CHARLES TOWN UTILITY BOARD
AGENDA

WEDNESDAY, AUGUST 25, 2021

Regular Meeting | **661 South George Street, Charles Town, WV 25414** | **4:00 PM**

CALL TO ORDER

1. **APPROVAL OF MINUTES**
   a. Approval of August 11, 2021 Regular Meeting Minutes
      2021.08.11 UB MINUTES.pdf

2. **PUBLIC COMMENT**
   This portion of the agenda is designed for members of the general public to share thoughts on items of interest in the community. By law, Board members may ask clarifying questions or discuss procedural matters but are not permitted to discuss the policy merits of any issue unless it is scheduled for discussion.

   The public is invited to attend this meeting in person or via webcast (www.ctubwv.com- Board Meetings - Meeting Agendas and Minutes 2021) or by accessing the following zoom link:

   https://us06web.zoom.us/j/83978546298?pwd=NGc4THRacC9uVFNPVFdKclJxWXlCdz09

   Meeting ID: 839 7854 6298
   Passcode: 658186
   +1 301 715 8592 US

3. **UNFINISHED BUSINESS**

4. **NEW BUSINESS**
   a. RK&K Facility Plan
      4a-CTUB Facility Plan 08-17-2021.pdf
   b. RK&K 2021 Facility Plan Design and Construction Phase
      4b-19339.019.PDF
   c. 2021 Bond Refunding Overview and Timeline
      4c-2021 Bond Refunding.pdf
      4c-Board Resolution.pdf

5. **MANAGER REPORTS**

a. Utility Manager Report - Discussion on Amendments to AMEA's
b. Chairman Report

6. **APPROVAL OF BILLS**
   a. August 25, 2021
      Board Report 8.25.21.pdf

7. **ADJOURNMENT**

8. **INFORMATION ONLY - NEXT MEETING - SEPTEMBER 8, 2021 AT 4:00 P.M.**

August 11, 2021

The Charles Town Utility Board held a regular meeting on August 11, 2021 at 4:00 p.m. Members of the Board present were Daryl Hennessy, Pete Kubic, Duke Pierson, Tommy Stocks and Jacquelyn Milliron (virtual). Also present were Kristen Stolipher, April Shultz, Hoy Shingleton, and Commissioner Caleb Hudson (virtual). The Chairman called for changes or corrections to the July 28, 2021 regular meeting minutes. With no objections, the Board approved the minutes as presented. The Board received public comments from Lyn and Ron Widmyer and Brad McGuire.

The Chairman next opened the floor for discussion on the CED Modebach Electric VFD Quote. Kristen stated that consistent with the GDF project updates provided at the last meeting, the quote is for two VFD's for intake pumps at the water plant totaling $61,646.82. This project would utilize the surety funds received for water. Motion by Duke, second by Tommy, with discussion from the Board, the Board approved the quote for the CED Modebach electric VFD's.

Next discussed was the LB Water Butterfly Valve Pneumatic Actuator Quote. Kristen provided the quote was also mentioned in the GDF project updates last meeting. This would replace four butterfly valves and actuators totaling $49,265.83 which would also be paid out of the water surety money. Motion by Duke, second by Tommy, with discussion from the Board, the Board approved the quote for the LB water butterfly valve pneumatic actuators.

Next, the Well Site Evaluation was discussed. Kristen provided a proposal from Terracon for the Phase 3 test well evaluation totaling $39,000.00. Also included was a quote from Valley Drilling for the efforts associated with drilling a test well on each property ($24,796.00 per well) and test pumping on the site ($22,914.00 per site) if 200 gallons per minute is achieved. Staff has been working with the property owners of both test well sites. Kristen mentioned that after the proposal was submitted, she met with the Widmyer's about the possibility of a spring they have access to on Federal Hill Farm. An additional proposal will be submitted to the Board to explore that option as well. Kristen mentioned the possibility of grant monies available toward this endeavor. The Board held discussions on the well options. Motion made by Pete, second by Duke, with discussions from the Board, the Board approved both the Terracon and Valley Drilling Corporation proposals to test the two well sites with the understanding the spring option will be explored at a later time and include notice requirements to surrounding homeowners prior to drilling.

The Chairman next opened the floor for discussion on the Property Purchase Request from Evitts Run Estates. Kristen presented a request from a property owner adjacent to the parcel CTUB owns where the maintenance shop is located. The property owner has requested a boundary line adjustment to allow for additional footage on their property. After much discussion from the Board, Kristen will go back to the property owners to explore further.

The Utility Manager Report was next addressed. Kristen briefed the Board on this month's sewer and water efforts including the submission of the source water protection grant application that is due by September 1st; a review of the 2015 A & B bond refunding, the R&R project costs and the Facility Plan for the collection system next meeting; and a sewer availability request from the Green Hill (formerly Stonecrest) subdivision. Kristen also mentioned she would be providing City Council with an update on projects and the bond refunding on September 7th. Jacquelyn requested further discussions on the possibility of developer availability fees and a periodic high-level report on the Route 9 reimbursements. The Chairman requested the discussion on the Amendments to AMEA's be held next meeting.

There were no updates provided under the Chairman Report. The Board next discussed the Approval of Bills. Motion by Tommy, second by Duke, with discussion from Jacquelyn, the Board approved the payment of bills.

Next, motion by Duke, second by Jacquelyn, the Board approved convening into Executive Session to discuss SJPS WVPSC Financial Evaluation Presentation by John Kunkle - Possible Executive Session Under: WV State Code Section §6-9A-4(b)(9) - To consider matters involving or affecting the purchase, sale or lease of property, advance construction planning, the investment of public funds or other matters involving commercial competition, which if made public, might adversely affect the financial or other interest of the state or any political subdivision and involving contract matters. The Board declared executive session over at 6:02 PM. No action was taken.

Motion by Duke, seconded by Tommy, the Board adjourned the meeting at 6:03p.m. The August 25th regular meeting will be held beginning at 4:00 p.m.

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Chairman Secretary

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

August 17, 2021

CHARLES TOWN UTILITY BOARD
661 South George Street
Charles Town, WV 25414
(304)-724-7080

DRAFT

Prepared by:

Rummel, Klepper & Kahl, LLP
159 Plaza Drive
Keyser, WV 26726

Phone: 304-788-3370 Fax: 304-788-3577

_____
John W. Cole, PE #17949

_____
Date

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

SECTION 1
INTRODUCTION

1.0 INTRODUCTION

This Facility Plan for the Charles Town Utility Board, 2021 Collection System Project has been prepared by Rummel, Klepper & Kahl, LLP (RK&K) on behalf of the Utility.

1.1 LOCATION

As shown in **Figure 1-1**, the Charles Town Utility Board service area is located in Jefferson County, West Virginia and encompasses the City of Ranson and the City of Charles Town.

The Charles Town Utility Board sewer system consists of three wastewater treatment plants, over 100 miles of gravity sewer lines, over 25 miles of force main, and 47 pump stations.

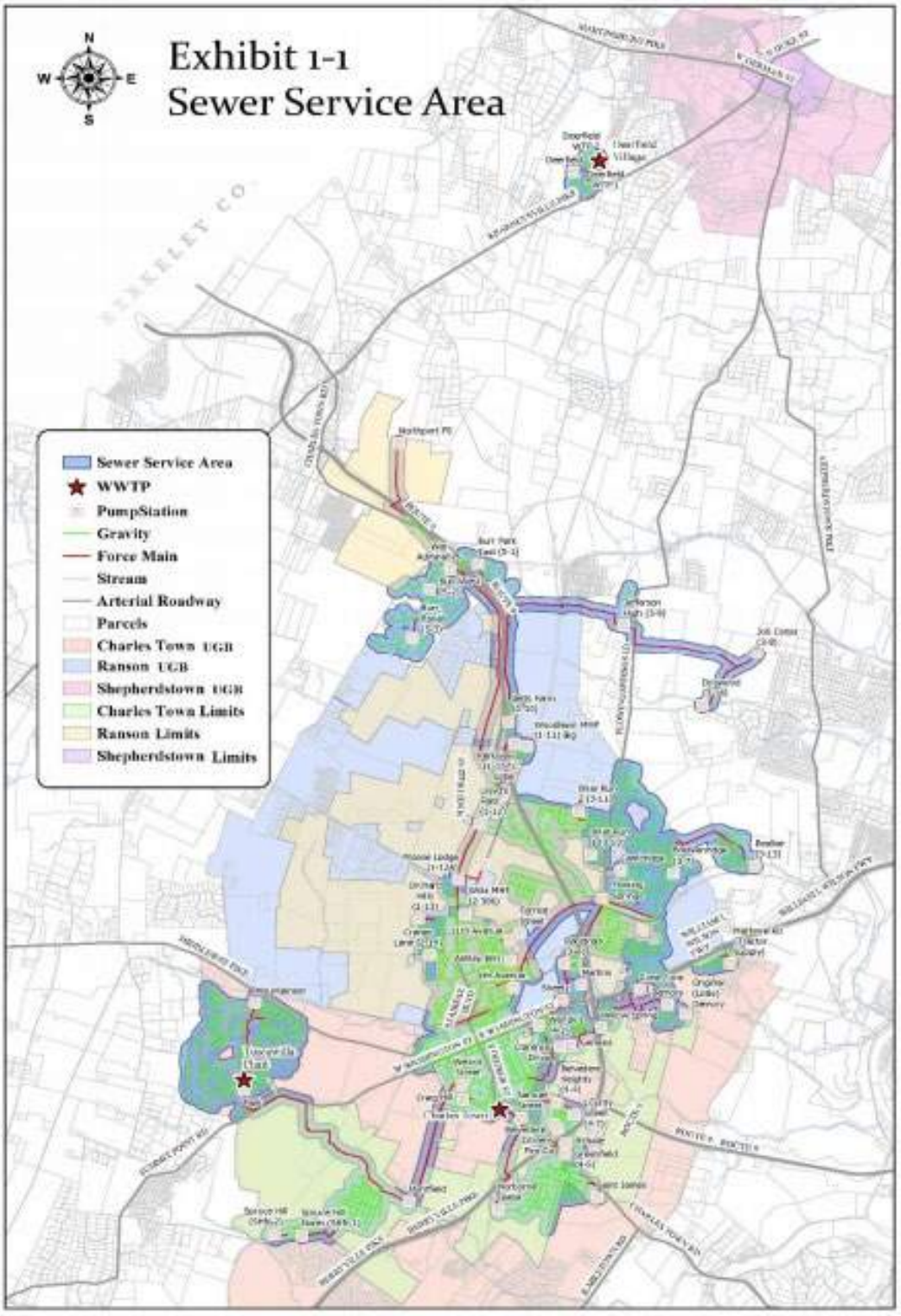

Figure 1-1 Charles Town Utility Board Existing System

1.2 HISTORY

On July 1, 2018, the City of Charles Town acquired the City of Ranson sewer system, and on January 1, 2019, the City of Charles Town acquired the Jefferson County Public Service District. Prior to this consolidation, a Preliminary Engineering Report (PER) for Jefferson County PSD for the Wastewater Improvement Project WVIJDC #2014S-1538 was developed in 2014 (**Appendix A**).

At the time, the City of Ranson had contacted the Jefferson County PSD regarding concerns about heavy flows in the "Old Town" sewer lines and had requested that the PSD develop a solution to remove the flows from the "Old Town" section of the sewer system. The purpose of the 2014 PER was to divert existing sewer flows from the Northern Route 9 collection system to the Flowing Springs Basin collection system. This included constructing a new interceptor sewer line from the Northern Route 9 system to the Flowing Springs system, constructing a new pump station below the Breckenridge East Subdivision and upgrading the Ranson Flowing Springs Pump Station.

This project was never constructed, and changes have been made to the CTUB's system, making this project no longer practical. As noted in the Charles Town Utility Board 2021 Wastewater Strategic Plan (**Appendix B**), the area is experiencing significant growth, and therefore, more demand for capacity within the system. In addition, in 2017, Governor Jim Justice announced that ROXUL will build a $150 million manufacturing plant in the City of Ranson, Jefferson County. The CTUB constructed the Route 9 Sewer Project (**Appendix C**), designed by Hatch, in 2021 to serve ROXUL. The addition of these flows via a new alignment that discharges to the Flowing Springs Pump Station has also impacted the plan for rerouting flows within the system to alleviate capacity issues in the "Old Town" Ranson sewer lines.

Discussions with the CTUB have resulted in a list of projects with the same intent of removing flows from the "Old Town" Ranson sewer lines.

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

SECTION 2
CURRENT SITUATION

2.0 CURRENT SITUATION

2.1 LOCATION

CTUB provides sewer collection and treatment services for approximately 7,880 sewer customers comprising residential, commercial, industrial and public authority entities within the municipalities of the City of Charles Town, the City of Ranson, and the surrounding areas within Jefferson County. The system consists of 100 miles of gravity sewer lines, 25 miles of force main, 47 pump stations, and three wastewater treatment facilities.

2.2 CONDITION OF EXISTING FACILITIES

2.2.1 Wastewater Treatment Plant

CTUB operates three wastewater treatment plants: the Charles Town Wastewater Treatment Plant (CTWWTP), the Tuscawilla Wastewater Treatment Plant (TWWTP), and the Deerfield Sewer Treatment Plant which is not connected to the larger Charles Town System. CTUB has the ability to treat flows at either the CTWWTP or the TWWTP through the Huntfield Transfer Pump Station. The relevant NPDES permit numbers are WV0022349, WV008461, and UIC0665-03-037-001. The CTWWTP has a treatment capacity of 1.75 MGD, and the TWWTP has a treatment capacity of 0.5 MGD. The average daily flow to the CTWWTP in 2020 was 1.15 MGD, and the average daily flow to the TWWTP in 2020 was 0.16 MGD. CTUB's 2021 Sewer Strategic Plan (**Appendix B**) includes planning for future capacity upgrades to the CTWWTP in the next 10 years in order to serve the growing population in Jefferson County.

2.2.2 Collection System

Following consolidation of the three systems, CTUB's system consists of 100 miles of gravity sewer lines, 25 miles of force main, and 47 pump stations. A Sewer Model (**Appendix D**) focusing on the main trunklines of the system specified by the CTUB was created by RK&K in 2020. The Sewer Model indicated areas of concern with the existing system peak dry weather flows and wet weather flows. These areas included the Evitts Run Interceptor between the Flowing Springs Pump Station discharge and the CTWWTP and the Park Interceptor through Jefferson Memorial Park. The Sewer Model also analyzed 22 pump stations specified by the CTUB under current conditions. The majority of the pump stations were currently operating with available capacity, but if future development is proposed in the service area, the impact on each pump station's capacity would need to be evaluated.

Many of the pump stations are in poor condition due to age and hydrogen sulfide within the system. Decommissioning of pump stations to consolidate the three systems has been a focus of the CTUB.

Decommissioning reduces operation and maintenance costs, including the cost of electric for each pump station. Decommissioning of pump stations also reduced the amount of hydrogen sulfide in the system, which has deteriorated many manholes. RK&K has completed inspections of all manholes downstream of pump stations, and has made recommendations for lining and replacement of manholes (**Appendix E**).

The installation of the Route 9 sewer project to serve ROXUL will impact the capacity of some of the pump stations, including the Burr East Pump Station, the Jett's Farm Pump Station, the Moose Lodge Pump Station, the Lloyd's Flat Pump Station, and the Flowing Springs Pump Station due to rerouting of the Burr Industrial Park flow to the War Admiral Pump Station.

The 2020 Annual Report (**Appendix F**), reports 4.12% inflow and infiltration (I&I) treated by CTUB. CTUB has completed a first phase of an I&I study, through smoke testing in selected areas of the collection system. The study was conducted by Hydrostructures in 2019 and identified defects in the system that needed to be repaired or investigated further.

2.2.3 Burr East Pump Station

The Burr East Pump Station currently collects flow from the Burr West Pump Station and the Bardane Industrial Park on the East side of Route 9. The Sewer Model Report (**Appendix D**), noted that the Burr East Pumps have a duty point of 265 GPM @ 98' TDH. Part of the Route 9 Project involves redirecting flow from the Burr West Pump Station to the new War Admiral Pump Station across Route 9 from the Burr East Pump Station.

After this redirection of flow, the Burr East Pumps will be oversized. In addition, the force main from the Burr East Pump Station is aging. To address these issues, and to relieve Old Town Ranson of flow, CTUB has requested that the Burr East Pump Station collect the flow from the Jefferson High School Pump Station and be redirected to the War Admiral Pump Station across Route 9. This would allow for the force main along Charles Town Road to the Jett's Farm Pump Station to be abandoned.

2.2.4 Jett's Farm Pump Station

The Jett's Farm Pump Station currently collects flow from the Woodlawn Pump Station and all of the northern flow from the Burr East Pump Station and the Jefferson High School Pump Station. The Jett's Farm pumps have a duty point of 287 GPM @ 97' TDH, and the pump station is in poor condition due to age. Redirection of flow at the Burr East Pump Station would result in a reduction in flow at the Jett's Farm Pump Station. After this reduction in flow, the pumps and force main would be oversized. These issues were analyzed in RK&K's Parkview-Woodlawn Report (**Appendix G**).

2.2.5 Moose Lodge Pump Station

The Jett's Farm Pump Station currently discharges to the Lloyd's Flat Pump Station. The War Admiral Pump Station associated with the new Route 9 Project discharges to a manhole on Baker Boulevard within The Boulevard at Potomac Town Center near the Lloyd's Flat Pump Station. In order to relieve flow in Old Town Ranson, CTUB has requested that the Lloyd's Flat Pump Station be decommissioned and all flow added via gravity to the new Route 9 gravity line that flows through Fairfax Crossing.

The Moose Lodge Pump Station currently collects flow from the Lloyd's Flat Pump Station and from a few businesses via gravity. The Lloyd's Flat pumps have a duty point of 296 GPM and the Moose Lodge pumps have a duty point of 310 GPM. This redirection in flow at Lloyd's Flat will result in a reduction in flow at the Moose Lodge Pump Station, causing the Moose Lodge pumps and force main to be oversized. These issues were analyzed in RK&K's Parkview-Woodlawn Report (**Appendix G**).

2.2.6 Flowing Springs Pump Station and Evitt's Run Interceptor

The Route 9 Sewer Report (**Appendix C**), states that following the Route 9 Project, the flow from the War Admiral Pump Station will be received at the Flowing Springs Pump Station (FSPS). The Flowing Springs Pump Station currently receives flow from an 8-inch force main from the Breckenridge Pump Station, from an 8-inch gravity sewer from the Shenandoah Springs Subdivision, and from a 15-inch gravity sewer from the Fairfax Crossing area. Flowing Springs Pump Station was constructed in 2005 and was designed for future expansion. The Route 9 Sewer Report states that "when peak flow from the 15-inch sewer is adjusted to account for full interception of Lloyd's Flat flow, total peak flow increases to 687 GPM which represents a 76% consumption of FSPS' current simplex pumping capacity as of 2019."

RK&K's Sewer Model (**Appendix D**) analyzed the capacity of the gravity system downstream of the FSPS during current conditions. This section of line is also called the Evitt's Run Interceptor. The analysis indicated that under current dry weather conditions, the Evitt's Run Interceptor has sections over 75% of capacity and a surcharged manhole. Under current peak wet weather conditions, multiple portions of the Evitt's Run Interceptor are over 100% of capacity.

According to the CTUB's 2021 Sewer Strategic Plan (**Appendix B**), Flowing Springs Pump Station serves an area that includes the following developments:

- Aspen Green
- Beallair
- Blackford Village
- Breckenridge East
- Briar Run
- Burr Industrial Park and Bardane
- Cambridge
- Clayhill Farm
- Daniels Forest
- Harvest Hills
- Lakeland Place/Lloyd's
- Jefferson Orchards
- Lloyd Property
- Locust Knoll
- Potomac Marketplace
- President's Pointe
- Ranson Gateway/Boulevard
- Shenandoah Springs
- Greenhill
- Rockwool
- Shenandoah Junction

A summary of all projections for the Springs Pump Station and the Evitt's Run Interceptor is included in **Appendix H**. The projections indicate that the Flowing Springs Pump Station will need to be sized for the following:

	Year 1 2021	**Year 5 2025**	**Year 10 2030**	**Year 20 2040**
FSPS	1,500 GPM	1,900 GPM	2,500 GPM	3,700 GPM

The projected flows were incorporated into the Sewer Model to determine the impact of increased flows on the capacity in the Evitt's Run gravity line. The results of this scenario are shown in **Appendix I**.

2.2.7 Jefferson Memorial Park Force Main

RK&K's Sewer Model (**Appendix D**) analyzed the capacity of the gravity line through the Jefferson Memorial Park during current conditions. This analysis indicated that under peak wet weather flows, throughout this line, there are capacity restrictions, peak flows exceed the capacity of the downstream segments, and several manholes along this interceptor are predicted to be overflowing or surcharged.

This prediction has been verified by RK&K and CTUB Staff when manholes on this line have been seen surcharging during rain events.

2.2.8 Fairfax Crossing Parallel Line

The Route 9 Sewer Project connects to CTUB's existing system at manhole FC-59 on Baker Boulevard within the Boulevard at Potomac Town Center. The Route 9 Sewer Report (**Appendix C**) analyzed the capacity of this line from the Route 9 discharge to the Flowing Springs Pump Station. The analysis showed that the sewer will not be above capacity under 2019 peak conditions.

Prior to connection of the Route 9 Sewer Project to CTUB's existing system, an Agreement (**Appendix J**) was made between Potomac TC Owner LLC and the City of Charles Town. This Agreement states that:

"in connection with the Sewer Pipeline and the Easements contained herein, the Grantee hereby agrees, at its sole cost and expense, that upon receipt of notice from the Grantor that it intends to develop all or any portion of the Grantor's Property and such development needs additional sewer capacity, Grantee shall (i) construct and install approximately 2,400 linear feet of 10" gravity sewer line parallel with the existing 10" gravity sewer line and (ii) complete the installation and associated electrical connection of the third pump at the Flowing Springs Pump Station, located in Ranson, West Virginia. Such construction and completion shall accommodate development by Grantor and shall not unreasonably increase or reduce potential capacity for any upstream development by other parties."

2.2.9 Forrest Street

The 11th Street Pump Station currently collects flow from houses on East 11th Avenue. The Forrest Street Pump Station currently collects flow East 12th Avenue, Forrest Avenue, and North Forrest Street via gravity and from the 11th Avenue Pump Station. The 11th Street pumps serve 15 customers, and the Forrest Street pumps serve 36 customers and have a duty point of 45 GPM. The Forrest Street Pump Station is located in the front yard of a house on North Forrest Street, and there have been previous instances of the pump station backing up into the house.

Expansion of the Lakeland Place Subdivision is currently being designed by a developer. This development would require a pump station to be located in the same vicinity as the Forrest Street Pump Station. CTUB has requested that the Forrest Street Pump Station and the new Lakeland Place Pump Station be combined into a single pump station. In addition, CTUB has requested that the 11th Avenue Pump Station is decommissioned and redirected via gravity to the new pump station. Doing so would eliminate two pump stations, reducing operation and maintenance costs, as described in the RK&K Forrest Avenue/Fairfax Crossing Report (**Appendix K**).

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

SECTION 3
FUTURE SITUATION

3.0 FUTURE SITUATION

3.1 POPULATION TRENDS

The US Census projects that the number of customers within Charles Town Utility Board's system will increase within the next several years. Current projections for the City of Charles Town, the City of Ranson, and Jefferson County compared to 2000 and 2010 census data are as follows:

Table 3-1 Population Trends

Town	Pop. 2000 Census	Pop. 2010 Census	Pop. Est. 2019	% difference
Charles Town	5,259	5,229	6,029	14.2%
Ranson	4,440	4,394	5,239	17.5%
Jefferson County	53,498	53,490	57,146	6.6%

3.2 PROJECTIONS

CTUB's 2021 Sewer Strategic Plan (**Appendix B**) outlines growth projections for the sewer service area through 2040, and a table showing the development forecast is included in the Appendix. Historical data shows that an average of 129 residential units are built per year.

Based on the 2020 PSC Annual Report, the breakdown of the existing customer counts and EDUs for the Charles Town Utility Board are as follows:

Table 3-2 Customer Counts & EDUs

Type of Customer	Number of Customers	EDUs
Residential	5,534	5,534
Commercial	552	552
Industrial	0	0

Based on population trends Charles Town, Ranson, and Jefferson County, for the next 10 years there is significant growth anticipated.

