix A) with the Town of Bluefield, Virginia. Bluefield, Virginia owns the sewer collection system in the Town and the Sanitary Board of Bluefield is responsible for maintaining and upgrading the collection system.

The Sanitary Board of Bluefield has commissioned Thompson & Litton, Inc. to develop this Preliminary Engineering Report (PER) to further assess and provide construction costs and preliminary probable project costs for replacing a portion of the collection system in the Wintercreek area of Bluefield, VA.

1.2 Project Location

The community of Wintecreek is located within the town limits of Bluefield, Virginia which resides in Tazwell County, Virginia. Tazwell County is positioned in Southwest Virginia, and is bordered by Bland County to the east, Smyth County to the south, Russell County to the west, Buchanan County to the northwest, and McDowell and Mercer Counties, West Virginia to the north. The community of Wintercreek lies adjacent to U.S Route 460 and is approximately 0.5 miles north of Graham High School. According to the City of Bluefields' "Sanitation Viewer," the community contains 57 residencces that are current users of the sewage collection system. A general location map illustrating the community's general geographical area and the project area is presented in Exhibit I.



LOCATION MAP

SCALE: APPROXIMATE 1"=2000'

SOURCE: BLUEFIELD, VIRGINIA AND COVE CREEK VIRGINIA U.S.G.S. QUADRANGLE

PROJECT NO.	DATE
717270	4/7/2023
FILE NAME	
CIVIL/CADD\WORKING DRAWINGS	

COLLECTION SYSTEM REPLACEMENT WINTERCREEK

SANITARY BOARD OF BLUEFIELD, VIRGINIA

THOMPSON & LITTON

EXHIBIT I

1.3 System Description

The Sanitary Board of Bluefield's existing wastewater collection and treatment system consists of two (2) wastewater treatment plants (WWTP). The Bluefield Westside Wastewater Treatment Plant is designed to treat 8.3 million gallons per day (MGD), and the Ada Wastewater Treatment Plan is designed to treat 1.2 MGD. Combined, the plants have nine (9) sewage pump stations, approximately 350 miles of sanitary sewer mains, and approximately 3,559 manholes (MH).

The sanitary sewer mains are comprised of polyvinyl chloride pipe (PVC) and vitrified clay pipe (VC). In addition, the mains were constructed in short segments with gaskets seldom being used. This type of piping material and construction creates a high potential for leaks which typically leads to system wide Inflow and Infiltration (I&I) problems.

The Wintercreek Collection System Replacement Project proposed in this PER consists of replacing approximately 270 L.F. of 10-inch sewer line, 2,525 L.F. of 8-inch sewer line and 5,300 L.F of 6-inch sewer line. The project also proposes the replacement of 28 manholes and 7 new manholes in this area along with the replacement of all appurtenances associated with the lines. For clarification see Exhibit 2 in Appendix B.

The collection system serving Wintercreek conveys the flow from private residences and commercial properties, such as Graham High School and Graham Middle School. The flow from this project area is ultimately conveyed to the Bluefield Westside WWTP for treatment.

The Bluefield Westside WWTP is regulated by the Virginia Department of Environmental Quality (DEQ) under permit VA0025054. Effluent from the WWTP is discharged to the Bluestone River. The WWTP submits a Discharge Monitoring Report monthly to DEQ and is typically well within the discharge requirements. The WWTP is in compliance with applicable regulations. Typical average daily flow at the WWTP is approximately 4 MGD.

The Sanitary Board of Bluefield invests $500,000 annually for capital improvement sewer line replacement and/or sewer line rehabilitation projects. Additionally, they recently completed a $1,929,000 sewer line replacement project on College Avenue and Deerfield. These improvements serve to correct identified inflow & infiltration (I&I) issues, help to prevent sewer

back-ups and overflows, and thus protect human health by drastically reducing potential exposure to raw sewage.

In a 2015 Sanitary Sewer Evaluation Study data was obtained from the Wintercreek area regarding I&I into the current collection system. The methodology behind the study involved using Equivalent Dwelling Units (EDU's) to establish an average sanitary flow from the area. Additionally, flow meters were placed in specific manholes which recorded the peak flow during a rain event. The difference in the two flow rates yielded the estimated amount of I&I in the system.