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

SECTION 4
ALTERNATIVES

4.0 ALTERNATIVES

This section identifies the needed improvements for the Charles Town Utility Board's Wastewater system. The proposed improvements are as follows:

- Burr East Pump Station Flow Diversion
- Jett's Farm Pump Station and Force Main
- Moose Lodge Pump Station and Force Main
- Flowing Springs Pump Station
- Evitts Run Interceptor
- Jefferson Memorial Park Force Main
- Fairfax Crossing Parallel Line
- Forrest Avenue Pump Station Relocation

The proposed improvements noted above for the Utility's Wastewater system will be evaluated and discussed separately in the following paragraphs.

4.1 BURR EAST PUMP STATION

4.1.1 Alternative BE 1 – Burr East Pump Station Diversion – 2 Pumps

This alternative involves redirecting flow from the northern portion of the system (Jefferson High School Pump Station, Burr East Pump Station) into the new Route 9 line at the new War Admiral Pump Station (**Appendix L**). Doing so relieves the Old Town Ranson gravity sewer of flow. This alternative would consist of:

- Redirection of gravity sewer flowing into the Burr East Pump Station
- Installing a new force main from the Burr East Pump Station to the War Admiral Pump Station
- Modifying the force main on Shenandoah Junction Road
- Modifying the force main along Charles Town Road
- Upgrading the Burr East Pump Station

As shown in **Table 4-1**, the construction cost for Alternative BE 1 is $696,720 and the soft costs including engineering are $139,300 for a total project cost of $840,000.

TABLE 4-1

No.	Description	Quantity	Unit	Unit Price	Total Price
	MODIFIED FLOWING SPRING PROJECT				
1	Mobilization	1	LS	$ 7,000	$ 7,000
2	Erosion & Sediment Control	1	LS	$ 5,000	$ 5,000
3	Test Pit	1	EA	$ 800	$ 800
4	Launching/Receiving Pit Excavation	1,950	CY	$ 60	$ 117,000
5	Burr East Pump Station Modifications	1	LS	$ 234,000	$ 234,000
6	Doghouse Manhole	1	EA	$ 3,500	$ 3,500
7	Manhole Extension	4	VF	$ 250	$ 1,000
8	Air Release Valve	1	EA	$ 3,500	$ 3,500
9	6" C900 Class 165 FM	2,150	LF	$ 45	$ 96,750
10	1.5" SDR 9 HDPE FM	1,100	LF	$ 25	$ 27,500
11	System Tie-in Connection	5	EA	$ 7,500	$ 37,500
12	Valve Vault Modifications	1	LS	$ 10,000	$ 10,000
13	Miscellaneous Ductile Iron Fittings	1,000	LBS	$ 5	$ 5,000
14	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 17,000	$ 17,000
15	Traffic Control	1	LS	$ 15,000	$ 15,000
			Construction Subtotal		**$ 580,600**
	Construction Contingency	20%		$	116,120
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**696,720**
16	Soft Costs (Design, Permitting, Surveying, etc.)	20%		**$**	**139,300**
			Total Project Cost		**$ 840,000**

4.1.2 Alternative BE 2 – Burr East Pump Station Diversion – 3 Pumps

This alternative involves redirecting flow from the northern portion of the system (Jefferson High School Pump Station, Burr East Pump Station) into the new Route 9 line at the new War Admiral Pump Station (**Appendix L**). Doing so relieves the Old Town Ranson gravity sewer of flow. This alternative would consist of:

- Redirection of gravity sewer flowing into the Burr East Pump Station
- Installing a new force main from the Burr East Pump Station to the War Admiral Pump Station
- Modifying the force main on Shenandoah Junction Road
- Modifying the force main along Charles Town Road
- Upgrading the Burr East Pump Station

As shown in **Table 4-2**, the construction cost for Alternative BE 2 is $701,640 and the soft costs including engineering are $140,300 for a total project cost of $850,000.

TABLE 4-2

No.	Description	Quantity	Unit	Unit Price	Total Price
	MODIFIED FLOWING SPRING PROJECT				
1	Mobilization	1	LS	$ 7,000	$ 7,000
2	Erosion & Sediment Control	1	LS	$ 5,000	$ 5,000
3	Test Pit	1	EA	$ 800	$ 800
4	Launching/Receiving Pit Excavation	1,950	CY	$ 60	$ 117,000
5	Burr East Pump Station Modifications	1	LS	$ 238,000	$ 238,000
6	Doghouse Manhole	1	EA	$ 3,500	$ 3,500
7	Manhole Extension	4	VF	$ 250	$ 1,000
8	Air Release Valve	1	EA	$ 3,500	$ 3,500
9	6" C900 Class 165 FM	2,150	LF	$ 45	$ 96,750
10	1.5" SDR 9 HDPE FM	1,105	LF	$ 25	$ 27,625
11	System Tie-in Connection	5	EA	$ 7,500	$ 37,500
12	Valve Vault Modifications	1	LS	$ 10,000	$ 10,000
13	Miscellaneous Ductile Iron Fittings	1,000	LBS	$ 5	$ 5,000
14	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 17,000	$ 17,000
15	Traffic Control	1	LS	$ 15,000	$ 15,000
			Construction Subtotal		**$ 584,700**
	Contingency	20%		$	116,940
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**701,640**
16	Soft Costs (Design, Permitting, Surveying, etc.)	20%		**$**	**140,300**
			Total Project Cost		**$ 850,000**

4.1.3 Alternative BE 3 – Do Nothing

If Alternative BE 3 is selected, no diversion of flow will be made from the northern areas of the system to the new War Admiral Pump Station and Route 9 line. This will result in continued high flows through the Old Town Ranson gravity system.

4.2 JETT'S FARM PUMP STATION

4.2.1 Alternative JF 1 – Jett's Farm Pump Station Modifications and Force Main Slip-Lining

The Burr East Project described above includes redirecting flow from the northern pump stations (Burr East, Burr Royal, Burr West, Driswood Job Corps, Jefferson High School) to the new War Admiral Pump Station instead of continuing towards the Jett's Farm Pump Station. This will greatly reduce the flow at the Jett's Farm Pump Station, and therefore, modifications to the pump station and force main must be made.

This option consists of replacing the pumps, controls, piping, and valve vault at the Jett's Farm Pump Station. This option also includes the

installation of approximately 4,300 LF of 3" HDPE force main inserted inside the existing 6" force main from the Jett's Farm Pump Station to the discharge manhole (MH 37) on War Admiral Boulevard. Pump and haul will be utilized while the existing 6" force main is slip lined with the new 3" force main. Also included with this option is connecting the single residential grinder unit at 2466 North Mildred Street into the new 3" HDPE force main (**Appendix G**).

This option also consists of installing a connection under Route 115 to connect the residences at 2328 N Mildred Street and 2256 N Mildred Street to the new Route 9 gravity sewer line.

As shown in **Table 4-3**, the construction cost for alternative JF 1 is $426,000 and the soft costs including engineering are $85,200 for a total project cost of $520,000.

TABLE 4-3

No.	Description	Quantity	Unit	Unit Price	Total Price
	JETT'S FARM OPTION 1				
1	Mobilization	1	LS	$ 9,000	$ 9,000
2	Erosion & Sediment Control	1	LS	$ 7,000	$ 7,000
3	3" DR 21 HDPE Force Main	4,300	LF	$ 30	$ 129,000
4	Air Release Valve Assembly	2	EA	$ 3,500	$ 7,000
5	Flushing Valve	4	EA	$ 3,500	$ 14,000
6	Pump Station Modifications	1	LS	$ 122,000	$ 122,000
7	Pump and Haul	1	LS	$ 25,000	$ 25,000
8	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
9	Traffic Control	1	LS	$ 5,000	$ 5,000
10	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 22,000	$ 22,000
			Construction Subtotal		**$ 355,000**
	Construction Contingency	20%		$	71,000
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**426,000**
11	Soft Costs (Design, Permitting, Surveying, etc.)	20%		**$**	**85,200**
			Total Project Cost		**$ 520,000**

4.2.2 Alternative JF 2 – Jett's Farm Pump Station and Force Main Installation

The Burr East Project described above includes redirecting flow from the northern pump stations (Burr East, Burr Royal, Burr West, Driswood Job Corps, Jefferson High School) to the new War Admiral Pump Station instead of continuing towards the Jett's Farm Pump Station. This will greatly reduce the flow at the Jett's Farm Pump Station, and therefore, modifications to the pump station and force main must be made.

This option consists of replacing the pumps, controls, piping, and valve vault at the Jett's Farm Pump Station and installation of approximately 2,200 LF of 3" force main from the Jett's Farm Pump Station through a casing under Route 9 to the new Route 9 force main. There is an old existing casing that was abandoned under Charles Town Road South of Jett's Farm Pump Station, but no existing casings are present under Route 9.

This option includes abandoning the existing 6" force main from the Jett's Farm Pump Station to the residence at 2466 North Mildred Street and installing a grinder pump and force main (**Appendix G**).

This option also consists of installing a connection under Route 115 to connect the residences at 2328 N Mildred Street and 2256 N Mildred Street, to the new Route 9 gravity sewer line.

As shown in **Table 4-4**, the construction cost for alternative JF 2 is $830040 and the soft costs including engineering are $166,000 for a total project cost of $1,010,000.

TABLE 4-4

No.	Description	Quantity	Unit	Unit Price	Total Price
	JETT'S FARM OPTION 2				
1	Mobilization	1	LS	$ 3,000	$ 3,000
2	Erosion & Sediment Control	1	LS	$ 2,000	$ 2,000
3	4" C900 PVC Force Main	1,290	LF	$ 30	$ 38,700
4	12" Steel Casing (Bore & Jack)	350	LF	$ 800	$ 280,000
5	Air Release Valve	1	EA	$ 3,500	$ 3,500
6	Pump Station Modifications	1	LS	$ 185,000	$ 185,000
7	1.5" SDR-9 IPS HDPE Force Main	940	LF	$ 25	$ 23,500
8	Valve Vault	1	LS	$ 68,000	$ 68,000
9	Mainline Cleanout	1	EA	$ 3,000	$ 3,000
10	6" SDR 35 PVC Gravity Sewer	366	LF	$ 90	$ 32,940
11	4' Dia. Manhole (up to 6')	2	EA	$ 7,500	$ 15,000
12	Frame and Cover (highway)	2	EA	$ 500	$ 1,000
13	System Tie-in Connection	3	EA	$ 7,500	$ 22,500
14	Line Existing Manhole	1	EA	$ 1,500	$ 1,500
15	Traffic Control	1	LS	$ 5,000	$ 5,000
16	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 7,000	$ 7,000
			Construction Subtotal		**$ 691,700**
17	Construction Contingency	20%		$	138,340
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**830,040**
18	Soft Costs (Design, Permitting, Surveying, etc.)	20%		**$**	**166,000**
19	Easements and Acquisiton ($5/LF)			**$**	**11,000**
			Total Project Cost		**$ 1,010,000**

4.2.3 Alternative JF 3 – Do Nothing

If Alternative JF 3 is selected, no changes will be made to the Jett's Farm Pump Station or force main. If no changes are made, the pump station will be oversized due to flow being diverted at the Burr East Pump Station. This will lead to odor and hydrogen sulfide issues due to long detention times in the wet well and force main.

4.3 MOOSE LODGE PUMP STATION

4.3.1 Alternative ML 1 – Moose Lodge Replacement with Gravity

The Lloyd's Flat Pump Station Decommission, being constructed in house by Charles Town Utility Board Staff, redirects flow into the new Route 9 Sewer Project, so that the Moose Lodge Pump Station will only serve 1 industrial and 4 commercial customers. This option consists of the demolition of the Moose Lodge Pump Station and the construction of approximately 1,820 LF of 8" gravity sewer line and 6 manholes from MH 45B beside the Moose Lodge Pump Station to MH R3. This option also includes abandoning approximately 1,390 LF of the existing 6" force main from the Moose Lodge Pump Station to MH R3 (**Appendix G**).

As shown in **Table 4-5**, the estimated cost of the Moose Lodge Replacement with Gravity is $530,000.

TABLE 4-5

No.	Description	Quantity	Unit	Unit Price	Total Price
	MOOSE LODGE OPTION 1				
1	Mobilization	1	LS	$ 4,000	$ 4,000
2	Erosion & Sediment Control	1	LS	$ 3,000	$ 3,000
3	Demo Existing Moose Lodge Pump Station	1	LS	$ 25,000	$ 25,000
4	8" SDR 35 PVC Gravity Sewer	1,820	LF	$ 125	$ 227,500
5	Manhole	6	EA	$ 7,500	$ 45,000
6	Manhole Extension	14	LF	$ 500	$ 7,000
7	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
8	16" Steel Casing (Bore & Jack)	40	LF	$ 350	$ 14,000
9	Traffic Control	1	LS	$ 5,000	$ 5,000
10	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 10,000	$ 10,000
			Construction Subtotal		**$ 355,500**
	Construction Contingency	20%		$	71,100
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**426,600**
11	Soft Costs (Design, Permitting, Surveying, etc.)	20%		**$**	**85,300**
12	Easements and Acquisition			**$**	**9,200**
			Total Project Cost		**$ 530,000**

4.3.2 Alternative ML 2 – Moose Lodge Upgrade and Force Main

The Lloyd's Flat Pump Station Decommission, being construction in house by Charles Town Utility Board Staff, redirects flow into the new Route 9 Sewer Project, so that the Moose Lodge Pump Station will only serve 1 industrial and 4 commercial customers. Therefore, the pump station and the force main will experience far less flow and will require modifications.

This option consists of the demolition of the existing pump station, installation of a new package pump station, and installation of approximately 1,375 LF of 2" force main inside of the existing 6" force main (**Appendix G**).

As shown in **Table 4-6**, the estimated cost of the Moose Lodge Upgrade and Force Main is $250,000.

TABLE 4-6

No.	Description	Quantity	Unit	Unit Price	Total Price
	MOOSE LODGE OPTION 2				
1	Mobilization	1	LS	$ 6,000	$ 6,000
2	Erosion & Sediment Control	1	LS	$ 8,000	$ 8,000
3	2" SDR 21 PVC Force Main	1,375	LF	$ 15	$ 20,625
4	Demo Existing Station	1	LS	$ 10,000	$ 10,000
5	Package Pump Station	1	LS	$121,200	$ 121,200
6	Traffic Control	1	LS	$ 5,000	$ 5,000
			Construction Subtotal		**$ 170,900**
	Construction Contingency	20%		$	34,200
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**205,100**
8	Soft Costs (Design, Permitting, Surveying, etc.)	20%		**$**	**41,000**
			Total Project Cost		**$250,000**

4.3.3 Alternative ML 3 – Do Nothing

If Alternative ML 3 is selected, no modifications will be made to the Moose Lodge Pump Station or force main. If no changes are made, the pump station will be oversized due to flow being diverted at the Burr East Pump Station. This will lead to odor and hydrogen sulfide issues due to long detention times in the wet well and force main.

4.4 FLOWING SPRINGS PUMP STATION

4.4.1 Alternative FSPS 1 – Upgrade FSPS

This alternative involves using a phased approach to upgrade the Flowing Springs Pump Station to handle the rerouting of flows due to the other components of this project. The upgrade will also accommodate future flows projected in the CTUB 2021 Sewer Strategic Plan (**Appendix B**).

The Flowing Springs Upgrades can be phased to accommodate projected flows at year 5, year 10, and year 20. At year 5, the existing 12" force main will be sufficient for the proposed pump flow. At year 10, a parallel 12" force main will need to be installed to allow capacity for the projected flow.

As shown in **Table 4-7**, the estimated cost to upgrade the FSPS at year 5 is $990,000.

TABLE 4-7

No.	Description	Quantity	Unit	Unit Price	Total Price
	FLOWING SPRINGS PS UPGRADE				
1	Mobilization	1	LS	$ 5,000	$ 5,000
2	Bypass Pumping	1	LS	$ 60,000	$ 60,000
3	Demo Existing Station	1	LS	$ 18,000	$ 18,000
4	Miscellaneous Site Work	1	LS	$ 5,000	$ 5,000
5	Miscellaneous Concrete	10	CY	$ 2,000	$ 20,000
6	Wet Well Liner Installation	1	LS	$ 40,000	$ 40,000
7	Submersible Non-Clog Pumps (Assume Myers 4VLX, 150 HP)[4]	3	EA	$ 40,000	$ 120,000
8	Lift-out base and rail system	2	EA	$ 12,000	$ 24,000
9	Sewer Grinder	1	EA	$ 95,000	$ 95,000
10	Misc. Fittings	1	LS	$ 5,000	$ 5,000
11	Flow Meter Replacement	1	EA	$ 7,000	$ 7,000
12	Pressure Gauge Assemblies (Replacement)	3	EA	$ 1,500	$ 4,500
13	Misc. Mechanical[3]	1	LS	$ 5,000	$ 5,000
14	Wet Well Terminal Boxes/Structure (Replacement)	1	LS	$ 15,000	$ 15,000
15	Pump Soft Starters (To Replace VFD's)	3	EA	$ 8,000	$ 24,000
16	Electrical[2]	1	EA	$ 40,000	$ 40,000
17	Controls	1	EA	$ 40,000	$ 40,000
18	Generator & ATS Replacement	1	EA	$153,000	$ 153,000
19	Clean-up / Demobilization	1	LS	$ 5,000	$ 5,000
20	Start-up (Non-supplier)	1	LS	$ 1,500	$ 1,500
			Construction Subtotal		**$ 687,000**
21	Construction Contingency	20%		$	137,400
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**824,400**
22	Soft Costs (Design, Permitting, Surveying, etc.)	20%		**$**	**164,800**
			Total Project Cost		**$ 990,000**

4.4.2 Alternative FSPS 3 – Do Nothing

This alternative involves doing nothing to accommodate the additional flows from the project and the projected development flows to the Flowing Springs Pump Station.

4.5 EVITTS RUN INTERCEPTOR

4.5.1 Alternative ER 1 – New Parallel Gravity Sewer Line

This alternative involves installing a parallel gravity line adjacent to the existing gravity sewer line from the Flowing Springs Discharge to the Charles Town WWTP and abandoning the existing gravity line. This alternative will be installed in an existing sewer easement where an old gravity sewer line used to be prior to 1987. The new gravity sewer line will be utilized for the FSPS flow and for flow in Old Town Ranson (**Appendix M**).

As shown in **Table 4-8**, the estimated total cost of the new gravity sewer line is $4,380,000.

TABLE 4-8

No.	Description	Quantity	Unit	Unit Price	Total Price
	EVITT'S RUN OPTION 1 - PARALLEL GRAVITY				
1	Mobilization	1	LS	$ 145,000	$ 145,000
2	Erosion & Sediment Control	1	LS	$ 138,000	$ 138,000
3	36" SDR 35 PVC Gravity Sewer	2,600	LF	$ 350	$ 910,000
4	30" SDR 35 PVC Gravity Sewer	1,600	LF	$ 300	$ 480,000
5	24" SDR 35 PVC Gravity Sewer	1,700	LF	$ 250	$ 425,000
6	4 ft. Dia. Manholes (up to 6')	27	EA	$ 7,500	$ 202,500
7	MH Extensions	65	EA	$ 500	$ 32,500
8	Frame & Cover (Highway)	27	EA	$ 500	$ 13,500
9	System Tie-in Connection	11	EA	$ 2,000	$ 22,000
10	Test Pit Excavation and Refill	5	EA	$ 1,000	$ 5,000
11	Asphalt Overlay	87	TON	$ 120	$ 10,440
12	Aggregate for Backfill	3,720	CY	$ 50	$ 186,000
13	Bypass Pumping	1	LS	$ 1,000	$ 1,000
14	Line New Manholes	260	VF	$ 345	$ 89,700
15	48" Steel Casing (Bore & Jack)	250	LF	$ 1,500	$ 375,000
16	Traffic Control	1	LS	$ 5,000	$ 5,000
			Construction Subtotal		**$ 3,040,700**
17	Contingency	20%		$	608,200
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**3,648,900**
18	Soft Costs (Engineering, Survey, etc)	**20%**		**$**	**729,780**
					$ 4,380,000

4.5.2 Alternative ER 2 – Extend FSPS Force Main and Rehab Manholes

This alternative involves extending the Flowing Springs Pump Station Force Main the entire way to the Charles Town WWTP and rehabilitating the existing manholes and sewer lines between the current FSPS discharge and the CTUB WWTP (**Appendix M**).

As shown in **Table 4-9**, the estimated total cost of the force main extension and manhole rehabilitation is $1,780,000.

TABLE 4-9

No.	Description	Quantity	Unit	Unit Price	Total Price
	EVITT'S RUN OPTION 3 - EXTEND FM				
1	Mobilization	1	LS	$ 59,000	$ 59,000
2	Erosion & Sediment Control	1	LS	$ 56,000	$ 56,000
3	4 ft. Dia. Manholes (up to 6')	1	EA	$ 7,500	$ 7,500
4	MH Extensions	1	EA	$ 500	$ 500
5	Frame & Cover (Highway)	5	EA	$ 500	$ 2,500
6	System Tie-in Connection	2	EA	$ 2,000	$ 4,000
7	Test Pit Excavation and Refill	5	EA	$ 1,000	$ 5,000
8	Asphalt Trench Patch (Base)	62	TON	$ 150	$ 9,300
9	Aggregate for Backfill	1,740	CY	$ 50	$ 87,000
10	Bypass Pumping	1	LS	$ 60,000	$ 60,000
11	Line Existing Manholes	260	VF	$ 500	$ 130,000
12	12" Force Main	6,060	LF	$ 85	$ 515,100
13	24" Steel Casing (Bore & Jack)	250	LF	$ 1,100	$ 275,000
14	Traffic Control	1	LS	$ 20,000	$ 20,000
			Construction Subtotal	**$**	**1,230,900**
15	Contingency	20%		$	246,200
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**1,477,100**
16	Soft Costs (Engineering, Survey, etc)	**20%**		**$**	**295,420**
					$ 1,780,000

4.5.3 Alternative ER 3 – Phased Replacement

This alternative involves replacing the sewer line and manholes from the Flowing Springs Pump Station discharge to the Charles Town WWTP utilizing a phased approach based on the analysis of the Evitt's Run capacity (**Appendix I**).

In year 5, 1,600 LF of sewer line between CT-423 and CT-58 will need to be upgraded to a 30" line.

In year 10, 2,600 LF of sewer line between C-59 and the CTWWTP will need to be upgraded to a 36" line.

In year 20, 1,700 LF of sewer line between R-259 and CT-423 will need to be upgraded to a 24" line.

As shown in **Table 4-10**, the estimated cost for the necessary replacement in year 5 is $1,190,000.

TABLE 4-10

No.	Description	Quantity	Unit	Unit Price	Total Price
	EVITT'S RUN OPTION 1 - PHASED REPLACEMENT YEAR 5				
1	Mobilization	1	LS	$ 40,000	$ 40,000
2	Erosion & Sediment Control	1	LS	$ 38,000	$ 38,000
3	30" SDR 35 PVC Gravity Sewer	1,600	LF	$ 300	$ 480,000
4	4 ft. Dia. Manholes (up to 6')	9	EA	$ 7,500	$ 67,500
5	MH Extensions	6	EA	$ 500	$ 3,000
6	Frame & Cover (Highway)	9	EA	$ 500	$ 4,500
7	System Tie-in Connection	4	EA	$ 2,000	$ 8,000
8	Test Pit Excavation and Refill	1	EA	$ 1,000	$ 1,000
9	Asphalt Overlay	10	TON	$ 120	$ 1,200
10	Aggregate for Backfill	1,020	CY	$ 50	$ 51,000
11	Bypass Pumping	1	LS	$ 60,000	$ 60,000
12	Line New Manholes	59	VF	$ 345	$ 20,355
13	48" Steel Casing (Bore & Jack)	30	LF	$ 1,500	$ 45,000
14	Traffic Control	1	LS	$ 5,000	$ 5,000
			Construction Subtotal		**$ 824,600**
15	Contingency	20%		$	165,000
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**989,600**
16	Soft Costs (Engineering, Survey, etc)	**20%**		**$**	**197,920**
					$ 1,190,000

4.5.4 Alternative ER 4 – Do Nothing

This alternative involves doing nothing to relieve the Evitt's Run Interceptor line of flow, allowing surcharges to continue to occur. This alternative does not involve rehabilitation of the existing sewer, leaving the sewer in poor condition due to hydrogen sulfide.

4.6 JEFFERSON MEMORIAL PARK FORCE MAIN

4.6.1 Alternative JMP 1 (Red Alignment)

The existing gravity sewer line through the Jefferson Memorial Park is shallow and is undersized for the current flow conditions. The manholes through the Park have been observed surcharging on multiple occasions, and the RK&K Sewer Model noted capacity issues in this line. This alternative involves the continuation of the Clarence Drive Pump Station force main down Morison Street, through an existing utility easement, to the Samuel Street Pump Station. This alternative relieves the gravity line through the park of flow so that it is no longer at capacity.

This alternative has less impact on property owners and the park. As a result, less easements will be required because construction will occur within existing City streets and existing easements (**Appendix N**).

As shown in **Table 4-11**, the estimated cost for Alternative JMP 1 is $246,000.

TABLE 4-11

No.	Description	Quantity	Unit	Unit Price	Total Price
	RED LINE				
1	Mobilization	1	LS	$ 5,000	$ 5,000
2	Erosion & Sediment Control	1	LS	$ 4,000	$ 4,000
3	6" SDR 21 PVC Force Main	2,341	LF	$ 45	$ 105,345
4	12" SDR 35 PVC Gravity Sewer	21	LF	$ 125	$ 2,625
5	4 ft. Dia. Manholes (up to 6')	1	EA	$ 7,500	$ 7,500
6	Frame & Cover (Highway)	1	EA	$ 500	$ 500
7	Combination Air Release Vacuum Break	1	EA	$ 3,500	$ 3,500
8	System Tie-in Connection	2	EA	$ 2,000	$ 4,000
9	Test Pit Excavation and Refill	2	EA	$ 1,000	$ 2,000
10	Asphalt Trench Patch (Base)	26	TON	$ 150	$ 3,825
11	Asphalt Wearing	13	TON	$ 120	$ 1,530
12	Aggregate for Backfill	438	CY	$ 50	$ 21,900
13	Bypass Pumping	1	LS	$ 4,000	$ 4,000
14	Traffic Control	1	LS	$ 5,000	$ 5,000
			Construction Subtotal		**$ 170,800**
15	Contingency	20%		$	34,200
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**205,000**
16	Soft Costs (Design, Surveying, etc)	20%		**$**	**41,000**
				Say	**$ 246,000**

4.6.2 Alternative JMP 2 (Blue Alignment)

The existing gravity sewer line through the Jefferson Memorial Park is shallow and is undersized for the current flow conditions. The manholes through the Park have been observed surcharging on multiple occasions, and the RK&K Sewer Model noted capacity issues in this line. This alternative involves the continuation of the Clarence Drive Pump Station force main through the Jefferson Memorial Park to the Samuel Street Pump Station. This alternative relieves the gravity line through the park of flow so that it is no longer at capacity. This alternative would require easements from one property owner (**Appendix N**).

As shown in **Table 4-12**, the estimated cost for Alternative JMP 2 is $297,000.

TABLE 4-12

No.	Description	Quantity	Unit	Unit Price	Total Price
	MODIFIED BLUE LINE				
1	Mobilization	1	LS	$ 5,000	$ 5,000
2	Erosion & Sediment Control	1	LS	$ 4,000	$ 4,000
3	6" SDR 21 PVC Force Main	2,325	LF	$ 45	$ 104,625
4	16" SDR 35 PVC Gravity Sewer	50	LF	$ 125	$ 6,250
5	Combination Air Release Vacuum Break	1	EA	$ 3,500	$ 3,500
6	Flushing Valve	1	EA	$ 3,500	$ 3,500
7	System Tie-in Connection	6	EA	$ 2,000	$ 12,000
8	Test Pit Excavation and Refill	1	EA	$ 1,000	$ 1,000
9	Asphalt Trench Patch (Base)	40	TON	$ 150	$ 6,000
10	Asphalt Overlay	70	TON	$ 120	$ 8,400
11	Asphalt Milling	360	SY	$ 8	$ 2,880
12	Aggregate for Streets and Driveways	325	TON	$ 55	$ 17,875
13	Aggregate for Backfill	500	CY	$ 50	$ 25,000
14	Traffic Control	1	LS	$ 5,000	$ 5,000
				Construction Subtotal	**$ 205,100**
15	Contingency	20%		$	41,020
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**246,200**
16	Soft Costs (Design, Surveying, etc)	20%		**$**	**49,300**
17	Easements and Acquisition (1 Easement, $5/LF)			**$**	**780**
				Say	**$ 297,000**

4.6.3 Alternative JMP 3 – Do Nothing

If Alternative JMP 3 is selected, no changes will be made to the Jefferson Memorial Park gravity line, and the line will continue to be undersized for the current flows. As a result, surcharging will continue to occur during wet weather events.

4.7 FAIRFAX CROSSING PARALLEL LINE

4.7.1 Alternative FC 1 – Option 1

This option consists of installing 3,090 LF of 15" gravity sewer and 12 manholes from the Route 9 line to the existing sewer on the opposite side of Route 9. This option parallels the existing 10" sewer alignment through the Fairfax Crossing Development. Utilizing a parallel alignment will allow for the proposed line to be placed near the existing line, hopefully eliminating the need for blasting. Interruptions to traffic should only occur on Joshua M. freeman Boulevard and North Fairfax Boulevard. This option also consists of upgrading the 12" section of line under Route 9 to a 15" section of line with a new bore and jack under Route 9 (**Appendix J**).

As shown in **Table 4-13**, the estimated cost of rehabilitation of manholes and gravity sewer lines is $2,031,800.

TABLE 4-13

No.	Description	Quantity	Unit		Unit Price		Total Price
	Fairfax Crossing Parallel Line (Option 1)						
1	Mobilization	1	LS	$	67,000	$	67,000
2	Erosion & Sediment Control	1	LS	$	64,000	$	64,000
3	15" SDR 35 PVC Gravity Sewer (D<8')	570	LF	$	110	$	62,700
4	15" SDR 35 PVC Gravity Sewer (8'<D<12')	770	LF	$	120	$	92,400
5	15" SDR 35 PVC Gravity Sewer (D>12')	1,750	LF	$	130	$	227,500
6	4 ft. Dia. Manholes (up to 6')	12	EA	$	7,500	$	90,000
7	MH Extensions	125	LF	$	300	$	37,500
8	Frame & Cover (Highway)	12	EA	$	650	$	7,800
9	System Tie-in Connection	2	EA	$	7,500	$	15,000
10	30" Steel Casing (Bore & Jack)	305	LF	$	1,100	$	335,500
11	48" Steel Casing (Bore & Jack)	240	LF	$	1,500	$	360,000
12	Traffic Control	1	LS	$	30,000	$	30,000
13	Concrete Sidewalk Repair	1	CY	$	300	$	300
14	Concrete Curb Repair	2	CY	$	1,000	$	1,500
15	Asphalt Repair	36	TON	$	205	$	7,380
16	Test Pit Excavation and Refill	4	EA	$	1,000	$	4,000
				Construction Subtotal		**$**	**1,402,600**
17	Contingency	20%		$			280,600
	TOTAL ESTIMATED CONSTRUCTION COST			**$**			**1,683,200**
18	Soft Costs (Engineering, Survey, etc)	20%		**$**			**336,700**
19	Easements and Acquisition ($5/LF)			**$**			**11,900**
					Say	**$**	**2,031,800**

4.7.2 Alternative FC 2 – Option 2

This option consists of installing 2,095 LF of 15' gravity sewer and 14 manholes from the Route 9 line to the existing sewer on the opposite side of Route 9. This option parallels the existing 10" sewer line along Baker Place, follows North Fairfax Boulevard, and crosses the Potomac TC Owner LLC property. Utilizing this alignment allows for the sewer line to be bored under many of the roads, rather than open cut. Interruptions to traffic would occur on Joshua M. Freeman Boulevard and North Fairfax Boulevard. This option also consists of upgrading the 12" section of line under Route 9 to a 15" section of line with a new bore and jack under Route 9 (**Appendix J**).

As shown in **Table 4-14**, the estimated cost of rehabilitation of manholes and gravity sewer lines is $2,055,500.

TABLE 4-14

No.	Description	Quantity	Unit	Unit Price	Total Price
	Fairfax Crossing Parallel Line (Option 2)				
1	Mobilization	1	LS	$ 68,000	$ 68,000
2	Erosion & Sediment Control	1	LS	$ 65,000	$ 65,000
3	15" SDR 35 PVC Gravity Sewer (D<8')	410	LF	$ 110	$ 45,100
4	15" SDR 35 PVC Gravity Sewer (8'<D<12')	475	LF	$ 120	$ 57,000
5	15" SDR 35 PVC Gravity Sewer (D>12')	1,210	LF	$ 130	$ 157,300
6	4 ft. Dia. Manholes (up to 6')	14	EA	$ 7,500	$ 105,000
7	MH Extensions	155	LF	$ 300	$ 46,500
8	Frame & Cover (Highway)	14	EA	$ 650	$ 9,100
9	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
10	30" Steel Casing (Bore & Jack)	425	LF	$ 1,100	$ 467,500
11	48" Steel Casing (Bore & Jack)	240	LF	$ 1,500	$ 360,000
12	Concrete Sidewalk Repair	15	CY	$ 300	$ 4,500
13	Traffic Control	1	LS	$ 15,000	$ 15,000
14	Test Pit Excavation and Refill	4	EA	$ 1,000	$ 4,000
				Construction Subtotal	**$ 1,419,000**
15	Contingency	20%		$	283,800
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**1,702,800**
16	Soft Costs (Engineering, Survey, etc)	20%		**$**	**340,600**
17	Easements and Acquisition ($5/LF)			**$**	**12,100**
				Say	**$ 2,055,500**

4.7.3 Alternative FC 3 – Option 3

This option consists of installing 2,585 LF of 15" gravity sewer and 12 manholes from the Route 9 line to the existing sewer on the opposite side of Route 9. This option parallels the existing 10" sewer line along Baker Place, goes around the Fairfax Boulevard roundabout, and crosses the Potomac TC Owner LLC property. Utilizing this alignment allows for the sewer line to be

bored under North Fairfax Boulevard, rather than open cut. Interruptions to traffic will only occur on North Fairfax Boulevard (**Appendix J**).

As shown in **Table 4-15**, the estimated cost of rehabilitation of manholes and gravity sewer lines is $1,939,300.

TABLE 4-15

No.	Description	Quantity	Unit	Unit Price	Total Price
	Fairfax Crossing Parallel Line (Option 3)				
1	Mobilization	1	LS	$ 64,000	$ 64,000
2	Erosion & Sediment Control	1	LS	$ 61,000	$ 61,000
3	15" SDR 35 PVC Gravity Sewer (D<8')	25	LF	$ 110	$ 2,750
4	15" SDR 35 PVC Gravity Sewer (8'<D<12')	570	LF	$ 120	$ 68,400
5	15" SDR 35 PVC Gravity Sewer (D>12')	1,990	LF	$ 130	$ 258,700
6	4 ft. Dia. Manholes (up to 6')	12	EA	$ 7,500	$ 90,000
7	MH Extensions	160	LF	$ 300	$ 48,000
8	Frame & Cover (Highway)	12	EA	$ 650	$ 7,800
9	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
10	30" Steel Casing (Bore & Jack)	315	LF	$ 1,100	$ 346,500
11	48" Steel Casing (Bore & Jack)	240	LF	$ 1,500	$ 360,000
12	Traffic Control	1	LS	$ 15,000	$ 15,000
				Construction Subtotal	**$ 1,337,200**
13	Contingency	20%		$	267,500
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**1,604,700**
14	Soft Costs (Engineering, Survey, etc)	20%		**$**	**321,000**
15	Easements and Acquisition ($5/LF)			**$**	**13,600**
				Say	**$ 1,939,300**

4.7.4 Alternative FC 4 – Do Nothing

This alternative involves doing nothing. If this alternative is chosen, the agreement between Potomac TC Owner LLC and the City of Charles Town will not be satisfied at this time.

RK&K reviewed flow monitor data collected between 07/21/2021 and 08/05/2021 from manholes FC-29 and FC-58 along the existing Fairfax Crossing sewer line. Review of the data indicated that the maximum flow through the gravity line during the timeframe is 225 gpm.

Once the 2021 Collection System Project is complete, the projected maximum flow is estimated at 475 GPM. This projected flow is comprised of 150 gpm from the War Admiral PS; 250 gpm from the Lloyd's Flat PS; and the 75 gpm generated from the existing Fairfax Crossing commercial development. This projected flow does not include any flows from future developments.

Based on review of the available plans for the existing gravity sewer line between manholes FC-59 and FC-30, RK&K calculated an average hydraulic capacity of 550 GPM based on the current alignment, except for a 291 LF section between manholes FC-32 and FC-34 which has a limited capacity of 450 GPM. As a result, the proposed flows from the 2021 Collection System Project will exceed the available capacity in this section of the existing gravity line without upgrades. Likewise, as continued development occurs within the Fairfax Crossing development, it will further hinder the hydraulic capacity of the existing gravity line resulting in the need for continued reevaluation. Charles Town is planning on replacing the 291 LF section of line to allow for the Year 1 capacity. Based on analysis, the parallel line would need to be constructed in the next 5 years.

4.8 FORREST AVENUE PUMP STATION RELOCATION

4.8.1 Alternative FA 1 – Combined Lakeland Place Pump Station

This alternative involves decommissioning of the 11th Street Pump Station, decommissioning of the Forrest Avenue Pump Station, and construction of a combined Lakeland Place Pump Station.

This option consists of the construction of 735 LF of 8" gravity sewer, 5 manholes, demolition of the existing 11th Avenue PS; and converting the existing pump station into a sanitary manhole. This option utilizes the alley between E. 10th Ave. and E. 11th Ave. and ties into the proposed manhole at the location of the existing Forrest Ave. Pump Station.

This option also consists of the construction of 685 LF of gravity sewer, 3 manholes, demolition of the existing Forrest Avenue PS, and 830 LF of force main. This option also includes the construction of the Lakeland Place Pump Station at the low point of the developer's property in the proposed dog park. This alignment utilizes the property lines and will require 125 LF of easement from a homeowner and 242 LF of easement from the GLP capital tract property. This leaves the GLP capital tract property open for future development (**Appendix K**).

The benefit of this Option is that it removes the existing Forrest Ave. Pump Station from the front yards and combines the existing Forrest Ave. Pump Station and the proposed Lakeland Place Pump Station into a single pump station. The new force main will run along Mare Street and will tie into an existing manhole in the development.

As shown in **Table 4-16**, the estimated cost of construction is $1,076,600.

TABLE 4-16

CONCEPTUAL LEVEL COST ESTIMATE
June 11, 2021

No.	Description	Quantity	Unit	Unit Price	Total Price
	COMBINED LAKELAND PLACE				
1	Mobilization	1	LS	$ 36,000	$ 36,000
2	Erosion & Sediment Control	1	LS	$ 34,000	$ 34,000
3	8" SDR 35 PVC Gravity Sewer (D<8')	1,045	LF	$ 110	$ 114,950
4	8" SDR 35 PVC Gravity Sewer (8'<D<12')	108	LF	$ 125	$ 13,500
5	8" SDR 35 PVC Gravity Sewer (D>12')	267	LF	$ 175	$ 46,725
6	4 ft. Dia. Manholes (up to 6')	8	EA	$ 7,500	$ 60,000
7	MH Extensions	13	EA	$ 500	$ 6,500
8	Frame & Cover (Highway)	8	EA	$ 500	$ 4,000
9	System Tie-in Connection	2	EA	$ 2,000	$ 4,000
10	Test Pit Excavation and Refill	6	EA	$ 1,000	$ 6,000
11	Forrest Ave. PS Demolition	1	LS	$ 12,000	$ 12,000
12	Asphalt Trench Patch (Base)	2	TON	$ 150	$ 225
13	Asphalt Overlay	3	TON	$ 120	$ 300
14	Aggregate for Backfill	7	CY	$ 50	$ 350
15	11th St. PS Demolition	1	LS	$ 12,000	$ 12,000
16	Pump Station	1	LS	$ 358,355	$ 358,355
17	4" PVC Force Main	830	LF	$ 45	$ 37,350
			Construction Subtotal	**$**	**746,300**
18	Contingency	20%		$	149,300
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**895,600**
19	Soft Costs (Engineering, Survey, etc)	20%		**$**	**179,120**
20	Easements and Acquisition (2 Easements, $5/LF)			**$**	**1,850**
				Say	**$ 1,076,600**

4.8.2 Alternative FA 2 – Do Nothing

This alternative involves do nothing. If this alternative is chosen, the 11th Street and Forrest Avenue Pump Stations will stay in service and O&M costs will not be decreased. A separate pump station will be installed for the Lakeland Place Pump Station, and all pump stations will not be combined.

4.9 PRESENT WORTH ANALYSIS

All proposed alternatives are accompanied by no salvage value and low operation and maintenance costs over their lifetimes. Because of this, a life cycle cost analysis is not applicable to the wastewater collection system part of this project.

4.10 NON-MONETARY FACTORS

Completion of the various components in the 2021 Collection System Project will give capacity back to the gravity lines in “Old Town” Ranson and will give capacity back to the Jefferson Memorial Park gravity line. Rerouting of various pump stations and flows will remove old and aging infrastructure from the collection system, minimizing the need for maintenance. No additional staff will be needed to maintain the proposed infrastructure.

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

SECTION 5
PLAN SELECTION AND PUBLIC PARTICIPATION

5.0 PLAN SELECTION AND PUBLIC PARTICIPATION

The proposed alternatives for the Burr East Pump Station Flow Diversion, Jett's Farm Pump Station and Force Main, Moose Lodge Pump Station and Force Main, Flowing Springs Pump Station and Evitts Run Interceptor, Jefferson Memorial Park Force Main, Fairfax Crossing Parallel Line, and Forrest Avenue Pump Station Relocation and their associated costs were discussed in Section 4. In this section, the advantages and disadvantages for each project will be discussed, and the recommended solution for each proposed project will be presented.

5.1 BURR EAST PUMP STATION

Table 5-1 Advantages and Disadvantages of Each Alternative

Burr East Alternative	Advantages	Disadvantages
BE 1 – Burr East Pump Station Diversion – 2 Pumps	Reduced flow through Old Town Ranson Impeller can be modified for future development for more capacity	Construction cost
BE 2 – Burr East Pump Station Diversion – 3 Pumps	Reduced flow through Old Town Ranson	Construction cost
BE 3 – Do Nothing	No cost	Flow through Old Town Ranson

5.1.1 Recommendation

RK&K's recommendation for the Burr East Pump Station is to divert flow to the War Admiral Pump Station via modifications to the pump station in accordance with Alternative BE 1.

5.2 JETT'S FARM PUMP STATION AND FORCE MAIN

Table 5-2 Advantages and Disadvantages of Each Alternative

Jett's Farm Alternative	Advantages	Disadvantages
JF 1 – Jett's Farm Pump Station Modifications and Force Main Installation	All new infrastructure Accommodates reduction in flow	Construction cost Bore under Route 9
JF 2 – Jett's Farm Pump Station Modifications and Force Main Slip-Lining	Accommodates reduction in flow	Construction cost Utilization of old force main with slip lining resulting in temporary bypassing
JF 3 – Do Nothing	No cost	O&M cost for aging pump station Does not accommodate reduction in flow

5.2.1 Recommendation

RK&K's recommendation for the Jett's Farm Pump Station and Force Main is to modify the Jett's Farm Pump Station and install a new force main in accordance with Alternative JF 1.

5.3 MOOSE LODGE PUMP STATION AND FORCE MAIN

Table 5-3 Advantages and Disadvantages of Each Alternative

Moose Lodge Alternative	Advantages	Disadvantages
ML 1 – Moose Lodge Upgrade and Force Main	No new easements required	Pump station O&M Construction cost
ML 2 – Moose Lodge Replacement with Gravity	Decommission pump station	Higher construction cost Easements required
ML 3 – Do Nothing	No cost	Does not accommodate reduction in flow

5.3.1 Recommendation

RK&K's recommendation for the Moose Lodge Pump Station and Force Main is that the pump station is modified and the force main is slip lined with a smaller force main in accordance with Alternative ML 1.

5.4 FLOWING SPRINGS PUMP STATION

Table 5-4 Advantages and Disadvantages of Each Alternative

Flowing Springs Pump Station Alternative	Advantages	Disadvantages
FSPS 1 – Upgrade Pump Station	Accommodates future development Phased approach	Construction cost
FSPS 2 – Do Nothing	No cost	Pump station undersized Pump station cannot handle future development

5.4.1 Recommendation

RK&K's recommendation for the pump station is that the upgrades are done at the station in accordance with Alternative FSPS 1.

5.5 EVITTS RUN INTERCEPTOR

Table 5-3 Advantages and Disadvantages of Each Alternative

Evitts Run Interceptor Alternative	Advantages	Disadvantages
ER 1 – New Gravity Sewer Line	Utilizes existing easement Phased approach	Construction cost Possibility of continued hydrogen sulfide issues
ER 2 – Replace Gravity Sewer Line	All new infrastructure Construction completed at once	Highest construction cost Bypass pumping needed
ER 3 – Extend FSPS Force Main	Utilizes existing easement Reduced hydrogen sulfide issues in gravity	Construction cost Infrastructure lined and not replaced
ER 4 – Phased Replacement	Phased approach Only replace sections in need	Bypass pumping needed Construction cost
ER 5 – Do Nothing	No cost	Infrastructure in poor condition Gravity line undersized for flows

5.5.1 Recommendation

RK&K's recommendation for the Evitts Run Interceptor is that the new gravity line is installed utilizing a phased approach in accordance with Alternative ER 4.

5.6 JEFFERSON MEMORIAL PARK FORCE MAIN

Table 5-3 Advantages and Disadvantages of Each Alternative

Jefferson Memorial Park Alternative	Advantages	Disadvantages
JMP 1 – Red Alignment	No new easements required Park line relieved of flow	Construction cost
JMP 2 – Blue Alignment	Park line relieved of flow	Construction cost Easements required
JMP 3 – Do Nothing	No cost	Manholes surcharged during storm events Line under capacity

5.6.1 Recommendation

RK&K's recommendation for the Jefferson Memorial Park Force Main is that the force main is constructed through existing easements in accordance with Alternative JMP 1.

5.7 FAIRFAX CROSSING PARALLEL LINE

Table 5-3 Advantages and Disadvantages of Each Alternative

Fairfax Crossing Alternative	Advantages	Disadvantages
FC 1 – Option 1	Agreement satisfied Connects to proposed developments	Construction cost Increased traffic control needed
FC 2 – Option 2	Agreement satisfied Connects to proposed developments	Construction cost
FC 3 – Option 3	Agreement satisfied Bored rather than open cut Lowest construction cost Connects to proposed developments	Construction cost
FC 4 – Do Nothing	No cost Available capacity at this time	Agreement not satisfied

5.7.1 Recommendation

RK&K's recommendation is that no parallel line is to be constructed at this time through Fairfax Crossing and the capacity of the existing line is monitored as each new development upstream is proposed. Depending on development, it is anticipated that the parallel line will need to be constructed in the following five years, as a second phase to the 2021 Collection System Project.

Overall, as more development occurs, and additional capacity is needed, RK&K's recommendation is that the parallel 15" dia. line is constructed in accordance with Option 3. The cost for this option is the less expensive of the various options evaluated at $1,939,300 and will also result in less impact on vehicular and pedestrian traffic during construction.

5.8 FORREST AVENUE PUMP STATION RELOCATION

Table 5-3 Advantages and Disadvantages of Each Alternative

Forrest Avenue Alternative	Advantages	Disadvantages
FA 1 – Combined Lakeland Place Pump Station	O&M for only 1 pump station Pump station removed from front yard	Easement required Deep gravity sewer lines Construction cost
FA 2 – Do Nothing	No construction cost	O&M for three pump stations

5.8.1 Recommendation

RK&K's recommendation for the Forrest Avenue Pump Station Relocation is that the combined Lakeland Place pump station is constructed in accordance with Alternative FA 1.

5.9 PUBLIC PARTICIPATION

The alternatives in this PER have been discussed during the Utility Board's regular board meetings which are recorded and posted on the Utility's website. Additionally, the alternatives in this PER have been presented in various reports during the Utility Board's regular meetings. These reports have been posted on the Utility Board's website in each meeting's Agenda Packet.

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

SECTION 6
ENVIRONMENTAL INFORMATION

6.0 ENVIRONMENTAL INFORMATION

6.1 ENVIRONMENTAL IMPACTS

6.1.1 Air Quality

The only potential effect on air quality created by this project would be during the construction phase. This impact would be from exhaust fumes and dust from construction equipment.

Incineration is not proposed with this project.

There will be significant growth and development expected from the implementation of this project. It is anticipated that the growth and development will not create violations of the ambient air quality or noise standards as either primary or secondary impacts. Growth will be controlled by county zoning.

Violation of noise standards is not expected as a primary or secondary impact of the project.

6.1.2 Water Quality

The existing WWTP discharges do not cause a violation of existing stream standards, and present stream standards are not being legally challenged.

To mitigate the effects of possible sedimentation or erosion, a plan utilizing best practice procedures will be submitted for approval with the construction plans. The procedures outlined in the submitted plan will be followed by the contractor and the owner.