The additional volume produced by I&I in the project area is inevitably treated at Bluefield Westside Water treatment plant. A flow meter placed in the Wintercreek community at MH-791 estimated 62.15 GPM of I&I. This equates to an estimated amount of 89,496 GPD (gallons pers day) of additional volume to be treated. Mountain Lane was also analyzed in the aforementioned study; a flow meter was placed at MH-811 and the results estimated an I&I of 19.83 GPM which equates to 28,555 GPD. Replacement of the collection system in this area will aid to mitigate I&I and thus prevent the additional treatment of inflow at the WWTP as well as prevent sewage backups and overflows which result in hazardous exposure to the general public.

SECTION 2.0
PROJECT DESCRIPTIONS

The Wintercreek Collection System Replacement project includes approximately 270 L.F. of 10-inch PVC sewer mainline, 2,525 L.F of 8-inch PVC sewer mainline, and 4,750 L.F of 6" PVC sewer mainline and 550 L.F of 6" Vitrified Clay sewer line that will be replaced with 6" PVC sewer line. In addition, the project proposes the replacement of 28 existing manholes and the addition of 7 new manholes, and all apparatuses required with the new installation. For clarification reference Exhibit 2 in Appendix B.

The section of 20-inch PVC sewer line is situated on the west end of Wintercreek Dr. where it connects to a 20-inch PVC sewer that conveys the sewer northwest away from the community. The segment of 10-inch PVC line parallels Mountain Lane until it connects to manhole 11-790. There are two major sections of 8-inch PVC sewer line that mutually convey flow in the eastward direction. Both sections follow Wintercreek Dr. wherein the line is positioned in residential lawns. The remaining sewer mainline in the Wintercreek area is made up of 6" PVC however it should be noted there is a 550' section of Vitrified Clay pipe that is recommended to be replaced with 6" PVC.

The project area consists of residential homes, and light woodland. For further clarification, photos from a recent site visit that depict streets in the community and existing conditions can be found in Appendix C. Permits and coordination required for this zone of the project will include, but are not limited to, a Virginia Marine Resources Commission (VMRC) Joint Permit Application (JPA), an Army Corps of Engineers (ACOE) Nationwide Permit, Virginia Department of Environmental Quality (DEQ) permit, and a Bluefield, Virginia erosion & sediment control permit for land disturbance.

SECTION 3.0
PROJECT COSTS

The project costs, which are provided in this section as Table 3.1 are based upon the proposed facility descriptions discussed in this PER and, therefore, represent preliminary cost estimates for the Wintercreek Collection System Replacement Project.

Project costs are defined as the sum of estimated construction costs and related costs. In this cost analysis, construction costs are based upon experience with similar projects, manufacturer's cost information and actual unit cost bids received on similar projects. In addition, the U.S. Army Corps of Engineers (USACE) Civil Works Construction Cost Index System (CWCCIS) was utilized to adjust historical cost data to the present fiscal year (FY2023). The consumer cost price index (CPI) was also examined to compare and utilize the more conservative of the two figures. This method was utilized due to the current economic climate of high inflation. Finally, the unit costs were projected into the fiscal year in which the project would most likely to be under construction being FY2025.

Related costs have been generated by using percentages of total construction cost established by the various funding agencies typically associated with projects of this nature. It should be noted that 10 percent of the total construction cost has been assumed to cover contingency items. Preliminary and conceptual cost estimates require these contingencies until final design information is available. It is important to stress that these cost estimates are preliminary in nature and have been developed without the benefit of final design information and details. Therefore, these costs are subject to further revision as field surveys are completed and detailed plans are developed for the project.

TABEL 3.1
PRELIMINARY STATEMENT OF PROBABLE PROJECT COST
FOR THE
COLLECTION SYSTEM REPLACEMENT
WINTERCREEK AREA
BLUEFIELD, VIRGINIA