If the planning area continues to grow at the rates experienced in the past ten years, non-implementation of this project could affect the surface water and groundwater quality of Jefferson County. This would be due to the increased number of septic tanks installed or additional point source discharges of package treatment plants. It is natural to assume that the more septic water infiltrates into the ground, the greater the chance for groundwater deterioration. It should be noted that most of Jefferson County is underlain by carbonate bedrock which has undergone karsification. Chemicals can quickly be carried from the surface through conduits in the bedrock into the groundwater. From there, they can move quickly to streams, springs, and water wells.

6.1.3 Water Supply

There are no known water supply intakes downstream of the existing discharge points.

Since all current receiving streams eventually flow into the Potomac and Shenandoah Rivers, the project will not cause a significant amount of water to be transferred from one sub-basin to another.

There are no known existing or future proposed groundwater supply sources to which the project will discharge.

6.1.4 Biology

There are one endangered and two threatened species in the project area including the Indiana Bat, the Northern Long-eared Bat, and the Madison Cave Isopod (**Appendix O**).

Response has not yet been received from USFWS.

Response from WV DNR stated:

"We have no known records of any RTE species at the project site; however, Evitts Run is a High Quality Stream and state mussel stream. If any in-stream work is anticipated, a mussel survey may be needed. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review."

No wildlife or their habitat will be affected by the proposed construction. The effects of future development on wildlife or their habitat will be controlled by the Jefferson County Planning Commission.

There are no indications that aquatic life will be affected by the project or the discharge from the existing treatment plant.

6.1.5 Sensitive Areas

The service area does not include and is not part of an area designated or considered sensitive by a local state or federal agency.

The service area does not include streams which have or are being considered for designation as a Wild and Scenic River.

6.1.6 Wetlands

Wetlands are included in the service area, but no permanent disturbance of wetlands will occur (**Appendix P**).

Response has not yet been received from ACOE.

The wetlands in the service are will not be affected directly or indirectly by the existing treatment plant or the interceptors once construction is complete.

6.2 LAND USE PLANNING AND MANAGEMENT

6.2.1 Existing Land Use

The Jefferson County Planning Commission has zoned a large amount of land for either residential, commercial, or industrial growth. This project largely serves the zoned growth areas and is in agreement with the Comprehensive Plan's goals for land usage.

The project conforms to existing land use plans and will not cause significant changes to existing land use patterns. Several subdivisions are already planned and some are already under construction. Growth is already planned for the County, and this project is in response to that growth to provide those developments with adequate wastewater facilities.

6.2.2 Reserve Capacity

The proposed pump stations will not have an initial reserve capacity greater than 50% of its design average capacity.

6.2.3 Vacant Land

Large areas of existing vacant land will not be subject to increased development pressure because of this project.

6.2.4 Population Changes

The proposed project will be designed to take care of planned and projected wastewater requirements. The project will serve population changes which have already been provided for by the Jefferson County planning. These projects will induce population changes but the effect will be only minor on energy sources and loss of agricultural land.

Response has not yet been received from NRCS.

Floodplains will not be opened to development due to interceptor routing. The current sludge disposal practices will not be changed.

6.3 SOCIO-ECONOMIC ENVIRONMENT

The project will not require the acquisition of residential property except for easements on the proposed lines. The modifications to pump stations will occur within the existing easement. A site will be required for the Forrest Avenue Pump Station and has been chosen outside of residential areas of the study area. Land for the pump station will be acquired by fee negotiation or condemnation.

No parks or recreational areas will be acquired for or affected by pump station or interceptor routing. The force main adjacent to Jefferson Memorial Park has a chosen alignment in the street rather than through the park.

There is no known documentation which suggests the local populace cannot afford their local share of the proposed project. In addition, existing landowners could benefit from the development of land due to the project.

Buffer zones exist between pump stations and existing or proposed parks, and buffer zones exist between the proposed project and existing residential areas.

The project will not affect known or potential archaeological sites as identified by the Federal Register, state preservation officer, or other interested parties.

Response from WV Culture and History stated:

"Architectural Resources & Archaeological Resources:

According to our records, the project may have the potential to affect the following resources: the Old Charles Town Historic District (NR# 00001308) , the Happy Retreat property (NR# 73001912) including 46-JF-624, Aspen Hill (NR # 80004024), Gap View Farm (NR# 96001574), The Peter Burr House (NR # 82004322) and archaeological sites 46-JF-21, 46-JF-338, 46-JF-339, 46-JF-340, 46-JF-214, 46-JF-216, 46-JF-195, 46-JF-198, and 46-JF-193. We require additional information to better assess potential impacts on these resources.

Please elaborate on the proposed modifications/improvements that will occur at the Burr East Pump Station, the Jett's Farm Pump Station, the Moose Lodge Pump Station, and Flowing Springs Pump Station. Clearly illustrate on project mapping the locations of all new force main and gravity sewer lines that will be installed during this project. The submitted project information states that the Forrest Avenue and the 11th Avenue Pump Stations will be demolished during the project and replaced by the construction of the Lakeland Place Pump Station. However, the location of the 11th Avenue Pump Station and the Lakeland Place Pump Station are not illustrated on project mapping. Also, the location of the new grinder pump in the Jett's Farm Pump Station and Force Main project area is not illustrated on project mapping. Please denote the locations of these support facilities on project mapping. Provide photographs of the following: the pump station locations, the grinder pump location, the routes of all new force main and gravity sewer lines, and all buildings and/or structures over 45 years of age that will have or have a line of sight to the project's above ground components (e.g., pump stations). Key the photographs to project mapping. We will provide further comments upon receipt of the requested information; however, we reserve the right to request the completion of Historic Property Inventory (HPI) forms and/or a Phase I archaeological survey upon review of this information.

Cemetery Resources:

The proposed project may have the potential to affect the Mordington Cemetery (46-JF-129) and the Burr-McGarry Cemetery. The Mordington Cemetery is associated with the National Register-listed Happy Retreat. The Burr-McGarry Cemetery is a contributing component to the William Burr property (JF-0078-0102) which is considered eligible for listing in the National Register. Please clearly delineate the location of the new gravity sewer line within the Flowing Springs Pump Station and Evitt's Run Interceptor project area. Clearly delineate the route of the new Route 9 line that ties into the War Admiral Pump Station. We will provide further comment upon receipt of this information."

The project does not threaten to violate a Federal, State, or local law or requirement, which was originally imposed to protect the environment.

The project as proposed has not developed a significant level of public controversy.

6.4 SUSTAINABILITY CONSIDERATIONS

Completion of the proposed projects for the CTUB will reduce the CTUB's operation and maintenance costs. The project involves the decommissioning of three pump stations and the downsizing of two pump stations.

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

SECTION 7
PROJECT SUMMARY

7.0 PROJECT SUMMARY

The preceding sections described the various proposed projects and their alternatives to improve the Charles Town Utility Board's Wastewater System. The various components have been combined into an overall project (**Appendix R**). The resulting project will relieve the Old Town Ranson gravity sewer system of flow. In the following paragraphs, each recommended component of the project will be discussed in detail.

7.1 BURR EAST PUMP STATION

The designated alternative for the Burr East Pump Station is Alternative BE 1. This option involves redirecting flow from the northern portion of the system (Jefferson High School Pump Station, Burr East Pump Station) into the new Route 9 line at the War Admiral Pump Station.

See **Section 4.1.1** for the cost breakdown for the $840,000 project component.

7.2 JETT'S FARM PUMP STATION AND FORCE MAIN

The designated alternative for the Jett's Farm Pump Station and Force Main is Alternative JF 2. This option involves downsizing the Jett's Farm Pump Station by replacing the pumps, controls, piping, and valve vault, and installing approximately 2,200 LF of 3" force main from the Jett's Farm Pump Station to the new Route 9 force main from the War Admiral Pump Station.

This option also includes abandoning the existing 6" force main from the Jett's Farm Pump Station to the residence at 2466 North Mildred Street and installing a grinder pump and 870 LF of 1.5" force main from the residence to MH 37.

See **Section 4.2.2** for the cost breakdown for the $1,010,000 project component.

7.3 MOOSE LODGE PUMP STATION AND FORCE MAIN

The designated alternative for the Moose Lodge Pump Station and Force Main is Alternative ML 2. This option involves modifications to the Moose Lodge Pump Station and installation of approximately 1,375 LF of 2" force main inside of the existing 6" force main.

See **Section 4.3.2** for the cost breakdown for the $250,000 project component.

7.4 FLOWING SPRINGS PUMP STATION

The designated alternative for the Flowing Springs Pump Station is Alternative FSPS 1. This option involves using a phased approach to upgrade the Flowing Springs Pump Station to handle the rerouting of flows due to other components of this project. The upgrade will also accommodate future flows projected in the CTUB 2021 Sewer Strategic Plan.

See **Section 4.4.1** for the cost breakdown for the $990,000 project component.

7.5 EVITT'S RUN INTERCEPTOR

The designated alternative for the Evitt's Run Interceptor is Alternative ER 4. This option involves replacing the existing Evitt's Run gravity line utilizing a phased approach.

See **Section 4.5.2** for the cost breakdown for the $1,190,000 project component.

7.6 JEFFERSON MEMORIAL PARK FORCE MAIN

The designated alternative for the Jefferson Memorial Park Force Main is Alternative JMP 1. This option involves the continuation of the Clarence Drive Pump Station force main down Morison Street, through an existing utility easement, to the Samuel Street Pump Station. This alternative relieves the gravity line through the park of flow so that it is no longer at capacity.

See **Section 4.6.1** for the cost breakdown for the $246,000 project component.

7.7 FAIRFAX CROSSING PARALLEL LINE

The designated alternative for the Fairfax Crossing Parallel Line is Alternative 3. RK&K's recommendation is that no parallel line is to be constructed at this time through Fairfax Crossing and the capacity of the existing line is monitored as each new development upstream is proposed. Depending on development, it is anticipated that the parallel line will need to be constructed in the following five years, as a second phase to the 2021 Collection System Project.

Overall, as more development occurs, and additional capacity is needed, RK&K's recommendation is that the parallel 15" dia. line is constructed in accordance with Option 3. The cost for this option is the less expensive of the various options evaluated at $1,939,300 and will also result in less impact on vehicular and pedestrian traffic during construction.

7.8 FORREST AVENUE PUMP STATION RELOCATION

The designated alternative for the Forrest Avenue Pump Station Relocation is Alternative FA 1. This option involves decommissioning of the 11th Street Pump Station, decommissioning of the Forrest Avenue Pump Station, and construction of a combined Lakeland Place Pump Station.

This option consists of the construction of 735 LF of 8" gravity sewer, 5 manholes, demolition of the existing 11th Avenue PS; and converting the existing pump station into a sanitary manhole. This option utilizes the alley between E. 10th Ave. and E. 11th Ave. and ties into the proposed manhole at the location of the existing Forrest Ave. Pump Station.

This option also consists of the construction of 685 LF of gravity sewer, 3 manholes, demolition of the existing Forrest Avenue PS, and 830 LF of force main. This option also includes the construction of the Lakeland Place Pump Station at the low point of the developer's property in the proposed dog park. This alignment utilizes the property lines and will require 125 LF of easement from a homeowner and 242 LF of easement from the GLP capital tract property. This leaves the GLP capital tract property open for future development (**Appendix K**).

See **Section 4.8.1** for the cost breakdown for the $1,076,600 project component.

7.9 PROJECT SCHEDULE

The proposed project schedule is based on the project being submitted to IJDC in September 2021.

Preparation of plans, specifications and contract documents for the project will take approximately six (6) months and advertising for bids and award of contract will take four (4) months. Construction is estimated to take at least eighteen (18) months to complete. Based on the availability of project funding and the noted timelines, the project could potentially be completed and fully operational by the beginning of year 2024.

7.10 PERMIT REQUIREMENTS

The following is a list of the permits anticipated to complete the various phases for the Charles Town Utility Board:

- Health Department
- NPDES Modification Permit
- Clearance letter from Culture & History
- Department of Highways Permit (for any work within their jurisdiction)
- DEP E&S Control

7.11 TOTAL PROJECT COST ESTIMATE (ENGINEER'S OPINION)

In this section, the total estimated cost for the various components of this 2021 Collection System Project for the Charles Town Utility Board will be discussed.

The work recommended for the CTUB has compiled into a single sewer collection project. Individual cost estimates including construction and soft costs have been prepared. Each phase is detailed in **Section 4.** The estimated total project cost including soft costs is $5,602,600.00.

TABLE 7-1

No.	Description	Quantity	Unit	Unit Price	Total Price
	CTUB 2021 COLLECTION SYSTEM PROJECT				
1	Burr East Pump Station	1	LS	$ 580,600	$ 580,600
2	Jett's Farm Pump Station and Force Main	1	LS	$ 830,040	$ 830,040
3	Moose Lodge Pump Station and Force Main	1	LS	$ 205,100	$ 205,100
4	Flowing Springs Pump Station	1	LS	$ 687,000	$ 687,000
5	Evitt's Run Interceptor	1	LS	$ 824,600	$ 824,600
6	Jefferson Memorial Park Force Main	1	LS	$ 170,800	$ 170,800
8	Forrest Ave. Pump Station Relocation	1	LS	$ 746,300	$ 746,300
			Construction Subtotal		**$ 4,044,500**
	Construction Contingency	20%		$	774,560
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**4,646,460**
	Soft Costs			**$**	**929,140**
	Easements and Acquisition			**$**	**12,850**
				Total Project Cost	**$ 5,602,600**

7.12 ANNUAL OPERATING BUDGET

The report defines one project needed for the CTUB's sewer collection system. In the following paragraphs, the expected revenue generated and O&M costs will be discussed for the project.

7.12.1 INCOME

This project involves repairing/improving the existing wastewater system's efficiency and performance. Currently, the CTUB generates revenue through monthly sewer billings that go towards debt collection, O&M costs, and cost to treat the wastewater. The CTUB currently charges their customers in the territory formerly served by the Charles Town Utility Board or the City of Ranson $44.48/3,400 gallons a month for wastewater treatment and currently charges their customers in the territory formerly served by the Jefferson County Public Service District $50.72/3,400 gallons a month for wastewater treatment. Although grant money will be pursued,

the CTUB understands that additional revenue will need to be generated to cover the debt service on loan money to pay for the project. Overall, this project will improve the quality of the wastewater service that the CTUB provides.

7.12.2 ANNUAL O&M COSTS

The proposed projects will maintain or reduce the operation and maintenance cost of the system. The improvements to the pump stations and collection system will improve the facilities so that future deficiencies do not occur. A review of the wastewater system's financial status for the past year is shown in the following table.

The CTUB will repay their debts through annual revenue from wastewater service that the CTUB performs. Annual O&M costs for the CTUB are shown in the CTUB's 2020 Annual Report (**Appendix F**). As of the 2020 Annual Report, the CTUB's total operating expenses are $3,343,575 and the CTUB's total wastewater operating revenues are $6,133,529.

7.12.3 RESERVES

The CTUB currently uses funds from sewer bill collection to maintain their existing wastewater system. It is suggested that the CTUB continue using the monies collected from sewer service to make payments for debt service and O&M costs.

7.13 FUNDING

To be completed after CTUB project review and concurrence on recommended project.

7.14 SUMMARY

The proposed project is to include improvements to the sewer collection system to improve both efficiency and performance. The revenue generated from sewer service will go to debt collection and O&M costs.

This project will help the CTUB improve its sewer collection system to provide safer and more reliable sewer service to its customers.

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

SECTION 8
APPENDIX

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX A
JCPSD 2014 PER

PRELIMINARY ENGINEERING REPORT

FOR

JEFFERSON COUNTY PSD

FOR THE

WASTEWATER IMPROVEMENT PROJECT

WVIJDC # 2014S - 1538

NOVEMBER, 2014

THE THRASHER GROUP PROJECT #505-020-1212



PRELIMINARY ENGINEERING REPORT
FOR THE
JEFFERSON COUNTY PUBLIC SERVICE DISTRICT
JEFFERSON COUNTY, WEST VIRGINIA
FOR THE
WASTEWATER IMPROVEMENT PROJECT

- INDEX -

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PRELIMINARY ENGINEERING REPORT
FOR THE
JEFFERSON COUNTY PUBLIC SERVICE DISTRICT
JEFFERSON COUNTY, WEST VIRGINIA
FOR THE
WASTEWATER IMPROVEMENT PROJECT

I. INTRODUCTION

The Jefferson County Public Service District owns and operates a sewage collection system in Jefferson County, West Virginia. The District was formed in 1983 and is the implementing authority for this study. The District's service area population has grown rapidly since its' collection system was first built due to many new developments and the Jefferson County Industrial Park being served by the District's collection system.

The District's collection system consists of three legs. A map is included following this section showing the layout of the existing sewer system.

1. The Northern Route 9 collection system that conveys the flows from the Job Corps and Burr/Bardane Industrial Park area along Route 115 through Ranson and to the Charles Town Wastewater Treatment Plant .

2. The Flowing Springs Basin collection system which collects sewage from Walnut Grove area, Briar Run Subdivision, Breckenridge Subdivision and Beallair Subdivision, and is currently conveyed from the Breckenridge Pump Station to the Ranson Flowing Springs Pump Station.

3. The Southern Route 9 Collection system which conveys the flows from the southern side of Route 340 with flows coming from the Catholic Church, Norborne Glebe, Greenfield Subdivision and others along Route 9 back to Route 340.

The Town of Ranson contacted the District to discuss concerns regarding heavy flows in its Old Town Ranson sewer lines. Due to issues with sewer lines capacity issues in Ranson, the Town has requested that the District develop a solution to remove the flows from the Old Town Ranson section of the sewer system. Additionally, there are areas of the existing sewer system that are at capacity with pump stations that are in poor condition.

The District began developing a project to construct a wastewater treatment plant along Flowing Springs, however the project did not come to fruition. Therefore, the District is developing a project to make other improvements to its system to address concerns.

The District conducted a preliminary evaluation of its sewer system and is proposing a project to divert existing sewer flows from the Northern Route 9 collection system to the Flowing Springs Basin collection system. The project will includes constructing a new interceptor sewer line from the Northern Route 9 system to the Flowing Springs system, constructing a new pump station

below the Breckenridge East Subdivision and upgrading the Ranson Flowing Springs Pump Station.

Since this project will route flows through the Ranson Flowing Springs pump station, the septicity issues at the CTWWTP will be less than they are today. Septicity is caused by sewage sitting in forcemains for extended periods of time. The sewage flowing through gravity sewers gains oxygen from splashing as it goes through bends and manholes. The elimination of forcemains by this project should help eliminate some of the septicity issues at the CTWWTP.

This project will alleviate issues Ranson has in its Old Town Ranson collection lines by removing the District's Northern Route 9 flows. Since the District was able to work with Ranson to resolve the sewage flow issues in the Old Town Ranson collection system, Ranson is providing the District with access to its 12 - inch Flowing Springs pump station force main. The project with the District and Ranson and Charles Town will meet the current demands in the District system and those of Ranson in Old Town Ranson. The District will utilize its existing 8 - inch forcemain from the Breckenridge pump station to the Ranson Flowing Springs pump station. Also, the District and Ranson will use the 12 - inch force main from the Ranson Flowing Springs pump station to the Evitts Run gravity interceptor going into the Charles Town System above the Charles Town scavenger pump station. Ths will provide Charles Town maximum flexibility with these flows from the District and Ranson.

Sizing of the gravity collection system is provided in Appendix 4

Total and Remaining Lots Per Platted Subdivision and the Utility Responsible to Provide Sewer Service

KEARNEYSVILLE PIKE
LEETOWN RD
CHARLES TOWN RD
ROUTE 9
FLOWING SPRINGS RD
N MILDRED ST
SHEPHERDSTOWN PIKE
WILLIAM L WILSON FWY
S FAIRFAX BLVD
S GEORGE ST
W WASHINGTON ST
MIDDLEWAY PIKE
SUMMIT POINT RD
BERRYVILLE PIKE
KABLETOWN RD

TACKLEY MILL
Total Lots : 1370
Remaining Lots : 1370

BLACKFORD VILLAGE
Total Lots : 468
Remaining Lots : 468

Burr Office Park - 5-1
Burr Industrial Park - 5-2
Bardane Park - 5-3

HARVEST HILLS
Total Lots : 419
Remaining Lots : 413

Jefferson High School - 3-9
Job Corps - 3-8
Driswood - 3-14

DANIELS FOREST
Total Lots : 192
Remaining Lots : 192

STONECREST
Total Lots : 225
Remaining Lots : 224

ASPEN GREENS
Total Lots : 203
Remaining Lots : 203

BUTLER FARM
Total Lots : 217
Remaining Lots : 217

BRECKENRIDGE EAST
Total Lots : 694
Remaining Lots : 694

Old Country Club Road - 3-12
Briar Run North - 3-11
BRIAR RUN ESTATES
Total Lots : 406
Remaining Lots : 92
Briar Run South - 3-10
PRESIDENTS POINTE
Total Lots : 643
Remaining Lots : 643

BEALLAIR WEST
Total Lots : 132
Remaining Lots : 132
BEALLAIR
Total Lots : 304
Remaining Lots : 199
Beallair - 3-13
Breckenridge - 3-7
Cambridge
CAMBRIDGE
Total Lots : 113
Remaining Lots : 39

SHERIDAN
Total Lots : 178
Remaining Lots : 122
Sheridan

Jetts Farm - 1-10
Woodlawn MHP - 1-11
Lloyds Flats - 1-12

Moose Lodge - 1-12A
AMERICAN HERITAGE EAST
Total Lots : 504
Remaining Lots : 504
LAKELAND PLACE AT FAIRFAX CROSSING
Total Lots : 510
Remaining Lots : 239
Flowing Springs
LEXINGTON PARK
Total Lots : 1609
Remaining Lots : 1609
Wilts MHP - 2-306
Orchard Hills - 2-13
Forrest Street
E Eleventh Ave
Cranes Lane - 2-14
Ashley Brin
4th Avenue
Sheetz
Martins
Cone Zone
Race Track - 3-6
SHENANDOAH SPRINGS
Total Lots : 355
Remaining Lots : 218
Patrick Henry Estates
Walmart Shopping Center
WINDMILL CROSSING
Total Lots : 147
Remaining Lots : 13

SPRING HILLS
Total Lots : 470
Remaining Lots : 470

Wendys - 4-2
Euclid Avenue - 4-3

LOCUST HILL
Total Lots : 580
Remaining Lots : 14

JEFFERSON HEIGHTS
Total Lots : 237
Remaining Lots : 235
THE VILLAGE AT SAMUEL STATION
Total Lots : 27
Remaining Lots : 25
Belvedere North - 4-4
County Green - 4-7
Samuel Street
Belvedere South
Greenfield North - 4-6
Greenfield South - 4-5

NORBORNE GLEBE
Total Lots : 1000
Remaining Lots : 894
Saint James
KINGS CROSSING
Total Lots : 279
Remaining Lots : 279
Norborne Glebe

HUNTFIELD
Total Lots : 543
Remaining Lots : 163
Huntfield
SPRUCE HILL NORTH
Total Lots : 119
Remaining Lots : 32
Spruce Hill West - SHN-2

THORN HILL
Total Lots : 179
Remaining Lots : 179

0 1,000 2,000 3,000 4,000
Feet

Treatment_Plant
JCPSD PS
Ranson PS
Charles Town PS
Private PS
JCPSD Sewer Main
Ranson Sewer Main
Charles Town Sewer Main
Private Main
JCPSD Utility
Ranson Utility
Charles Town Utility
JUI Utility
Shenandoah River

September 4, 2013 - Subdivision_Utility.pc

II. CURRENT SITUATION

A. SOURCES/DISCHARGE

The 2000 and 2010 Census did not collect data related to sewage disposal practices. The most current data available for sewer disposal practices is from the 1990 Census which reports the following housing unit figures for sewage disposal in Jefferson County:

Table 1

TYPE OF DISPOSAL	HOUSING UNITS	PERCENTAGE
Public Sewer	5,906	40.4%
Septic Tank or Cesspool	8,486	58.1%
Other Means	214	1.5%
TOTAL	**14,606**	**100.0%**

The following details the receiving streams within the study area and surrounding the service area of the Jefferson County PSD:

Evitts Run (Charles Town WWTP, Tuscawilla WWTP)

Flowing Springs Run (Race Track WWTP) and the Shenandoah River (Old Standard) all receive effluent from wastewater treatment plants.

B. CUSTOMERS

From the 2014 Annual Report to the PSC of WV, the District had the following number of customers:

Residential	2,048
Commercial	152
Public Authority	10
Industrial	7

Total EDU's based on 4,500 gal/EDU/Month

153,422,000 (gallons/Year) / 12 (Months/Year) / 4,500 (gal/EDU/Month) = 2,841 EDU's

The non residential users converted to equivalent dwelling units are:

Annual average metered residential customer usage:

94,578,000 (gallons/year) / 12 (months / Year) / 2,048 average number of metered residential users = 3,848 gal/EDU/Mo.

Converting all metered users into Equivalent Users:

Residential		2,048 EDU's
Commercial	2,748,667 gal/mo / 3,848 gal/EDU =	714 EDU's
Public Authority	941,833 gal/mo / 3,848 gal/EDU =	245 EDU's
Industrial	252,750 gal/mo / 3,848 gal/EDU =	66 EDU's
Subtotal		3,073 EDU's
Flat Rate Residential Users		214 EDU's
Total		3,287 EDU's

C. COLLECTION SYSTEM

The Districts collection system consists of three main legs. The first leg is the Northern Route 9 collection system **(NRT9)** that conveys the flows from the Job Corps and Burr/Bardane Industrial Park area along Route 115 through Ranson and to the Charles Town wastewater treatment plant.

The second leg is the Flowing Springs Basin collection system **(FSB)** which collects sewage from Walnut Grove area, Briar Run Subdivision, Breckenridge Subdivision and Beallair Subdivision, and is currently conveyed from the Breckenridge Pump Station to the Ranson Flowing Springs Pump Station. From this station about 15% of the flow is returned to the District's pump station next to Applebee's. From there it flows through a series of pump stations and gravity lines along Jefferson Avenue to the Evitts Run Charles Town WWTP. The remaining flow leaves the Ranson Flowing Springs Pump Station with Ranson flows and then is conveyed to the Evitts Run gravity interceptor. It should be noted that there are financial responsibilities between the JCPSD and the City of Ranson for the use of the Ranson Flowing Springs pump station which have yet to be finalized.

The Third Leg is the Southern Route 9 collection system **(SRT9)** which conveys the flows from the southern side of Route 340 with flows coming from the Catholic Church, Norborne Glebe, Greenfield Subdivision and others along Route 9 back to Route 340. The flows are then conveyed to the Charles Town wastewater treatment plant by pump station 4-5.

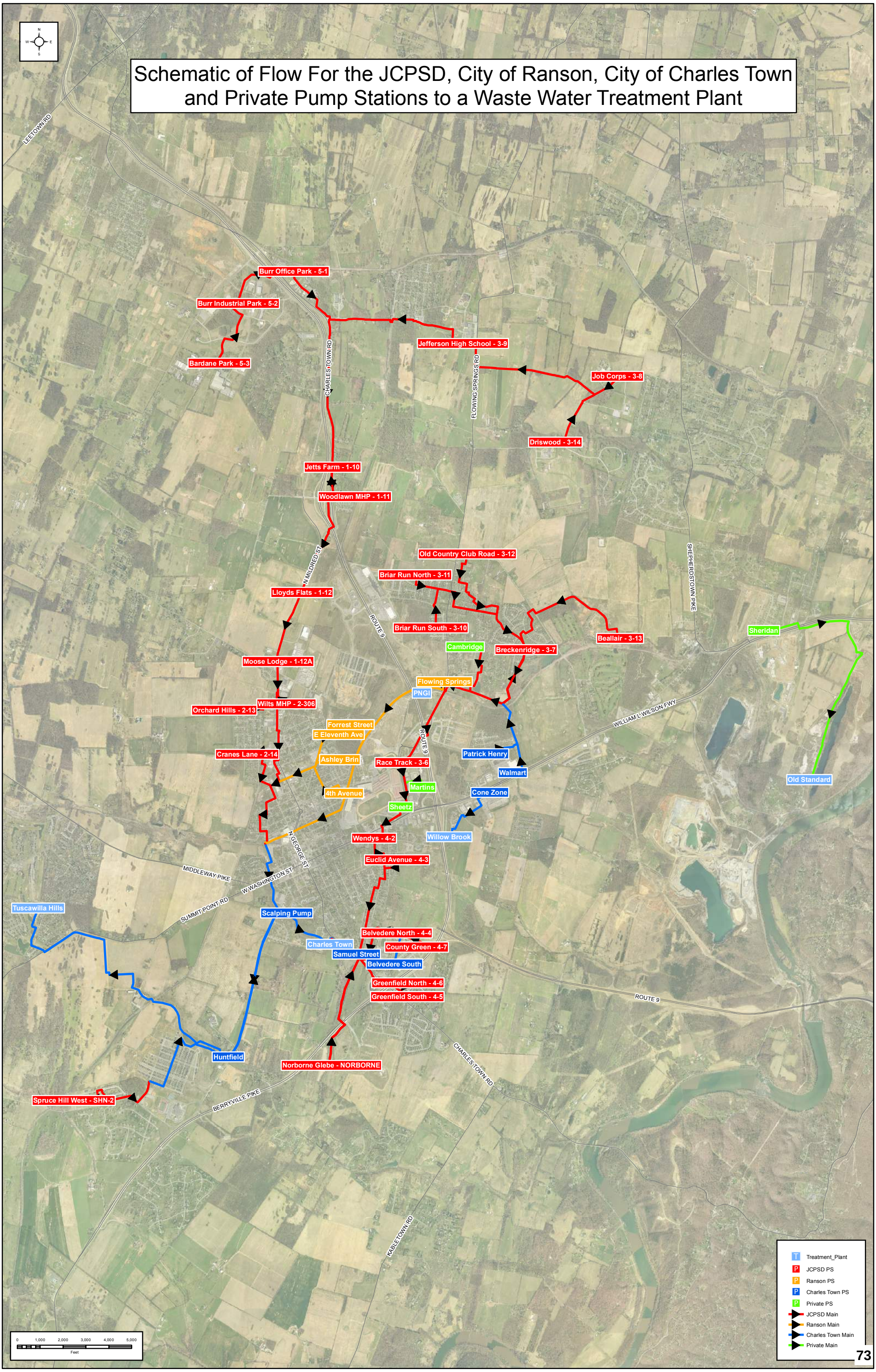
The backbone of the Districts collection system was constructed in the late 1980's. The system has been expanded since its initial construction mainly by developers and their associated alternative mainline extension agreements. A breakdown of the District's existing collection system is included in Table 2 on the following page.

Table 2

Size	Length	Miles	Allowable Infiltration @ 200 gal/inch dia/mile/day
21	2,674	0.51	2,127
18	2,361	0.45	1,610
15	1,400	0.27	795
12	5,353	1.01	2,433
10	10,432	1.98	3,952
8	166,850	31.60	50,561
6	20,211	3.83	4,593
4	24,175	4.58	3,663
Total	233,456	44.22	69,734
29 Pump Stations and Force Mains			
10	7,000	1.33	
8	12,194	2.31	
6	34,948	6.62	
4	19,911	3.77	
2	4,866	0.92	
1.5	1,739	0.33	
Total	80,658	15.28	

Mapping of the Districts existing sewer collection system is presented on the following page. The mapping is from the Districts GIS system and at a scale of 1" = 2,000'. It is presented on the current Jefferson County 911 background images.

Schematic of Flow For the JCPSD, City of Ranson, City of Charles Town and Private Pump Stations to a Waste Water Treatment Plant



D. TREATMENT

The District sends all their sewage to the City of Charles Town Utility Board for treatment and disposal other than what is generated and treated at the Deerfield Subdivision which is treated onsite. The District's sewage is treated at the Evitts Run Charles Town WWTP and at the Tuscawilla WWTP. According to the 2012 (Next update April 2015) Wastewater Strategic Plan & Ten Year Capital Plan for the Charles Town Utility Board, the Evitts Run WWTP is rated at 1.75 MGD and the Tuscawilla WWTP will be rated at 0.5 MGD once its upgrade is completed.

E. NEED FOR PROJECT

- Overflows/Backups at the Breckenridge Pump Station Resulting in Civil Suits
- Request from Ranson to No Longer Use Its Sewer System for the District's Northern Route 9 System, due to Limited Capacity through Ranson Old Town Collection System
    - On June 27th via letter the City of Ranson requested JCPSD immediately develop and execute plans to alleviate the capacity and flow issues caused by the PSD's usage of Ranson's main lines and Flowing Springs pump station
    - On October 3rd via letter the City of Ranson outlined a proposal that would allow the District to continue to use Ranson's Flowing Springs pump station (See appendix 4)
- Aging Pump Stations in Northern Route 9 and Flowing Springs Basin Collection Systems
- Deferred Upgrades to the Northern Route 9 Collection System
- Flowing Springs Collection System at capacity
- Industrial Park Needing Capacity

The flows from the Northern Route 9 collection system flow through the Ranson collection system (Old Town Collection System). The Ranson Old Town collection system is limited in its ability to handle the flows that are generated in the Northern Route 9 service area. The force main from PS 1-12A empties into a 10 inch gravity sewer which flows through increasing diameter gravity lines and eventually through the 18 inch gravity interceptor along Evitts Run. A 10 inch diameter line at minimum slope can convey 510 gallons per minute. Pump station 1-12A delivers a flow of 310 gallons per minute when it is pumping. Two other District pump stations from Orchard Hills deliver flows to this line. They are pump stations 2-13 and 2-14. They deliver 70 and 60 gallons per minute respectfully. That leave only 130 gallons per minute capacity for the other users. If you consider a peak factor the 130 gallons per minute, then the remaining capacity is only 32.5 gallons per minute or the capacity for 260 (180 gallon per day) EDU's which is not sufficient capacity for Ranson's users. In addition, the area served by the line is continuing to grow. New developments are planned for the near future and the industrial park needs additional capacity for its recently developed section.

The Flowing Springs drainage basin has been one of the fastest growing areas in Jefferson County. Currently the Breckenridge Pump Station (3-7) is responsible for the flows from 886 District customers and 275 EDU's of flow from Sanitary Associates which are customers of Charles Town. This pump station was constructed as a temporary pump station until a plant could be constructed lower in the basin. With the treatment plant not coming to fruition, this pump station will be a permanent fixture if it is not replaced. This pump station was upgraded in the Fall of 2008. During the upgrade the pumping capacity was increased to 600 gallons per minute. The pump station is now running an average of 7.8 hours per day. Also when the pump station was upgraded, the flows were diverted to the Ranson Flowing Springs pump station for transportation to the Evitts Run gravity interceptor. This was done because the previous conveyance system (Breckenridge PS System) could not handle the volume of flow. The Breckenridge PS system route has limited capacity as its gravity lines are only eight and ten inches in diameter. In addition, Jefferson Crossing has been developed which supplies an additional 37,000 gallons per day to the Breckenridge PS system. Improvements to this section would require not only the upgrade of the gravity system but the upgrade of three pump stations to handle the higher flows.

The District has experienced backups at the Breckenridge pump station which has caused flooding of a basement in the development on more than one occasion. That resulted in a civil law suit being filed and eventually settled by the District. The District agreed to install a check valve on the line to that residence and paid for renovations to repair damage on three occasions. However, the problem still exists. If the District has a failure at the pump station again, the flow can back up to the next lowest residence and flood their basement. The pump station was intended to be a temporary facility and was not designed for its current use. The District needs to move this pump station out of the neighborhood.

The pump stations have required and continue to require intensive maintenance. Hydrogen sulfide is a problem with the collection system due to long force mains and residence time within the forcemains. This has resulted in the deterioration of the wet wells and manholes concrete walls. The District expanded its use of chemical treatment to suppress the hydrogen sulfide issues from their force mains but needs to eliminate as many pump stations and forcemains as it can.

Jefferson County had been issuing 300 to 350 building permits per year for new houses until the economy experienced the recent downfall from which the country is finally recovering. The District is now seeing the housing industry rebound and the demand for sewer service is increasing within their service area. During 2012 the District only saw 25 new residential users. In 2013 there were 88 new residential and 23 commercial users. As of November 30, 2014 there have been 46 new residential and 2 new commercial users with another 74 applications pending from Beallair Subdivision.

F. Existing Permits / Certificates

1. NPDES Permit for operation of a sewage collection system approved. The Districts existing NPDES Permit provides for the construction of the proposed alternative and a wastewater treatment plant at the site of the proposed pump station. It will need modified for the pump station and force main.

2. PSC tariff and rate approvals and certificate of convenience and necessity will need to be obtained.

3. Highway encroachment and crossing permits from the WVDOH have been obtained.

4. Public Lands permits for stream crossings will be required.

5. Army Corps of Engineers Permits for stream crossings (General Permit) has been obtained.

6. Railroad Boring (crossing) Permit has been obtained. It will need to be executed when the project progresses.

7. Erosion and Sediment Control Permit has been obtained. It will need to be modified to show only the collection system and a pump station. It was renewed in September 2014.

III. FUTURE SITUATION

A. Population Projections

Historic trends for Jefferson County have documented a growth rate of 1.67 percent increase per year based on the 1990, 2000 and 2010 censuses. A population projection for the year 2033 predicts 76,683 as shown in the calculations below.

Arithmetic Projection:

Where ka is determined for two time intervals, 1990-2000 and 2000-2010:

ka1 = (42,190 - 35,926) / 10 = 626 (1.74 percent increase per year)

ka2 = (53,501 - 42,190) / 10 = 1,131 (2.11 percent increase per year)

Average ka = (626 + 1,131) / 2 = 879

Determine the 2033 population by arithmetic projection:

P = P2010 + ka(2033-2010)

P = 53,501 + (879 x 23) = 73,715 people

Geometric Projection:

Determine the geometric-growth constant for 1990-2010:

kg = (ln 53,501 - ln 35,926) / 20 = 0.0199

Determine the 2033 population by geometric projection:

ln P = ln 53,501 + kg(23)
= 10.8875 + 0.0199(23)
P = 84,559 people

Average:

Since two methods of population projection are used, the average of the two will govern for this report:

Average = (73,715 + 84,559) / 2 = 79,137 people in the year 2033.

The 2004 "Jefferson County Comprehensive Plan," by the county's Planning Commission, included various population predictions for the year 2020. The three methods predict 54,979 (Series M), 53,755 (Series A) and 62,692 (Planning Commission staff) with an average of 57,142 people which is higher than the projection of the 1994 Comprehensive Plan of 54,247 people. Utilizing the same projection method as shown on the previous page, a projection of 63,786 people for the year 2020 is predicted. This value exceeds the projections in the County's 2004 Comprehensive Plan but includes the data from the 2010 Census.

Table 3

Jefferson County Population Growth Over Time		
Year	Population	Annual Growth
1960	18,665	NA
1970	21,280	1.40%
1980	30,302	4.24%
1990	35,926	1.86%
2000	42,190	1.74%
2010	53,501	2.68%
Average Growth		2.38%

West Virginia University, College of Business and Economics Dr. Christiadi, PhD published a projection of West Virginia Counties Growth in 2009. The following are the projections for Jefferson County:

Year	Projected Population
2010	53,806
2015	60,133
2020	66,797
2025	73,889
2030	81,293
2035	88,967

The following tables document the growth of the Districts system since it was created.

Table 4

Users of the Jefferson County PSD System											
Year	1993	2003	2005	2007	2008	2009	2010	2011	2012	2013	2014
Domestic	810	1,603	1,827	1,834	1,930	2,082	2,082	2,127	2,138	2,178	2,262
Commercial	0			148	142	136	125	132	135	141	152
Industrial	0			8	8	8	7	7	7	7	7
Public Authority	0			9	9	9	9	10	10	10	10

Data from the Annual Reports to the PSC of WV

Table 5

Equivalent Dwelling Units Users of the Jefferson County PSD System											
Year	1993	2003	2005	2007	2008	2009	2010	2011	2012	2013	2014
Domestic	810	1,603	1,827	1,834	1,930	2,083	2,082	2,127	2,138	2,178	2,262
Commercial				653	597	583	567	495	494	675	714
Industrial				110	79	41	39	71	71	91	66
Public Authority				131	263	173	174	198	198	223	245
Total	810	1,603	1,827	2,728	2,869	2,880	2,862	2,891	2,901	3,167	3,287

Data from annual report converted into EDU's based on domestic use

B. Flow Projections

Water usage records (1-2014 through 10-2014) for the Northern Route 9 system indicate that pump station 1-10 should pump an average of 47,113 gallons per day. This is one of the pump stations serving the industrial park. Pump Station 1-10 ran an average of 5.2 hours per day between July 1, 2013 and July 30, 2014.

Water usage records (1-2014 through 10-2014) for the Flowing Springs system indicate that pump station 3-7 (Breckenridge PS) should pump an average of 155,206 gallons per day. Pump Station 3-7 ran an average of 7.8 hours per day between July 1, 2013 and July 30, 2014.

The flow metering records of the Ranson Flowing Springs pump station show that PS 3-7 delivered an average of 181,935 gallons per day from January through April of 2014. That indicates that the collection system is fairly tight with only a 15% gain in volume during wet weather flows when compared to the water usage report average.

Water usage records from January 2014 through October 2014 indicate the average residential user uses 137 gallons per day.

Currently the District has requests for 993 new EDU's worth of service in the Flowing Springs basin. At 180 gallons per EDU that equals 178,740 gallons per day of additional flows.

They have requests for 262 EDU's including the 200 EDU's requested by the industrial park for the Northern Route 9 service area. At 180 gallons per EDU that equals 47,160 gallons per day of additional flows.

Source	**GPD**
Existing Rt. 9 Flows	47,133
Future Rt. 9 Flows	47.160
Ex. Breckenridge PS Flows*	181,935
Future Breckenridge PS Flows	178,740
Total	454,968

Use 350,000 GPD ADF Pump Station for this phase

Replace 8" force main with 12" force main in future to increase capacity of PS.

* Includes Charles Towns Sanitary Associates Flows

C. Waste-Load Allocations

Not applicable as no treatment plant is proposed.

D. Permits / Certificates Required

1. NPDES Permit for operation of a sewage collection system approved. The Districts existing NPDES Permit provides for the construction of the proposed alternative and a wastewater treatment plant at the site of the proposed pump station. It will need modified for the pump station and force main.

2. PSC tariff and rate approvals and certificate of convenience and necessity will need to be obtained.

3. Highway encroachment and crossing permits from the WVDOH have been obtained.

4. Public Lands permits for stream crossings will be required.

5. Army Corps of Engineers Permits for stream crossings (General Permit) has been obtained.

6. Railroad Boring (crossing) Permit has been obtained. It will need to be executed when the project progresses.

7. Erosion and Sediment Control Permit was been obtained. It will need to be modified to show only the collection system and a pump station. It was renewed in September 2014.

IV. ALTERNATIVES

Three (3) alternatives were considered by this study. They are:

Alternative 1 (Selected Alternative)

Construct a 15 inch diameter interceptor for the Northern Route 9 system and a 24 inch diameter interceptor for the Flowing Springs Basin; construct a 0.35 MGD average daily flow pump station at the Breckenridge East Subdivision with a new 12 inch force main from the Breckenridge East pump station to tie into the existing 8 inch force main (at Breckenridge PS) which terminates at the Ranson Flowing Springs pump station. ($6,990,000)

Alternative 2

Construct a 30 inch diameter interceptor for the Northern Route 9 system and a 36 inch diameter interceptor for the Flowing Springs Basin; construct a 1.0 MGD daily average flow pump station at the Breckenridge East Subdivision with duel force mains to terminate at the Charles Town WWTP on Evitts Run. ($13,527,800)

Alternative 3

Do Nothing. While it is technically an option, the problems the District is experiencing with its collection system will continue to grow and eventually result in a moratorium on development within the Districts service area. That would not be responsible stewardship.

Discussion of the Selection Process:

The District has explored its options over the last three years and has evaluated at least 9 specific alternatives which are presented as an appendix to this report (See Appendix 1). As the District investigated alternatives and interacted with the other service providers (Charles Town and Ranson) it became apparent how expensive the necessary improvements would be. The District looked for a way reduce the cost or to share the cost with other service providers. It became evident that both Ranson and the District needed the upgrades for the Northern Route 9 service area.

Investigations also show that both the District and Ranson had a common issue with the limited capacity along in the Old Town collection system and that cooperation would be mutually beneficial. Ranson needed the capacity in the Old Town gravity line for developments within their annexation area and the District needed a way to get its flows

to the Charles Town WWTP. The District and Ranson have worked together in the past and continue to work with each other in finding a solution for their mutual issues.

Both the District and Ranson need additional transmission capacity from the Northern Route 9 service area. During their discussions, both parties decided that the best solution would be a sharing of facilities. Ranson has a pump station that currently transports the Districts sewage to the Evitts run gravity interceptor. The District is considering construction of a gravity interceptor and a pump station to convey sewage from the Northern Route 9 area to the Charles Town WWTP. Continuing to use the Ranson Flowing Springs pump station would eliminate duplication of expensive transmission facilities for the District. Taking advantage of the District proposed gravity interceptor would eliminate duplication of expensive collection facilities for Ranson.

Ranson and the District decided to revamp their agreement for the use of the Ranson Flowing Springs pump station. Ranson has agreed to reducing the Capital Improvement Fee (CIF) the District customers would have to pay to use the Ranson Flowing Springs pump station. That fee would only apply to new users of the system and will exclude the existing customers from both the existing Route 9 and Flowing Springs collection systems. New flows from those systems will be required to pay a CIF for using the Ranson Flowing Springs pump station. Currently there is a $4,375.00 per EDU CIF which came from an agreement between the District and Ranson dated February 4, 2008. A reduced amount is currently being negotiated. In return, the District agreed to allow Ranson customers to use the collection system proposed in this PER.

To use the Ranson Flowing Springs pump station, the District will need to upgrade the pumps inside of the pump station. The upgrade costs are shown in the selected project financial analysis.

Evaluation of Collection System Technology:

Evaluation of the various types of collection systems will be limited to gravity, pressure grinder and vacuum. The other types of systems have been eliminated for one or more of the following reasons:

1. The potential number of pumping units required.
2. Size of existing lots.
3. The growth potential of commercial, industrial and residential developments.
4. The number and cost of rights-of-ways on individual real properties.

Gravity Collection Systems:

The County is currently served by several gravity type sewer systems with conventional procedures. There are some grinder pump installations for specific applications where gravity is simply not possible but the vast majority of the systems are gravity with pump stations where needed.

Gravity systems are well suited to areas with patterns of natural drainage. The technology is widely accepted and has been in use for over 2000 years. Since the County already has existing gravity systems, duplication of this method of collection receives primary consideration. Gravity systems have long been the preference for just about any entity with public sewer service. The simple operational procedures and maintenance are more desirable for utility work forces as well as administrative personnel.

More complex and technical systems are always a consideration due to the potential in capital cost savings, but under normal conditions conventional gravity type sewers are preferred.

Vacuum Collection Systems:

As of 1989, the largest alternative wastewater system in the United States was a vacuum sewer system. It is located in Queen Anne's County, Maryland and has 3,500 connections (1300 valve pits). The next largest vacuum system in this country was in New York with 1,800 connections (868 valves). The most cost effective application for a vacuum sewer system is a high density flat area.

One of the major advantages of vacuum systems over most other sewer systems is the elimination of exfiltration and continued oxygenation of sewage. Another advantage is that the lines are usually small (3" to 8") and shallow (3' of ground cover). Also, there are no manholes on the vacuum lines.

Vacuum systems do require additional maintenance. There can be no more than four houses on each valve pit package. Interface valves require rebuilding about every ten years and controllers every five years. This must be done in-shop. The central vacuum collection stations require daily maintenance. Vacuum pumps need overhauling about every seven and a half years and replacement every fifteen years. Sewage pumps need seal changes about every four years and pump replacement every ten years. A 1989 survey found the mean time between service calls to be 6.9 years per valve.

Another disadvantage of vacuum systems is that leaks in lines or valves malfunctions disable the entire system (for that central collection station) until they are

located and isolated. To reduce this down time and make leak location quicker, many division valves must be installed. Also, during down time all customers on the branch system are without sewer service. There is usually one valve per branch and one every 1500 feet in the vacuum mains. If a low vacuum problem is not corrected within a designated period of time, then other parts of the system may be effected.

If peak flow exceeds 125 GPM, the collection station must be a two-story building approximately 20 feet by 24 feet. The first floor must be below ground level. For stations below 125 GPM, the station can be prepackaged at the factory and the floor plan would be about 16 feet by 22 feet.

Perhaps the biggest limitations of vacuum systems are the head capability and future expansion limitations. Line losses must be less than 13 feet, including static lift losses and friction loss. This limits the use of vacuum systems to areas that are quite topographically flat. This is a problem in Jefferson County since even the flattest areas have many rises and drops in the terrain. Also, even under ideal conditions, valve pits can be no further than three miles from the collection station.