ESTIMATED CONSTRUCTION COST:				
Item Descriptions	**Unit**	**Unit Price**	**Unit Quantity**	**Extended Cost**
10-inch Gravity Sewer Replacement (PVC - SDR 35)	L.F.	$ 230	270	$ 62,100
8-inch Gravity Sewer Replacement (PVC - SDR 35)	L.F.	$ 140	2,525	$ 353,500
6-inch Gravity Sewer Replacement (PVC - SDR 35)	L.F.	$ 105	5,300	$ 556,500
Watertight Manhole w/Frame & Cover (0 FT. to 6 FT.)	EA.	$ 8,400	10	$ 84,000
Standard Pre-Cast Concrete Manhole (0 FT. to 6 FT.)	EA.	$ 6,000	25	$ 150,000
Manhole Extra Depth	L.F.	$ 400	140	$ 56,000
Service Connection Taps At Main	EA.	$ 230	57	$ 13,110
4-inch Service Lateral	L.F.	$ 60	1,425	$ 85,500
4-inch Service Connection (Cleanout, Wye, Plug)	EA.	$ 710	57	$ 40,470
6-inch Main Line Cleanout	EA.	$ 600	10	$ 6,000
Stream Crossing Concrete Encased	L.F.	$ 490	50	$ 24,500
Asphalt Replacement - Surface and Base Material	S.Y.	$ 125	200	$ 25,000
Miscellaneous Coarse Aggregate No. 57	TON	$ 45	100	$ 4,500
Miscellaneous Trench Concrete	C.Y.	$ 230	25	$ 5,750
By-Pass Pumping	MONTH	$ 27,000	3	$ 81,000
Erosion & Sediment Control (4%)	L.S.	$ 58,700	1	$ 58,700
Traffic Control	L.S.	$ 26,600	1	$ 26,600
Bonds, Mobilization, and Insurance (5%)	L.S.	$ 73,350	1	$ 73,350

Estimated Subtotal Construction Cost	$	1,706,580
Construction Contingency (10%)	$	170,658
Estimated Total Construction Cost	$	1,877,238

ESTIMATED RELATED COST:

Includes Accounting, Administration, Legal/Bond Counsel, Surveying, Basic Engineering, Permitting, Construction Contract Administration, Resident Project Representation, and Record Drawings.

Estimated Total Related Costs (30% Total Construction Cost)	**$**	**563,171**
ESTIMATED TOTAL PROBABLE PROJECT COST	**$**	**2,440,409**

Please be advised that since Thompson & Litton has no control over the cost of labor, materials, equipment, or services furnished by others, or over Contractor(s') methods of determining prices, or over competitive bidding or market conditions, our opinions of probable project cost and construction cost provided herein are made on the basis of our experience and qualifications and represent our best judgment as experienced and qualified Professional Engineers familiar with the construction industry. Thompson & Litton cannot and does not guarantee that proposals, bids, or actual project construction cost will not vary from those opinions of probable costs prepared by Thompson & Litton. If, prior to the Bidding or Negotiating Phase, the Owner wishes greater assurance as to project or construction costs, the Owner should employ an independent cost estimator.

SECTION 4.0
CONCLUSIONS AND RECOMMENDATIONS

In conclusion, it is recommended that the Sanitary Board of Bluefield pursues implementation of the proposed project described in Section 2.0 and summarized below in Table 4.1. These improvements serve to correct inflow & infiltration issues, help to prevent sewer back-ups and overflows, and thus protect human health by drastically reducing potential exposure to raw sewage. The estimated total probable project cost is $2,440,409. An anticipated project schedule is provided in Table 4.2.

TABLE 4.1 – SUMMARY OF QUANTITIES
WINTERCREEK COLLECTION SYSTEM REPLACMENT PROJECT

Item Description	Unit	Approximate Quantity
10" Gravity Sewer Line	Linear Feet	**270**
8" Gravity Sewer Line	Linear Feet	**2,525**
6" Gravity Sewer Line	Linear Feet	**5,300**
Manhole	Each	**35**
Cleanout & WYE Connection	Each	**57**
Mainline Taps	Each	**57**

Table 4.2 – PRELIMINARY ANTICIPATED PROJECT SCHEDULE

WINTERCREEK COLLECTION SYSTEM REPLACEMENT PROJECT

TASK	ANTICIPATED DATE
Owner Approves	May 30, 2023
Owner Issues Engineer Design NTP	June 30, 2023
Submittal of Final Plans and Specs to DEQ	December 29, 2023
Plans and Specs Approved by DEQ	January 29, 2024
Advertise for Bids	February 11, 2024
Open Bids	March 19, 2024
Award Contracts	April 22, 2024
Issue Construction NTP	May 6, 2024
Substantial Completion	September 2, 2024
Final Completion	October 1, 2024

*****Please note this schedule assumes funding for design and construction is available for the project. If the owner plans to submit applications for funding, the schedule will need to be revised based on the funding applications for the project.