Consideration was given to the use of a vacuum system in the project area because of the potential savings on the initial capital cost of construction. However, after investigation of the topography of the area and the additional operation and maintenance resources required, this alternative is not recommended. The project area does have portions of gentle rolling real estate but these areas are divided by small streams therefore increasing the number of vacuum pumping stations required. The increase in equipment costs therefore cancels out the savings realized by the more shallow trench excavation. The AirVac vacuum sewer systems catalog states that "where the natural terrain is applicable to a gravity system - the vacuum system is rarely cost effective." Also, the areas which have topography best suited to vacuum systems are also the areas most likely to grow in the future.

The hydraulic design of the system requires specific velocities in force mains to accomplish continual scouring of the lines so that solids do not build up. Therefore, consideration of population growth is limited. Based on past records, the project area involved is anticipated to grow very rapidly. Consequently, present force main designs could be inadequate within a short period of time. Over sizing force mains to allow for growth could cause operational problems for the District and potentially violate equipment warranties.

Pressure Grinder Collection Systems:

Pressure grinder systems have become more popular in recent times primarily due to small diameter and shallow pipeline requirements. These systems are well suited to varying topographic terrain which does not share common local drainage patterns. The use of grinder systems has been investigated for Jefferson County. Even though

implementation of this system is an option, it is not a desirable alternative. Almost all of the areas to be served under this project share common surface runoff routes which drain by gravity to the Shenandoah River.

The use of a complete grinder pump system is limited in much the same way as the vacuum system previously discussed. The capital cost savings diminishes with respect to gravity lines when topographic restraints and increased operation and maintenance costs are considered. Also, system failures can result with interrupted service to vast numbers of residents. Another consideration is the aesthetic impact on homeowners' properties. Grinder pumps are easily visible which is usually not desired by the public.

The primary problem associated with the installation of grinder pump systems is designing proper line sizes and capacities for the present while taking into account future growth. Force main line sizes must be sized to maintain a two feet per second velocity yet in areas of expected population growth must be large enough to accept additional customers. Also tap fees for new customers allowed by the PSC do not come close to covering the cost of installation of a new grinder station for new customers when needed. As previously mentioned, Jefferson County is expected to grow rapidly in population.

Each grinder pump must be supplied with electrical power. This is usually accomplished by having each homeowner supply a connection and pay the power bill which is generally not favored by customers. This can be further complicated if one grinder is serving multiple houses but only one is supplying the power. Agreements for this type of service must be approved by the PSC. The PSC has not looked favorably on this situation in the past. Extended power outages are of great concern since it is not very practical to take a portable generator from house to house to pump out grinder basins.

Frequently, service personnel will not be aware of problems until contacted by homeowners since the alarms are usually at the pump. Since a high water alarm would not sound until the basin was at a high level, the resident will be without service until service personnel arrive and correct the problem.

With a pressure grinder system, leaks are usually not detected until sewage appears at ground level. Leaks in isolated areas may go undetected for long periods of time. In the case of major breaks, a large part of the collection system will go out of service.

A positive point is that there is little infiltration. This leads to smaller volumes to be treated which are also more consistent in strength. Peaks in flows are also reduced.

The frostline is of great concern since locating frozen sections can be difficult. Long discharge lines can produce septic sewage which increases treatment problems. Grinder pumps require overhauling about every ten years at a cost of about $400 to $800 each.

The following table evaluates the non-monetary factors of collection systems with a score of "1" being best.

Table 6

COLLECTION SYSTEM ALTERNATIVES			
FACTOR	**GRAVITY RANKING**	**VACUUM RANKING**	**GRINDER RANKING**
Air Quality	3	1	2
Noise	1	2	3
Aesthetics	1	3	2
Land Use	1	3	2
Energy	1	2	3
Reliability	1	3	2
Flexibility	1	2	2
Routine Maintenance	1	3	2
Expandability	1	2	2
Trouble-shooting Complexity	1	3	2
Compatibility with Surrounding Systems	1	3	2
Equipment Complexity	1	3	2
TOTALS	**14**	**30**	**26**
OVERALL RANK	**1**	**3**	**2**

The District considered three (3) major alternatives when evaluating their needs. The following details those alternatives considered and their associated costs:

Alternative 1

Construct a 15 inch diameter interceptor for the Northern Route 9 system and a 24 inch diameter interceptor for the Flowing Springs Basin; construct a 0.35 MGD average daily flow pump station at the Breckenridge East Subdivision with a 12 inch force main from the pump station to the 8 inch force main (at Breckenridge PS) which terminates at the Ranson Flowing Springs pump station.

Table 7

15 inch Gravity Line from 1-10 to Breckenridge PS then 24 inch to East Breckenridge PS Site and FM to Ranson Flowing Springs Pump Station

Item	Units	Qty.	Unit Price	Total
ROUTE 9 INTERCEPTOR:				
Gravity Line (15" SDR-35 PVC)	10,514	LF	$120	$1,261,680
4' Manholes	75	EA	$2,500	$187,500
Stream Crossing (15" Line) Using DIP and stone	200	LF	$250	$50,000
Road Bore (15" Line)	240	LF	$300	$72,000
Railroad Bore (15" Line)	75	LF	$600	$45,000
Railroad Bore Permits and Fees	1	EA	$29,100	$29,100
Gravity Lines (8" SDR-35 PVC)	754	LF	$40	$30,160
Gravity Lines (10" SDR-35 PVC)	213	LF	$55	$11,715
4' Manholes	4	EA	$2,500	$10,000
Decommission Pump Station	4	EA	$7,000	$28,000
Sub Total				$1,725,155
Please Note that 4,568 LF of 15" was installed by Aspen Green to serve their development and is used by this project				
FLOWING SPRINGS INTERCEPTOR:				
36" SDR-35-PVC	LF	5,893	$145	$854,485
STREAM CROSSINGS (36" LINE) USING DIP AND STONE	LF	142	$550	$78,100
6' DIA. MANHOLE	EA	27	$3,000	$81,000
Road Bore (36" Line)	LF	100	$550	$55,000
Decommission Breckenridge PS and replace with manhole	LS	1	$7,000	$7,000
Sub Total				$1,075,585

EXISTING 8" FORCE MAIN:				
Air Relief Valves	2	EA	$2,000	$4,000
Cleanouts (every 1,000 feet)	6	EA	$5,000	$30,000
Sub Total				$34,000
PUMP STATION AND FORCE MAIN TO RANSON FLOWING SPRINGS PS:				
Flowing Springs Pump Station (0.35 MGD DAF, 1.0 MGD Peak)	1	LS	$698,125	$698,125
12" Force Main (Bench in Gravity Ditch)	5,893	LF	$75	$441,975
12" Plug Valves (Cutoff Valves)	2	EA	$4,000	$8,000
Air Relief Valves	3	EA	$3,500	$10,500
Stream Crossing (12") Using DIP and Stone	142	LF	$250	$35,500
Cleanouts (every 1,000 feet)	6	EA	$5,000	$30,000
Force Main Road Bore	300	LF	$550	$165,000
Connect to 8" Force Main	1	LS	$10,000	$10,000
Pavement Overlay	5,000	SY	$20	$100,000
Access Road To Pump Station	2,288	LF	$50	$114,400
Sub Total				$1,613,500
UPGRADE EXISTING PS SYSTEM:				
Upgrade PS 3-6 (Pumps, Slide Rails, Control Panel)	1	LS	$100,000	$100,000
Upgrade PS 4-2 (Pumps, Slide Rails, Control Panel)	1	LS	$100,000	$100,000
Sub Total				$200,000
UPGRADE EXISTING RANSON FS PS:				
Upgrade Ranson FS PS (Pumps, Slide Rails and Control Panel)	1	LS	$375,000	$375,000
Sub Total				$375,000

PROPERTY AND RIGHT OF WAYS:				
Alternative Gravity Line	10,514	LF	$5	$52,570
Flowing Springs Interceptor	6,145	LF	$5	$30,725
Pump Station Site	1	AC	$23,000	$23,000
Sub Total				$106,295
Total Construction Costs:				
Pump Station and Force Main to Ranson Flowing Springs Pump Station				$1,613,500
Alternative Gravity Line				$1,725,155
Flowing Springs Interceptor				$1,075,585
Upgrade Existing PS 3-6 and 4-2				$200,000
Upgrade Ranson Flowing Springs PS				$375,000
Upgrade Existing 8" Force Main				$34,000
Sub Total				$5,023,240
Contingencies @ 10% ±				$501,760
Total Construction Cost				$5,525,000
Soft Costs:				
Legal:				
Local Counsel				$5,000
PSC Counsel				$45,000
Bond Counsel				$60,000
Accounting Services				$24,500
Administrative - Region 9				$55,000
Engineering:				
Study and Report Phase (Preliminary Engineering Reports, Funding Application)				$37,500
Engineering Design Fee:				

Preliminary Design				$125,000
Final Design				$125,000
Bidding and Negotiating				$30,000
Engineering Construction Services:				
Project Representation				$175,000
Engineering During Construction				$140,000
Post Construction				$35,000
Engineering Design Fee Curve Percentage			**4.52%**	
Total Engineering Fee Curve Calculation			**15.47%**	
Special Services as Defined in ASCE Manual:			**3.38%**	
Geotechnical Engineering for Pump Station				$10,000
Land Surveys and Easement Preparation				$10,000
Engineering Surveys and Topo				$10,000
Jefferson County PSD Meetings				$40,000
Communication Plan				$15,000
Asset Management Plan				$40,000
PSC Meetings/Hearings/Negotiations with Other Entities				$25,000
Construction Stakeout				$25,000
Environmental Assessment and Impact Statement				$12,000
Lands and Right of Way Acquisitions				$110,000
Right of Way Council				$70,000
Regulatory Agency/ WVDOH Permit Fees				$35,365
Reimbursables:				
Aspen Green				$43,216
Right of Way				$124,875
Project Contingency				$37,544
Total Project Cost				$6,990,000

Alternative 2

Construct a 30 inch diameter interceptor for the Northern Route 9 system and a 36 inch diameter interceptor for the Flowing Springs Basin; construct a 1.0 MGD daily average flow pump station at the Breckenridge East Subdivision with a duel force mains to terminate at the Charles Town WWTP on Evitts Run

Table 8

Item	Units	Qty.	Unit Price	Total
Alternative Gravity Line:				
Gravity Line (30" SDR-35 PVC)	15,082	LF	$175	$2,639,350
6' Manholes	88	EA	$3,000	$264,000
Stream Crossing (30" Line)	200	LF	$250	$50,000
Road Bore (30" Line)	240	LF	$550	$132,000
Railroad Bore (30" Line)	75	LF	$600	$45,000
Railroad Bore Permits and Fees	1	EA	$29,100	$29,100
Gravity Lines (8" SDR-35 PVC)	754	LF	$40	$30,160
Gravity Lines (10" SDR-35 PVC)	213	LF	$55	$11,715
4' Manholes	4	EA	$2,500	$10,000
Decommission Pump Station	4	EA	$7,000	$28,000
Sub Total				$3,239,325
FLOWING SPRINGS INTERCEPTOR:				
36" SDR-35-PVC	LF	5,893	$120	$707,160
STREAM CROSSINGS (36" LINE) USING DIP AND STONE	LF	142	$550	$78,100
6' DIA. MANHOLE	EA	27	$3,000	$81,000
Road Bore (36" Line)	LF	100	$550	$55,000
Decommission Breckenridge PS and replace with manhole	LS	1	$7,000	$7,000
Sub Total				$928,260

PROPERTY AND RIGHT OF WAYS:				
Alternative Gravity Line	15,597	LF	$5	$77,985
Flowing Springs Interceptor	6,145	LF	$5	$30,725
Force Main to CTWWTP	27,000	LF	$5	$135,000
Pump Station Site	1	AC	$23,000	$23,000
Sub Total				$266,710
Contingencies @ 10%				$26,671
Total				$293,381
PUMP STATION AND FORCE MAIN TO CT:				
Flowing Springs Pump Station (1.0 MGD DAF, 3.0 MGD Peak)	1	LS	$1,435,014	$1,435,014
Force Main (12" & 16")	27,000	LF	$120	$3,240,000
12" Gate Valves (Cutoff Valves)	9	EA	$4,000	$36,000
16" Gate Valves (Cutoff Valves)	9	EA	$10,000	$90,000
Air Relief Valves	20	EA	$3,500	$70,000
Cleanouts (every 1,000 feet)	54	EA	$5,000	$270,000
Force Main Road Bore	700	LF	$550	$385,000
Road Bore New Rt. 9	200	LF	$550	$110,000
Pavement Overlay	20,000	SY	$20	$400,000
Access Road To Pump Station	2,288	LF	$50	$114,400
Sub Total				$6,150,414
Total Construction Costs:				
Pump Station and Force Main to CTWWTP Gravity Collector				$6,150,414
Alternative Gravity Line				$3,239,325

Flowing Springs Interceptor				$928,260
Sub Total				$10,317,999
Contingencies @ 10%				$1,031,800
Total Construction Cost				$11,349,799
Soft Costs:				
Legal				$50,000
Fiscal Services				$30,000
Administrative - Region 9				$165,000
Planning				$20,000
Engineering Design Fee				$654,000
Engineering Construction Services				$511,000
Start Up/Overview/Certification				$50,000
Right of Ways				$200,000
Engineering Special Services ROW				$50,000
Right of Way Council				$100,000
Bond Counsel				$50,000
Interim Financing				$100,000
Sub Total				$1,980,000
Contingencies @ 10%				$198,000
Total Soft Costs				$2,178,000
Total Project Cost				$13,527,800

Alternative 3

Do Nothing.

COST AND PRESENT WORTH ANALYSIS:

Present worth Factor for 4 5/8% over 20 years = 12.87
See Appendix 3 for O&M projections.

Alternative	Annual O&M	PW Factor	Value
Alternative 1			$5,023,240
O&M	$239,457	12.87	$3,081,812
Total			$8,105,052
Alternative 2			$10,317,999
O&M	$314,061	12.87	$4,041,965
Total			$14,359,964

Annual O&M for pump stations only

Alternative 1 is the most economical solution.

V. PLAN SECTION AND PUBLIC PARTICIPATION

The three (3) main alternatives in this PER have been discussed during the District's regular board meetings. Additionally the 9 alternatives presented in the appendix were discussed during a special Board meeting on May 5, 2014 and again during the regular Board meeting later in the day. After a presentation by the Engineer, the public was allowed to comment. The same presentation was made at the regular Board meeting on May 5, 2014 for additional members of the public which did not attend the earlier special board meeting. A motion was then made, seconded, debated and voted on and passed by the District choosing Alternative 8 to be developed for the proposed project. That alternative was submitted to the IJDC and after staff reviewed the document, a meeting was held between staff and the engineer to discuss some concerns the staff had with the application. The application was tabled and while the engineer had further discussions with the District regarding the application during the regular board meetings. The District had additional discussions with Ranson and the selected alternative presented here is a result of those discussions.

VI. ENVIRONMENTAL INFORMATION

An assessment of the environmental impacts of the proposed project is required. Unavoidable adverse impacts of the project, and the measures that will be taken to mitigate or minimize those impacts, shall be addressed in this assessment. The assessment shall identify the 100 year flood elevation, and indicate whether the project will be subject to flooding and whether flood insurance is available for the proposed construction.

Adequate wastewater facilities are part of the essential infrastructure needed for economic growth of a thriving community such as Jefferson County as well as providing necessary health and welfare for its residents. With the proposed improvements, Jefferson County will be able to better serve the community. This will provide for an attractive environment for residential, commercial and industrial advances. However, the primary objective of this study is to provide a safe and healthy environment for the existing residents and wildlife in the study area. Without these improvements, the detrimental effects of pollution caused by homes and businesses on the region will eventually result in an unsafe community.

This study offers methods of serving some of the county residents and the Burr/ Bardane Industrial Park within this wastewater service area. The county has been divided in to study areas based upon natural flow patterns. Whether an area should be served or not is dependent upon both economic and cultural factors. This plan presents the economic factors for residents and officials to weigh against the cultural factors. It also will aid residents, officials and developers in planning for future growth.

The wastewater projects now being developed by the Jefferson County Public Service District shall be designed such that every effort is being made to eliminate potential and adverse environmental effects of wastewater generation, collection and transmission to a treatment facility. Progress of any kind is susceptible to producing some type of negative aspect. The District is committed to keeping unwanted facets to a minimum and making sure the absolute necessary adverse contingencies are far out weighed by the benefits that are gained. The District is also conscious to the importance of pursuing resolutions that meet the needs of Jefferson County without creating irreversible or irretrievable commitments of resources.

Two areas of particular concern are exfiltration and site impact on recreation. These issues are addressed as follows:

Exfiltration and infiltration:

Utilizing modern construction techniques including a rigid quality assurance/quality control program during construction should eliminate the concern of infiltration and

exfiltration problems. Monitoring and testing during construction will include pressure testing of the lines and vacuum testing of the manholes.

No data or narrative information in the literature demonstrate, or even suggest, that sewer exfiltration has directly contaminated surface waters. Several factors that control the occurrence of sewer exfiltration may explain the absence of a linkage between exfiltration and surface water pollution.

The occurrence of exfiltration is limited to those areas where sewer elevations lie above the groundwater table. Since groundwater elevations near surface water bodies are typically near the ground surface, sewers near surface water bodies generally are below the groundwater table, and infiltration (rather than exfiltration) will dominate the mode of sewer leakage in these areas. In areas of steep topographic conditions, where sewers are located near surface waters and at elevations that lie above the surface water, exfiltration impacts though improbable may be possible. These situations are assumed to be sufficiently rare in that exfiltration impacts on surface waters have not been observed. (Source: EPA/600/R-01/034 December 2000)

Possible impact on Recreational Contact use of the Shenandoah:

No impact is expected from discharges from this facility other than the negative perception of wastewater plant effluent being discharged by the Charles Town WWTP. Since this project is for the collection of sewage the discharge of the treated effluent is outside of the scope of this document.

Air Quality/Noise Standards:

a. The office of Air Quality has previously provided data indicating that Jefferson County is included in the category of "attainment/unclassifiable" by USEPA. This means that it is presumed to meet all applicable air quality standards for criteria pollutants. The only potential effect on air quality created by this project would be during the construction phase. This would be exhaust fumes and dust from construction equipment.

b. Incineration will not be a part of the treatment process.

c. There will be significant growth and development expected from the implementation of this project. It is anticipated that the growth and development will not create violations of the ambient air quality standards or noise standards as either primary or secondary impacts. Growth will be controlled by county zoning.

d. Violation of noise standards is not expected as a primary or secondary impact of the project.

Water Quality:

a. To mitigate the effects of possible sedimentation or erosion, a plan utilizing best practice procedures will be submitted for approval with the construction plans. The procedures outlined in the submitted plan will be followed by the contractor and the owner.

b. If the planning area continues to grow at the rates experienced in the past twenty years (or if the county experiences a population surge as many residents and officials expect), non-implementation of this project could affect the surface water and groundwater quality of Jefferson County. This would be due to the increased number of septic tanks installed or additional point source discharges of package treatment plants. It is natural to assume that the more septic water infiltrates into the ground, the greater the chance for groundwater deterioration. It should be noted that most of Jefferson County is underlain by carbonate bedrock which has undergone karsification. Chemicals can be quickly carried from the surface through conduits in the bedrock to the groundwater. From there, they can move quickly to streams, springs and water wells.

c. There are currently challenges to stream standards at the existing Charles Town Treatment Plant. This stream is Evitts Run.

Water Supply:

a. There are no known water supply intakes downstream of the proposed discharge points within the West Virginia regulatory boundaries.

b. Since all current receiving streams eventually flow into the Potomac and Shenandoah Rivers the project will not cause a significant amount of water to be transferred from one sub-basin to another.

c. There are no known existing or possible future groundwater supply sources to which the project will discharge.

Biology:

a. There are sixteen federally endangered and five federally threatened species in Jefferson County. There are an additional 81 rare species. The environmental studies which were conducted for the Flowing Springs project did not indicate that the project would affect their habitat. A request was sent to the WVDEP and they had no record of any endangered or threatened species within the proposed project area. See appendix 5 for details.

b. No wildlife or their habitat will be affected by the proposed construction. The effects of future development on wildlife or their habitat will be controlled by the Jefferson County Planning Commission.

c. There are no indications that aquatic life will be affected by the project or the discharge from the treatment works, except in a positive manner.

Sensitive Areas:

a. None of the proposed project construction will affect any known sensitive environmental areas.

b. There are no known plans to include any of the streams or their drainage areas in wild or scenic designated areas.

Wetlands:

a. Wetlands are included in the service area and the interceptor will run through a wetland area but will not cause any permanent disturbance of that wetland. The Flowing Springs project obtained permission under the US Army Corps of Engineers 404 Nationwide Permit program for the construction through the upland wetland that the interceptor would go. It is expected that permission can be obtained again.

b. The wetlands in the service area will not be affected directly or indirectly by the plant or interceptors once the construction is completed. Some short term issues will exist but will be resolved by following the requirements of the Nationwide Permit.

Land Use Planning and Management:

The Jefferson County Planning Commission has zoned a large amount of land for either residential, commercial or industrial growth. This is especially true around Charles Town, between Charles Town and Harpers Ferry and west of Shepherdstown. This project largely serves the zoned growth areas and is in agreement with the Comprehensive Plan's goals for land usage.

The project within this study does conform to existing land use plans and will not cause significant changes to existing land use patterns. Several subdivisions are already planned with some already under construction. So, growth is already planned for the County and this project is in response to that growth to provide those developments with adequate wastewater facilities.

The proposed projects will be designed to take care of planned and projected wastewater requirements. This project will serve population changes which have already been provided for by the Jefferson County planning. These projects will induce population changes but the effect will be only minor on energy sources and loss of agricultural land. County zoning will continue to control growth.

Flood plains will not be opened to development due to interceptor routing.

Reserve Capacity:

a. The pump stations will have for a 20 year staging period, greater than 30% of the design average capacity is devoted to reserve.

b. The interceptor will have a designed staging period of greater than 20 years and no documentation exists to indicate that the overall (primary and secondary) environmental impacts will not be reduced by construction with a larger pipe at the present time.

Socio-Economic Environment:

The project will not require the acquisitions of residential property except for easements for the proposed lines. A site will be required for the pump station location. The pump station location has been chosen outside of the residential areas of the study areas. Land for the pump station will be acquired by fee negotiation or condemnation. No parks or recreational areas will be acquired or affected by pump station or interceptor routing.

The project will not violate any laws that were imposed to protect the environment.

There is no known documentation which suggests the local populace cannot afford their local share of the proposed project. In addition, existing landowners could benefit from the development of land due to the project.

The West Virginia Division of Culture and History was contacted during the County wide study and they stated that a Phase I Archaeological Survey should be conducted in many areas of the County. They were contacted again for the Flowing Springs project and they requested that the District have a Phase 1 Archaeological Survey conducted along the route of the gravity interceptor and plant site. That study was conducted and the Division granted permission for the construction of the interceptor and plant based on that study. The area of this project was covered by that study. The Division has been contacted about this project and we are awaiting their response.

The new construction will be laid in easements which received their clearances during the Flowing Springs WWTP project design. The environmental clearances have been obtained for the route from the site of the proposed Flowing Springs WWTP to PS 1-10. That included a Phase 1 Archeological study of the corridor of the proposed collection system and plant (now Pump Station) site.

The pump station will be outside of the 100 year flood plain.

VII. PROJECT SUMMARIES

A. Engineering Summary - An engineering summary of the proposed project is required, including a description of all project elements (length and size of pipes, sizes of pumping stations and water tanks, capacities and descriptions of unit processes of the treatment plant, capacities of wells, number of fire hydrants, etc.).

Table 7 on the following pages details the lengths of line, pipe sizes, etc for his project.

Please note that a portion of the flow will continue to go through the existing transmission system from the Ranson Flowing Springs pump station to help assure the existing transmission system to PS 3-6 to PS 4-2 to Samuel Street PS does not become septic.

B. Cost Summary:

(i) The project cost summary is provided in Table 7 on the following pages

(ii) The Operation and maintenance Costs are provided on in Appendix 3

(iii) Existing Debt information is on page 43 of this report. (Page 212 from the 2014 annual Report to the PSC of WV.)

(iv) Proposed Project Financing is provided on page 44.

Table 7

15 inch Gravity Line from 1-10 to Breckenridge PS then 24 inch to East Breckenridge PS Site and FM to Ranson Flowing Springs Pump Station

Item	Units	Qty.	Unit Price	Total
ROUTE 9 INTERCEPTOR:				
Gravity Line (15" SDR-35 PVC)	10,514	LF	$120	$1,261,680
4' Manholes	75	EA	$2,500	$187,500
Stream Crossing (15" Line) Using DIP and stone	200	LF	$250	$50,000
Road Bore (15" Line)	240	LF	$300	$72,000
Railroad Bore (15" Line)	75	LF	$600	$45,000
Railroad Bore Permits and Fees	1	EA	$29,100	$29,100
Gravity Lines (8" SDR-35 PVC)	754	LF	$40	$30,160
Gravity Lines (10" SDR-35 PVC)	213	LF	$55	$11,715
4' Manholes	4	EA	$2,500	$10,000
Decommission Pump Station	4	EA	$7,000	$28,000
Sub Total				$1,725,155
Please Note that 4,568 LF of 15" was installed by Aspen Green to serve their development and is used by this project				
FLOWING SPRINGS INTERCEPTOR:				
36" SDR-35-PVC	LF	5,893	$145	$854,485
STREAM CROSSINGS (36" LINE) USING DIP AND STONE	LF	142	$550	$78,100
6' DIA. MANHOLE	EA	27	$3,000	$81,000
Road Bore (36" Line)	LF	100	$550	$55,000
Decommission Breckenridge PS and replace with manhole	LS	1	$7,000	$7,000
Sub Total				$1,075,585

EXISTING 8" FORCE MAIN:				
Air Relief Valves	2	EA	$2,000	$4,000
Cleanouts (every 1,000 feet)	6	EA	$5,000	$30,000
Sub Total				$34,000
PUMP STATION AND FORCE MAIN TO RANSON FLOWING SPRINGS PS:				
Flowing Springs Pump Station (0.35 MGD DAF, 1.0 MGD Peak)	1	LS	$698,125	$698,125
12" Force Main (Bench in Gravity Ditch)	5,893	LF	$75	$441,975
12" Plug Valves (Cutoff Valves)	2	EA	$4,000	$8,000
Air Relief Valves	3	EA	$3,500	$10,500
Stream Crossing (12") Using DIP and Stone	142	LF	$250	$35,500
Cleanouts (every 1,000 feet)	6	EA	$5,000	$30,000
Force Main Road Bore	300	LF	$550	$165,000
Connect to 8" Force Main	1	LS	$10,000	$10,000
Pavement Overlay	5,000	SY	$20	$100,000
Access Road To Pump Station	2,288	LF	$50	$114,400
Sub Total				$1,613,500
UPGRADE EXISTING PS SYSTEM:				
Upgrade PS 3-6 (Pumps, Slide Rails, Control Panel)	1	LS	$100,000	$100,000
Upgrade PS 4-2 (Pumps, Slide Rails, Control Panel)	1	LS	$100,000	$100,000
Sub Total				$200,000
UPGRADE EXISTING RANSON FS PS:				
Upgrade Ranson FS PS (Pumps, Slide Rails and Control Panel)	1	LS	$375,000	$375,000
Sub Total				$375,000

PROPERTY AND RIGHT OF WAYS:				
Alternative Gravity Line	10,514	LF	$5	$52,570
Flowing Springs Interceptor	6,145	LF	$5	$30,725
Pump Station Site	1	AC	$23,000	$23,000
Sub Total				$106,295
Total Construction Costs:				
Pump Station and Force Main to Ranson Flowing Springs Pump Station				$1,613,500
Alternative Gravity Line				$1,725,155
Flowing Springs Interceptor				$1,075,585
Upgrade Existing PS 3-6 and 4-2				$200,000
Upgrade Ranson Flowing Springs PS				$375,000
Upgrade Existing 8" Force Main				$34,000
Sub Total				$5,023,240
Contingencies @ 10% ±				$501,760
Total Construction Cost				$5,525,000
Soft Costs:				
Legal:				
Local Counsel				$5,000
PSC Counsel				$45,000
Bond Counsel				$60,000
Accounting Services				$24,500
Administrative - Region 9				$55,000
Engineering:				
Study and Report Phase (Preliminary Engineering Reports, Funding Application)				$37,500
Engineering Design Fee:				

Preliminary Design				$125,000
Final Design				$125,000
Bidding and Negotiating				$30,000
Engineering Construction Services:				
Project Representation				$175,000
Engineering During Construction				$140,000
Post Construction				$35,000
Engineering Design Fee Curve Percentage			**4.52%**	
Total Engineering Fee Curve Calculation			**15.47%**	
Special Services as Defined in ASCE Manual:			**3.38%**	
Geotechnical Engineering for Pump Station				$10,000
Land Surveys and Easement Preparation				$10,000
Engineering Surveys and Topo				$10,000
Jefferson County PSD Meetings				$40,000
Communication Plan				$15,000
Asset Management Plan				$40,000
PSC Meetings/Hearings/Negotiations with Other Entities				$25,000
Construction Stakeout				$25,000
Environmental Assessment and Impact Statement				$12,000
Lands and Right of Way Acquisitions				$110,000
Right of Way Council				$70,000
Regulatory Agency/ WVDOH Permit Fees				$35,365
Reimbursables:				
Aspen Green				$43,216
Right of Way				$124,875
Project Contingency				$37,544
Total Project Cost				$6,990,000

LONG-TERM DEBT (Account 221)

Bonds

1. Report below the particulars indicated of the long-term debt at end of year represented by unmatured obligations issued or assumed by the respondent, exclusive of advances from associated companies.
2. Group amounts according to accounts and show the total for each account.

3. If the respondent has pledged any of its long-term debt securities give particulars in a footnote (on schedule 801A-801B), including name of the pledgee and purpose of the pledge.

Notes:

Acct 427- See Schedule 306.

Administrative Fees should be included in Acct. 775.8, Schedule 605.

Acct 239-240 See Schedule 216.

Example:" Debt Holder: "WDA", Class:"WDA 1999", Series: "A"

Line No.	Debt Holder, Class, Series (a)	Nominal Date of Issue (b)	Date of Maturity (c)	Outstanding per Balance Sheet (d)	Rate (%) (e)	Interest for Year- Acct. 427.3 ($) (f)	Matured P.& I. Acct-239 & 240 ($) (g)	Principal for Year ($) (h)	Reserve Requirements ($) (i)	Total Funding Required (F + H + I) (j)
1	**Bonds (221)**									
2	WV Water Development; Sewer Revenue Bond; Series 1988B	05.05.88	10.10.28	163,759	0.00%	-	10,917	10,917	-	10,917
3	STTE Revolving Fund; Sewer Revenue Bond SRF Series 1993A	11.10.93	11.10.13	-	4.15%	-	24,274	24,274	-	24,274
4	Ferris Baker Watts, Sewer Revenue Bond 1998B	06.25.98	06.01.19	149,760	0.00%	-	29,952	29,952	-	29,952
5	WV Infrastructure Funds; Sewer Revenue Bond Series	06.25.98	06.01.38	662,039	0.00%	-	-	-	-	-
6	State Revolving Funds; Sewer Revenue Bond SRF 1999A	12.08.99	03.01.30	198,639	0.00%		12,612	12,612	-	12,612
7	State Revolving Fund; Sewer Revenue Bond SRF Series 2000A	06.22.00	12.01.31	673,680	0.00%	-	38,496	38,496	-	38,496
8	State Revolving Fund; Sewer Revenue Bond Series 2008	06.18.08	06.30.38	1,637,402	0.00%	-	66,836	66,836	-	66,836
9	Crews & Associates; Sewer Revenue Bond Series 2010	10.01.10	10.02.28	1,655,000	Various	67,856	147,856	80,000	-	147,856
10	Crew and Associates; Sewer; 2013A Revenue Bond	06.14.13	06.01.28	1,570,000	Various	52,183	142,183	90,000	-	142,183
11	Less: Deferred Loss On Refinance	06.25.1998	12.31.31	(279,371)						-
12	Less: OID For Series 2010	10.01.10		(8,291)						-
13										-
14										-
15										-
16										-
17										-
18										-
19										-
20										-
	Total Account 221			**6,422,617**		**120,039**	**473,126**	**353,087**	**-**	**473,126**

B (iv) **PROPOSED PROJECT FINANCING** - Provide proposed project financing, including anticipated loan and grant amounts and sources, and anticipated interest rate(s), term(s) of loan(s) and coverage rate(s).

The District is seeking both RUS and SRF funding for this project.

The District anticipates a $3.495 million 40 year 0% loan with a 1/2% administrative fee from the DEP SRF Fund and a $3.495 million 4% for 38 year loan from RUS. If the project causes the rates to exceed 1.75% of the MHI for Charles Town Magisterial, the Jefferson County Public Service District will apply for a 40 year 0% loan with 1/2% administrative fee from the DEP SRF Fund.

B (v) USER RATES PROJECTED

Provide user charge information, including the number of existing and proposed customers, the existing rate schedule and the proposed rate schedule including resale contract rates. For business or industrial parks, information regarding proposed rental rates, fees, etc., must be included in the report.

The District has had a Rule 42 prepared for this project. It includes adjustments for this project and items other than this project. As the financial analysis required to develop a Rule 42 filing is more accurate than adding the loan payment with coverage and the additional O&M to the current rates, this PER adapts the rates developed in the Rule 42 document. The following is the proposed post project rate structure:

Volumetric Charge:	$17.92 per 1,000 gallons
Flat Rate:	$80.64
Minimum Charge:	$44.80

Cost per 4,000 gallons per month:

4 (1,000 gallons) x $17.92 (per 1,000) = $71.68
$71.68 (mo) x 12(mo/yr) / $48,734 (2010 MHI) x 100% = 1.77%

Cost per 4,500 gallons per month:

4.5 (1,000 gallons) x $17.92 (per 1,000) = $80.64
$80.64 (mo) x 12(mo/yr) / $48,734 (2010 MHI) x 100% = 1.99%

C. PROJECT SCHEDULE

A project schedule shall be included in the report to detail the anticipated dates of critical project steps.

PROJECT SCHEDULE

(1)	Professional Services Acquired	Nov. 3, 2014
(2)	Approval of PER	February 4, 2015
(3)	Loan application acceptance	March 4, 2015
(4)	Archaeological Research begins	Nov. 1, 2008
(5)	Design begins	Nov. 1, 2014
(6)	Begin Right of Way acquisitions	Aug. 2009
(7)	Submission of project plans and specifications	April 23, 2015
(8)	Approval of project plans and specifications	May 23, 2015
(9)	Submission of user charges to the West Virginia Public Service Commission for approval	April 30, 2014
(10)	80% ROW, 100% Land Acquisition	Dec. 23, 2015
(11)	Request Authorization to Bid	Jan. 4, 2016
(12)	PSC approval	Dec. 23, 2015
(13)	Advertisement for bids	Jan 11, 2016
(14)	Opening of bids	Feb 16, 2016
(15)	Awarding of contracts	May 17, 2016
(16)	Loan Receipt	May 17, 2016
(17)	Commencement of project construction	May 18, 2016
(18)	Completion of project construction	May 18, 2017

Note: Exact dates are contingent upon approval dates of various state agencies.

D. LANDS AND RIGHTS-OF-WAY

The easements for the selected project will include the easements which were under negotiation or purchases for the Flowing Springs Collection portion of the Flowing Springs WWTP project. A total of 58 easements will be needed of which 44 have been obtained and 14 remain to complete. Therefore, 76% of the easements have been obtained.

During the design phase of the project, the Department of Transportation will be contacted and the District will confirm that the boring permits are still current. If not they will be reapplied for. The same will be done for the Railroad crossing permit.

E. PUBLIC HEALTH BENEFITS

The project will provide an adequately sized collection system for the service area for the next 20 years. That will help assure that the sewage generated within the service area is disposed of properly.

F. EVIDENCE OF FILING

Provide status / evidence of the filing with the Public Service Commission (if applicable) of the engineering agreement between the engineer and the public service district, unless the public service district is applying for funding for an emergency project as defined by West Virginia Code §31-15A-8(a).

The District is a Class A utility and does not require PSC approval.

G. EVIDENCE OF COMPLIANCE

Provide evidence of the project sponsor's compliance with West Virginia Code §§5G-1-1, et seq. in its procurement of engineering services.

Evidence of compliance with the 5G process are provided on the following pages.

Two separate 5G processes took place for this project. The PER is covered by the first 5G documentation presented and the 5G process for the design of the project is covered by the second set of documents.

5G Process for PER

AFFIDAVIT OF PUBLICATION

9/14/98

PUBLIC NOTICE
JEFFERSON COUNTY PUBLIC SERVICE DISTRICT
REQUEST FOR ENGINEERING PROPOSAL

On May 3, 1998, the Jefferson County Public Service District published Public Notice of its Request for Engineering Proposal for the project described herein. In order to comply with the publication requirements set forth in West Virginia Code §5G-1-3 The District is republishing the notice as follows:

The Jefferson County Public Service District is in the process of procuring engineering services to service feasibility studies and cost estimates, design and construction services necessary for the design and preparation of funding applications to various Federal, State, and Local agencies as well as implementation of projects for water and sewer.

Professional services will include: (1) Feasibility Studies, (2) Cost estimates along with advice and information necessary in order to prepare competitive and programs eligible applications, (3) if funded, design in accordance with all State, Federal and Local regulations that pertain to the District's water and sewer systems, (4) Preparation of bidding and contracting documents, (5) Participate in the evaluation of bids received, (6) Monitor and inspect construction activities on a daily basis to ensure compliance with plans and specifications and (7) Provide construction management services.

Final plans, specifications and bid documents will be completed after the project is funded. Procurement of said services shall be in accordance with 24 CFR Part 85 and West Virginia Code Chapter 5G. All consultants interested in being considered for this project must submit a proposal detailing qualification, technical expertise, management and staffing capabilities and related experience.

The object of the competitive process is to objectively select the firm who will provide the highest quality of service. Accordingly, technical qualifications and experience will be weighed heavily. Selected respondents will be interviewed and the firm judged most qualified will be selected.

Please submit all requested information to:

William S. Sine, Jr.
General Manager
Jefferson County Public
Service District
218 West 3rd Avenue
Ranson, West Virginia 25438

Proposals will be accepted until 3:00 p.m. on October 1, 1998. Those engineering firms which submitted proposals in response to the May 3, 1998 Public Notice need not resubmit the materials, as those proposals will be considered by the District in addition to any proposals received on, or in response to this Notice.

Attention is directed to the fact that funding sources for the proposed project may include, but not be limited to, West Virginia Infrastructure, Rural Utilities Service, SRF, EDA, ARC, or HUD SCDBG funding. All work will be performed in accordance with the regulations issued by these agencies and the State of West Virginia as pertaining thereto. The selected firm will be required to comply with Title VI of the Civil Rights Act of 1964, Executive Order 11246, Section 109 of the Housing and Urban Development Act of 1974, Section 4 of the Housing and Urban Development Act of 1968, Conflict of Interest Statement, and Access to Records provisions, where applicable.

The District will afford opportunity for minority business enterprises to submit a show of interest in response to this invitation and will not discriminate against any interested firm or individual on the grounds of race, creed, color, sex, age, handicap or national origin in the contract award.

The District reserves the right to accept or reject any and/or all proposals.

STANLEY E. TOMARO,

Certificate of Publication

This is to certify the annexed advertisement

Robert R Rodecker

Jefferson County Public Service Dist. Request for engineering proposal

appeared for 2 consecutive days/weeks in The Journal Publishing Company, a newspaper published in the City of Martinsburg, WV in its issue beginning

9/14

and ending

9/21

The Journal
207 W. King Street
Martinsburg, WV 25401

Fee $ 36.71

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
SANDRA E. SPERRY
[illegible]
My Commission Expires August 16, 2008

MINUTES OF
ENGINEER SELECTION COMMITTEE
MEETING HELD ON OCTOBER 23, 1996

Jefferson County
Public Service District

Engineer Selection Committee
October 23, 1996
Minutes

The Engineer Selection Committee of the Jefferson County Public Service District met at 10:00 A.M. on October 23, 1996 to interview engineers for the County-Wide Sewer and Water Feasibility Study. The committee members were Stanley E. Zombro, Thomas M. West, Carole A. hall and William B. Stine, Jr..

The following firms were interviewed:
Buchart Horn, Inc.
Anderson & Associates, Inc.
Pentree, Inc.

The Committee agreed to make the selection at the next PSD Board Meeting.

Carole A. Hall, Secretary

MINUTES OF
MEETING HELD ON NOVEMBER 12, 1996

Jefferson County
Public Service District

Regular Meeting
November 12, 1996
Agenda

Unfinished Business:

Charles Town/Ranson

PSC Hearing - Walnut Grove/Jefferson Utilities - Transfer of Ownership

The Hearing is scheduled for November 13, 1996. The General Manager will be meeting Mr. Rodecker in Charleston prior to the hearing.

- Walnut Grove/Jefferson Utilities Agreement

Mr. Rodecker discussed with the board a meeting with the Walnut Grove Homeowners Association and Jefferson Utilities. Mr. Rodecker made an offer for the Walnut Grove Sewer. The Board instructed Mr. Rodecker how to proceed if the offer was rejected.

Sanitary Associates

The Board discussed Sanitary Associates Water and Sewer. Mr. Rodecker was instructed to report to Jefferson Utilities that the District has every intention of pursuing the acquisition of Sanitary Associates Sewer.

Discussion was also held concerning SRF funding for the connection of Sanitary Associates and for the purchase of Walnut Grove Utilities.

- Complaint Hearing- Mose

The General Manager reported that the hearing date had been changed to November 21, 1996. Discussion followed.

- KOA

The General Manager reported that the surveying is to be done to find the sewer sleeve and its elevations.

- John Skinner - Contingency Fee

John Skinner and the Board discussed retaining his legal services on a contingency basis.

Mr. Skinner also reported that he had appealed the unemployment Law Judges decisions concerning the unemployment status for Timothy Mose.

Blue Ridge Water Project

Discussion of this project was held. Tom West made a motion to instruct Will Smith of Pentree Inc. to present the application to the Infrastructure Council for funding approval. Carole Hall seconded the motion, motion carried.

- Facility Plan- Selection

SEE ATTACHED MINUTES OF SELECTION COMMITTEE

Tom West made a motion to hire Pentree Inc. to do engineering services to provide feasibility studies and cost estimates for the design and construction services necessary for the design and preparation of funding applications to various federal, state and local sources as well as implementation of projects for water and sewer.

New Business:

Charles Town/Ranson

- DEP Inspection of Treatment Plant

The General Manager reported on a meeting he attended at the City of Charles Town concerning the Sewage Treatment Plant. The DEP inspection showed several areas that need to be corrected. Discussion followed. The General Manager was instructed to keep the Board informed on further developments.

- Disbursements

The General Manager presented the Board with the current bills. Carole Hall made motion instructing the General Manager which bills to pay. Tom West seconded the motion, motion carried.

Keyes Ferry Acres

- Disbursements

The General Manager presented the Board with the current bills. Tom West made a motion instructing the General Manager which bills to pay. Carole Hall seconded the motion, motion carried.

Glen Haven

- Disbursements

The General Manager presented the Board with the current bills. Tom West made a motion instructing the General Manager which bills to pay. Carole Hall seconded the motion, motion carried.

Cavaland

- Disbursements

The General Manager presented the Board with the current bills. Tom West made a motion instructing the General Manager which bills to pay. Carole Hall seconded the motion, motion carried.

Burr Industrial Park

- Disbursements

The General Manager presented the Board with the current bills. Carole Hall made a motion instructing the General Manager which bills to pay. Carole Hall seconded the motion, motion carried.

Carole Hall, Secretary

Next Meeting:
November 27, 1996
December 11,1996

5G Process for Design

PUBLIC NOTICE
JEFFERSON COUNTY PUBLIC SERVICE DISTRICT
REQUEST FOR ENGINEERING SERVICES PROPOSALS

The Jefferson County Public Service District ("District") is seeking proposals from engineering firms to provide final design services for a wastewater transmission upgrade project.

Professional services may include: (1) review scope of preliminary engineering report submitted to the West Virginia Infrastructure and Jobs Development Council; (2) prepare final design documents (3) provide additional engineering services during construction (4) provide inspection services during construction; (5) provide final "as built" plans.

The District's sanitary sewer collection and transmission system serves approximately 2300 customers and includes approximately 62 miles of pipe and 29 pump stations.

Qualified firms interested in being considered for these services must submit ten copies of the following: 1. Letters of interest; 2. Resumes detailing credentials and qualifications of the firm principals and key support personnel; 3. A list of previous and current jobs of similar scope and; 4. References. Please submit all requested forms to Susanne Lawton, General Manager, Jefferson County Public Service District, 340 Edmond Road, Suite A, Kearneysville, WV 25430.

Proposals will be accepted until July 2, 2014 at 4:00 PM, at the Jefferson County Public Service District office, 340 Edmond Road, Suite A, Kearneysville, WV. The purpose of the competitive process is to objectively select a firm who will provide the highest quality services at a realistic fee. Selection criteria will include expertise, related prior experience, personnel and references. Selected candidates will be interviewed, and the candidate judged most qualified will be asked to prepare a proposal including fees for said services.

The Jefferson County Public Service District reserves the right to reject any and all proposals.

The selected firm will be required to comply with Title VI of the Civil Rights Act of 1964, Executive order 11246, Section 109 of the Housing and Urban Development Act of 1974, Section 3 of the Housing and Urban Development Act of 1968, Conflict of Interest Statement, Access to Records Provisions and Executive Order 11625.

The selected firm will also be required to comply with West Virginia State laws as they relate to the Department of Environmental Protection and the Drinking Water Treatment Revolving loan programs, including but not restricted to the Minority /Women's

Business Enterprise Six Affirmatives Steps.

The District will afford opportunity for minority business enterprise to submit a show of interest in response to this invitation and will not discriminate against any interested firm or individual on the grounds of race, creed, color, sex, age, handicap or national origin in the contract award.

SUSANNE LAWTON, GENERAL MANAGER
JEFFERSON COUNTY PUBLIC SERVICE DISTRICT

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SUSANNE LAWTON, GENERAL MANAGER JEFFERSON COUNTY PUBLIC SERVICE DISTRICT

6.11,18 (2t)

Certificate of Publication

This is to certify the annexed advertisement

JC PUBLIC SERVICE DISTRICT NOTICE

appeared for 2 consecutive days/weeks in The Journal Publishing Company, a newspaper in the City of Martinsburg, WV in it's issue beginning:

6-11-14

and ending

6-19-14

The Journal
207 W. King Street
Martinsburg, WV 25401

Fee ($) 156.00

THE STATE OF WEST VIRGINIA
COUNTY OF BERKELEY

The foregoing instrument was acknowledged before me this 20th day of June 2014 by

Notary Public

My commission expires Feb 7, 2021

OFFICIAL SEAL
STATE OF WEST VIRGINIA
NOTARY PUBLIC
Jeri L. Wines
203 Grove Springs Lane
Harpers Ferry, WV 25425
My Commission Expires Feb. 7, 2021

Certificate of Publication

JEFFERSON PUBLISHING COMPANY, INC., Publisher

SPIRIT OF JEFFERSON ADVOCATE

Charles Town, W. Va. June 11 20 14

I hereby certify that the annexed Public Notice

in the case of Request for Engineering Services Proposals (Wastewater transmission upgrade project)

has been published once a week for two successive weeks, in the Spirit of Jefferson Advocate, a newspaper published in Charles Town, Jefferson County, West Virginia, in the issues of June 11 & 18, 20 14,

as required by law.

Editor/Manager, Spirit of Jefferson Advocate

State of West Virginia
County of Jefferson

Personally appeared before me, Mary Burns, Editor/Manager of the Spirit of Jefferson Advocate, and made oath that the above certificate is true and correct.

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
CARA D. YOUNG
JEFFERSON PUBLISHING CO., INC.
P.O. BOX 966
CHARLES TOWN, WV 25414
My Commission Expires January 27, 2019

Cara D. Young
Notary Public

Commission expires

PUBLIC NOTICE
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REQUEST FOR ENGINEERING SERVICES PROPOSALS

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The Jefferson County Public Service District reserves the right to reject any and all proposals.

The selected firm will be required to comply with Title VI of the Civil Rights Act of 1964; Executive order 11246; Section 109 of the Housing and Urban Development Act of 1974, Section 3 of the Housing and Urban Development Act of 1968, Conflict of Interest Statement, Access to Records Provisions and Executive Order 11625.

The selected firm will also be required to comply with West Virginia State laws as they relate to the Department of Environmental Protection and the Drinking Water Treatment Revolving loan programs, including but not restricted to the Minority /Women's Business Enterprise Six Affirmatives Steps.

The District will afford opportunity for minority business enterprise to submit a show of interest in response to this invitation and will not discriminate against any interested firm or individual on the grounds of race, creed, color, sex, age, handicap or national origin in the contract award.

SUSANNE LAWTON, GENERAL MANAGER
JEFFERSON COUNTY PUBLIC SERVICE DISTRICT

6/11/2t

Jefferson County Public Service District
Regular Board Meeting
October 6, 2014

The monthly meeting of the Jefferson County Public Service District was held at 7:00PM on Monday, October 6, 2014 in the meeting room at the Districts office in Kearneysville. Those in attendance included: Chairman, Peter Appignani; Secretary, Richard Weese; Treasurer, Bill Strider; General Manager, Susanne Lawton; Administrative Assistant, Ashley Stottlemyer; Operations Manager, Joe Freeze; District Legal Counsel, Jim Kelsh; from Thrasher Engineering, Wayne Morgan; and Liaison for the County Commission, Commissioner Jane Tabb.

CALL TO ORDER
Chairman Peter Appignani called the meeting to order at 7:00PM.

Approval of agenda
No changes.

Public Comments
Lyn Widmyer, County Commissioner but not representing the other County Commissioners, read a letter into record she addressed to Ms. Farrell at the Public Service Commission (PSC) regarding the letter Mr. Kelsh submitted to the PSC for the petition to reopen the District 2012 sewer rate case number 12-0513-PSC-42T-PC. She questioned whether the Board approved this letter before Mr. Kelsh submitted it.

OLD BUSINESS

Review Minutes of September 2 regular board meeting
The minutes of the September 2, 2014 regular board meeting were approved as presented.

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to accept the September 2, 2014 regular board meeting minutes as presented. Unanimously approved.**

Update on the water systems improvement project for Glen Haven and Cavaland

- Approval of resolution for payment #6
- Approval of change order #2
- Consider request from Mr. Welder for paving driveway

Ms. Lawton stated the Board needed to approve the sixth draw from the bond proceeds to pay the contractor, Gwin Dobson & Foreman, and Region 9. Mr. Appignani read the resolution for payment #6 as follows:

RESOLUTION OF THE PUBLIC SERVICE BOARD OF THE JEFFERSON COUNTY PUBLIC SERVICE DISTRICT APPROVING INVOICES RELATING TO ENGINEERING AND OTHER SERVICES FOR THE CAVALAND & GLEN HAVEN WATER SYSTEM IMPROVEMENTS PROJECT AND AUTHORIZING PAYMENT THEREOF IN THE AMOUNT OF $211,050.21.

Action: **Motion by Mr. Appignani and seconded by Mr. Strider to adopt the resolution as read by Mr. Appignani totaling $211,050.21. Unanimously approved.**

Ms. Lawton discussed the change order #2 submitted by the engineer which includes additional conduit and control wiring needed for the backup generators at Glen Haven and Cavaland well houses totaling $2,553.00.

Action: **Motion by Mr. Strider and seconded by Mr. Appignani to approve change order #2 for $2,553.00. Unanimously approved.**

Ms. Lawton also informed the Board of a customer in Glen Haven, Mr. Welder, who has concerns with his driveway patch work. Mr. Welder has requested his driveway be patched a different way or the District grant him a five year written guarantee that the current patch work would last. The Board agreed that it was not appropriate to change the current protocol or provide a guarantee to Mr. Welder.

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to direct Ms. Lawton to contact Mr. Welder informing him of the Board's decision to deny his requests. Unanimously approved.**

Update on easement/ownership of pump stations 3-9

Ms. Lawton is working with Mr. Glenn on the easement issue for pump station 3-9.

Action: **No action required by the Board.**

Consider revising West Virginia Infrastructure and Jobs Development Council application for sewer collection and transmission upgrades due to revised project scope

Mr. Morgan informed the Board of an email he received from Charles Town's engineer, John Cole at RK&K, and a letter the District received from Andy Blake at Ranson, both discussing their thoughts regarding the new project scope. Ranson supported the revised project and Mr. Cole didn't see a problem with supporting it but was going to take it to their Utility Board first. The new scope would eliminate five pump stations, rebuild pump stations 3-6, 4-2, and Ranson's Flowing Springs pump station, construct a 15 inch interceptor for northern Route 9, construct a 24 inch interceptor for the Flowing Springs basin, and utilize the 8 inch District forcemain and Ranson's 12 inch forcemain. This project would be a joint utility project with Ranson costing an estimated $6.9 million. Mr. Morgan stated that this project does not include utilizing the Old Standard treatment plant which would add an estimated $1.5 million to the project costs.

Mr. Morgan proposed to attempt to submit a revised preliminary engineering report to IJDC by the November 10th deadline. Mr. Kelsh added that a revised Rule 42 would need to be drafted by the Districts accountant and a letter of intent from Ranson should also be submitted. He also informed the Board that Bowles Rice, including himself, represent Ranson in matters unrelated to the project, but he does not see a conflict since the two parties are working toward a common goal.

Mr. Strider and Mr. Weese agreed that it was important to move forward and this project encompasses most of the aspects of the original project for less cost. Mr. Appignani has a problem with the lack of planning. He believes the costs of the project should not be placed solely on the existing ratepayers and other beneficiaries of the project should contribute.

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to approve the revised project scope costing an estimated $6.9 million while continuing to evaluate the Old Standard wastewater treatment plant option, to approve any administrative work including preparing a revised Rule 42, and accept the conflict of interest waiver letter from Counsel. Approved 2-1. Mr. Appignani voted against the motion.**

Consider selection of engineering firm for final design of a sewer collection and transmission project

Last month the selection committee interviewed three firms and decided to table the decision for final selection to the October board meeting. Each committee member was instructed to rate the firms and the firm with the highest total would be selected. Ms. Lawton tallied the results and announced to the Board as followed: Thrasher Engineering - 210 points, Dunn Engineers - 187 points, and S&S Engineers – 160 points. The Board will move forward with negotiations on price with Thrasher Engineering.

Action: **No action required by the Board.**

Consider applying for RUS funding for acquisition of water and sewer utility assets of Jefferson Utilities, Inc., Shenandoah Junction, Inc. and East Jefferson Sewer, LLC and water project to replace and upgrade Keyes Ferry Acres, Westridge Hills, and Harpers Ferry Campsites

Ms. Lawton suggested tabling this item until Mr. Morgan meets with RUS about funding.

Action: **No action required by the Board.**

Discuss the District's financial status (status of paying bills)

Ms. Lawton stated that the District will need an estimated $90,000 in payments to cover the disbursements for this month. Mr. Kelsh suggested the Board may want to consider combining a non-project related rate increase

with the sewer project certificate application that will need to be submitted to the Public Service Commission based on the possibility the District may not meet coverage for the next fiscal year due to the District's financial status.

Action: **No action required by the Board.**

NEW BUSINESS

Request for sewer service from Jefferson Heights North

Ms. Lawton informed the Board that the District had previously studied the sewer service for this development in 2006 and 2009 and came to the conclusion the District could serve with upgrades made to the pump station (4-4) located in Belvedere Heights. Mr. Paul Raco was in the audience representing one of the current owners of the property which has been split into 2 separate properties, one half now referred to as Jefferson Heights North. The property has been annexed into Charles Town, but the owner has contacted the District since their facilities are there already. Mr. Raco stated that the owner would utilize the District's pump station if feasible, but would go to Charles Town if costs are found to be too high to upgrade the pump station or the District's facilities cannot handle the 135 EDU's being requested. Ms. Lawton suggested the Board approve a preliminary commitment to serve letter until an evaluation is done by the engineers. Mr. Kelsh will draft a commitment letter.

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to conduct an engineering evaluation for Jefferson Heights North. Unanimously approved.**

Discuss the aboveground storage tank program requirements of Senate Bill 373 being implemented by West Virginia Department of Environmental Protection

Ms. Lawton explained that due to the chemical leak in Charleston, WV, new requirements are being implemented by the State for aboveground storage tanks. She would like the Board to consider sending a letter to DEP commenting on the new rules. District staff has registered with the State the aboveground tank at Cavaland and Evoqua has registered the bioxide tanks the District currently uses.

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to approve the letter to DEP for clarification on the new rule. Unanimously approved.**

Consider renewal of membership for the National Association of Clean Water Agencies (NACWA)

Due to the financial status of the District the Board decided to not renew the membership.

Action: **Motion made by Mr. Weese and seconded by Mr. Strider to not renew the NACWA membership. Unanimously approved.**

Presentation by Dan Bickerton from West Virginia American Water Company

Mr. Dan Bickerton from West Virginia American Water gave a presentation to the Board on a possible public-private partnership with American Water. Mr. Appignani made the statement that discussions relating to contract negotiations would be held in executive session.

Action: **No action required by the Board.**

Update on Status of Current Public Service Commission Cases

PSC case # 14-0606-PSD-C (Lutman Properties, LLC complaint) – Mr. Kelsh informed the Board of the PSC order ruling in the District's favor.

PSC case # 14-0582-PSD-PC (Termination Agreement with Mockingbirdhil, Inc.) – Mr. Kelsh submitted the revised termination agreement to the PSC.

PSC case # 13-1175-S-C (Old Standard, LLC complaint) & Circuit Court case # 14-C-51 – Mr. Rodecker has requested the courts extend the stay for both cases.

Action: **No action required by the Board.**

Discussion of any Expenses over Budget

There were no items over budget this month.

Action: **No action required by the Board.**

Disbursements

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to approve disbursements for Public Service District water expenses in the amount of $7,971.18. Unanimously approved.**

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to approve disbursements for the Public Service District sewer expenses in the amount of $199,870.09. Unanimously approved.**

Approve transfer of $7,000.00 from the Renewal & Replacement account to the Sewer Operating account for a new pump at 3-6

Approve transfer of $1,190.70 from the Renewal & Replacement account to the Sewer Operating account for repairs at pump station 3-9

Approve transfer of $632.50 from the Renewal & Replacement account to the Sewer Operating account for PLC repairs at pump station 3-6

Approve transfer of $1,164.00 from the Renewal & Replacement account to the Sewer Operating account for a spare pump

Approve transfer of $8,504.96 from the Sewer Security Deposit account to the Sewer Operating account for security deposit refunds

Approve transfer of $256.78 from the Water Security Deposit account to the Water Operating account for security deposit refunds

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to approve transfer of $7,000.00 from the Renewal & Replacement account to the Sewer Operating account for a new pump at 3-6, approve transfer of $1,190.70 from the Renewal & Replacement account to the Sewer Operating account for repairs at pump station 3-9, approve transfer of $632.50 from the Renewal & Replacement account to the Sewer Operating account for PLC repairs at pump station 3-6, approve transfer of $1,164.00 from the Renewal & Replacement account to the Sewer Operating account for a spare pump, approve transfer of $8,504.96 from the Sewer Security Deposit account to the Sewer Operating account for security deposit refunds, approve transfer of $256.78 from the Water Security Deposit account to the Water Operating account for security deposit refunds. Unanimously approved.**

General Manager's Report

Ms. Lawton updated the Board on activities since last month's meeting.

Action: **No action required by the Board.**

Other staff reports

None discussed.

Action: **No action required by the Board.**

Correspondence

None discussed.

Public Comment

Jacquelyn Milliron, Breckenridge resident, stated that she appreciated the efforts to reduce the sewer project costs, but there still needs to be a strategic plan drafted. She questioned how the sewer project will be funded and as a due diligence to the customers an income survey should be conducted before submitting the project. Ms. Milliron also made the comment that if the utilities are working together then consolidation should be considered.

Todd Milliron, Breckenridge resident, commented that developers should be made to pay rather than the ratepayers.

Mr. Freeze and Commissioner Tabb exited the meeting. Mr. Morgan and Mr. Dan Ferrell from Thrasher Engineering stayed for executive session. Mr. Dan Bickerton was invited to executive session to discuss his earlier presentation.

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to convene in executive session for the purpose of discussing litigation and contract negotiations. Unanimously approved.**

Action: **Motion made by Mr. Weese and seconded by Mr. Strider to return to public session. Unanimously approved.**

Action: **Motion made by Mr. Strider and seconded by Mr. Weese to adjourn. Unanimously approved.**

There being no further business at this time, the meeting was adjourned at 9:34PM.

The next regular meeting is scheduled for Monday, November 3, 2014 at 7:00pm at 340 Edmond Road, Suite A at the Districts office in Kearneysville.

Respectfully Submitted,

Peter L. Appignani
Chairman

William H. Strider
Treasurer

Jefferson County Public Service District

October 7, 2014

Daniel E. Ferrell, PE
Principal-in-Charge
Thrasher Engineering, Inc.
600 White Oaks Boulevard
Bridgeport, WV 26330

Re: Interview for Engineering Services for Wastewater Transmission Upgrade Project

Dear Mr. Ferrell:

Thank you for your recent proposal and taking the time to interview with us. We are pleased to inform you that we have decided to move forward with Thrasher Engineering, Inc. I will contact you to discuss the next step in the selection of an engineering firm according to West Virginia Code Chapter 5G, which is the contract negotiation phase.

Once again, thank you for your interest in working with the Jefferson County Public Service District.

Sincerely,

Susanne Lawton
General Manager

APPENDICES

APPENDIX	INFORMATION
Appendix 1	Alternatives Description 11"x17" Mapping of Alternatives Alternatives Matrix
Appendix 2	City of Ranson Letter - Remove Flows from Ranson System City of Ranson Letter - Offer to Assist Charles Town Utility Board Letter
Appendix 3	O&M Projections
Appendix 4	Line Sizing Calculation
Appendix 5	Environmental Clearances / Permits

Appendix 1

Alternatives Description

Alternatives Matrix

11"x17" Mapping of Alternatives

Document 1-Option Explanations

Jefferson County Public Service District
Alternatives to Consider for Inclusion in a Preliminary Engineering Report
August 6, 2012
(revised August 17, 2012)

The Public Service Commission of WV (PSC) denied the Districts Application of Convenience and Necessity to construct the Flowing Springs Wastewater Treatment Plant (WWTP). The District had deferred upgrades to its collection system to the Charles Town WWTP since the Flowing Springs Project would have radically changed the way it collected and treated the sewage generated in its service area. Since the project was denied, the District now needs to evaluate and plan how to properly handle the flows it is responsible for. This document, associated maps and matrix contains the options that the District is considering for further study in a Preliminary Engineering Report (PER). The resulting PER will be considered as a major component of the District's Strategic Plan.

The PER will include the following:

- Consider the current status of the Districts collection system and pump stations. The existing flows the collection system handles will be determined from the ongoing flow metering the District conducts on a regular basis. In addition, the runtimes of the pump stations will be reviewed from the maintenance records the District keeps to help quantify the flow rates within the collection system.
- Assess the flows the District will be expected to handle within the foreseeable future which is defined as 20 years by the regulatory agencies that regulate utilities in West Virginia.
- Evaluate the economics of the alternatives after gathering environmental and other pertinent information that could affect the economics of an alternative.
- Make a recommendation to the Board of the Jefferson County PSD based on the facts determined by the study.

Current Situation:

The Districts collection system consists of three legs.

1. **(NRT9)** The Northern Route 9 collection system that conveys the flows from the Job Corps and Burr Industrial Park area along Route 115 through Ranson and to the Charles Town WWTP.

2. **(FSB)** The second leg is the Flowing Springs Basin collection system which collects sewage from the Walnut Grove area, Briar Run Subdivision, Breckenridge Subdivision and Beallair Subdivision, and is currently conveyed from the Breckenridge Pump Station to the Ranson Flowing Springs Pump Station. From this station about 1/3 is returned to the District's pump station at the corner of Flowing Springs Road and Flowing Springs Road and the remaining 2/3 leaves the Ranson Flowing Springs Pump Station with Ranson flows and then is conveyed to the Evitts Run gravity interceptor.

3. **(SRT9)** The Third Leg is the Southern Route 9 Collection system which conveys the flows from the southern side of Route 340 from Norborne Glebe and the Saint James Catholic Church back to Route 340 and then conveys them to the Charles Town WWTP.

Two legs of the collection system north of Charles Town were going to be addressed by the construction of the Flowing Springs WWTP. They are the collection system along Northern Route 9 and the collection system that is served by the Breckenridge Pump Station **(NRT9, FSB).**

The District has an interest in the Old Standard WWTP. This study also considers how that asset could be utilized by the District. **(OS)**

Explanation of Alternatives:

The District is considering having a planning document (PER) prepared to address the needs of its collection system. The following alternatives detail the items the District may wish to consider for the service areas. More than one option may be required to address the entire service area. The alternatives below indicate which service area each one will serve as noted by the description in the "**Current Situation**" portion of this document.

Alternative 1 (NRT9, FSB)

Construct the collection system considered in the Flowing Springs project and construct a pump station at the site of the proposed Flowing Springs WWTP with a force main to terminate near the proposed Charles Town to Tuscawilla Pump Station on Evitts Run.

Alternative 2 (NRT9, FSB)

Construct the collection system considered in the Flowing Springs project and construct a pump station at the site of the proposed Flowing Springs WWTP with a force main to terminate at the Ranson Flowing Springs Pump Station.

Alternative 3 (NRT9, FSB)

3A. Consider upgrading the Districts existing northern Route 9 collection system along with the gravity collection system through Ranson to the Charles Town Evitts Run gravity interceptor. **(NRT9)**

3B. Consider upgrades to the existing Breckenridge Pump Station to convey flows to either the Ranson Flowing Springs Pump Station **(FSB)** or:

3C. Upgrading the conveyance system those flows originally traveled, that being from the Breckenridge Pump Station to Pump Station 3-6 (near the race track) then to Pump Station 4-2 (near Wendy's) and then through the Jefferson Avenue gravity system to the Samuel Street Pump Station and then to the Charles Town WWTP **(FSB)** .

Alternative 4 (NRT9)

Consider an alternative to upgrade the existing northern Route 9 collection system and upgrading the gravity system through Ranson by constructing a force main to bypass the Ranson gravity system and pump the Northern Route 9 flows directly to the Evitts Run gravity interceptor from the Lloyds Flat Pump Station.

Alternative 5 (NRT9)

Consider upgrading the existing northern Route 9 collection system along with the gravity collection system to Lloyds Flat and then constructing a gravity sewer through Fairfax Crossing to the Ranson Flowing Springs Pump Station collection system.

Alternative 6 (SRT9)

Consider the capacity and if upgrades to the Southern Route 9 collection system are required.

Alternative 7 (FSB)

Consider a cooperative project with Pleasants for their proposed Breckenridge East WWTP in the lower Flowing Springs basin. Provide an upgrade of 0.250 MGD.

Alternative 8 (NRT9, FSB)

Consider constructing the collection system upgrades proposed by the Flowing Springs project. Additionally, construct a pump station at the site of the proposed Flowing Springs WWTP which would provide capacity to pump to either the Old Standard WWTP, the Ranson Flowing Springs Pump Station or through the existing collection system to the Charles Town WWTP.

Alternative 9 Old Standard Alternatives - **(OS)**

9A. Consider upgrading the Old Standard WWTP from 0.125 MGD to 0.250 MGD to handle the flows generated in the Flowing Springs basin. This alternative does not include expansion of the collection system. This alternative considers the cost of adding additional membranes to build out existing capacity in plant. **(OS)**

9B. Consider upgrading the Old Standard WWTP from the 0.250 MGD discussed in 9A to 0.500 MGD to handle the flows generated in the lower Flowing Springs basin. This alternative does not include expansion of the collection system. This alternative considers construction of a duplicate plant next to the existing plant. **(OS)**

9C. Consider what upgrades would be required at the Breckenridge Pump Station to complement the previous two options. **(OS)**

Document 3, Matrix
Alternatives for Further Study in a Preliminary Engineering Report
(rev. August 15, 2012)

Option #	Current EDUs Served	Service Area Leg to be Addressed by Option	New EDUs that Could be Served by this Option	Pros	Cons	Affect on Ranson	Affect on Charles Town	Very Rough Cost Range	Description of Option
1	1000±	NRT9 and FSB	2304	Eliminates 5 existing p/s, at least 2 proposed p/s, relieves capacity issues within the existing Breckenridge collection system & creates a fairly trouble free gravity system with capacity for foreseable future. Many easements already attained.	Long forcemain through Charles Town neighborhoods. Future completely tied to Charles Town WWTP Plans, CIFs and rate increases.	Decreases flows through town & eliminates flows from the District to Ranson's Flowing Springs Pump Station	Delivery of Districts flows to requested location in Evitts Run Interceptor and reduces flows to Samuel Street Pump Station. Assures long term income from District to Charles Town.	$15,000,000 to $18,000,000	Construct the collection system considered in the Flowing Springs project and construct a pump station at the site of the proposed Flowing Springs WWTP with a force main to terminate near the proposed Charles Town to Tuscawilla Pump Station on Evitts Run.
2	1000±	NRT9 and FSB	2304	Eliminates 5 existing p/s, at least 2 proposed p/s, relieves capacity issues within the existing Breckenridge collection system & creates a fairly trouble free gravity system with capacity for foreseable future. Many easements already attained.	The District would be dependant upon Ranson & have to pay Ranson CIF for pump station & share in their pump station upgrades sooner than in other options. Future completely tied to Charles Town WWTP Plans, CIFs and rate increases.	Decreases flows through town & increases flows to Ranson's Flowing Springs Pump Station	Delivery of Districts flows to requested location in Evitts Run Interceptor and reduces flows to Samuel Street Pump Station. Assures long term income from District to Charles Town.	$10,000,000 to $12,000,000	Construct the collection system considered in the Flowing Springs project and construct a pump station at the site of the proposed Flowing Springs WWTP with a force main to terminate at the Ranson Flowing Springs Pump Station.
3A	400±	NRT9	836	Eliminates overloading of Ranson's Gravity collection system	Does not eliminate any District Pump Stations; does not relieve Breckenridge Pump Station; does not provide capacity for development in Flowing Springs Basin & ties District to Charles Town WWTP Plans, CIFs and rate increases.	Greater capacity through town	Delivery of Districts flows to Evitts Run Interceptor. Assures long term income from District to Charles Town.	$9,700,000 to $11,600,000	Consider upgrading the District's existing Northern Rt. 9 Collection System along with the gravity collection system through Ranson to the Charles Town Evitts Run gravity interceptor.
3B	600±	FSB	836	Eliminates backups into houses in the Breckenridge Development	Does not address sewer service in lower Flowing Springs Basin and ties District to the Ranson Flowing Springs Pump Station and future CIFs and upgrades of that system. Also ties the District's future to Charles Town WWTP Plans, CIFs and rate increases.	Uses up capacity in the Ranson Flowing Springs Pump Station and does not address the problems with the Northern Route 9 System	Delivery of Districts flows Evitts Run Interceptor via Ranson's Pump Station and reduces flows to Samuel Street Pump Station. Assures long term income from District to Charles Town.	$1,100,000 to 1,400,000	Consider upgrades to the existing Breckenridge Pump Station to convey flows to the Ranson Flowing Springs Pump Station.
3C	600±	FSB	836	May Eliminate backups into house in the Breckenridge Development & increases capacity in our existing path to the Samuel Street Pump Station	Does not address sewer service in lower Flowing Springs Basin or through Ranson, and Relies on Charles Town WWTP Plans, CIFs and rate increases for future.	Eliminates District flows from the Ranson Flowing Springs Pump Station and does not address the problems with the Northern Route 9 System & through Ranson's Mildred St. system	Increases flows to Samuel Street Pump Station which will require the needs to contribute to upgrades to that pump station.	$4,900,000 to $5,900,000	Consider upgrades to the conveyancing system from the existing Breckenridge Pump Station to Pump Station 3-6 near the race track, than on to the pump station behind Wendy's and then down to Charles Town's Samuel Street Pump Station.
4	400±	NRT9	492	Eliminates overloading of existing Ranson's Gravity collection system and keeps construction out of Downtown Ranson	Does not eliminate any District Pump Stations; does not relieve Breckenridge Pump Station; does not provide capacity for development in Flowing Springs Basin, Long Force Main & Keeps District ties to Charles Town Plans, CIFs and rate increases.	Greater capacity through town	Delivery of Districts flows to requested location	$5,800,000 to $7,000,000	Consider an alternative to upgrading the existing Rt.9 system and the gravity system through Ranson by constructing a force main to bypass the Ranson gravity system and pump the Northern Rt. 9 flows directily to the Evitts Run gravitgy interceptor from the Lloyds Flat Pump Station.

Document 3, Matrix
Alternatives for Further Study in a Preliminary Engineering Report
(rev. August 15, 2012)

Option #	Current EDUs Served	Service Area Leg to be Addressed by Option	New EDUs that Could be Served by this Option	Pros	Cons	Affect on Ranson	Affect on Charles Town	Very Rough Cost Range	Description of Option
5	400±	NRT9	492	Eliminates overloading of existing Ranson's Gravity collection system	Does not eliminate any District Pump Stations; does not relieve Breckenridge Pump Station; does not provide capacity for development in Flowing Springs Basin & keeps the District tied to Charles Town for future WWTP plans, CIFs and rate increases.	Greater capacity through town	Delivery of Districts flows to requested location	$4,200,000 to $5,400,000	Consider upgrading the existing North Rt. 9 to Lloyds Flat and then constructing a gravity sewer through Fairfax Crossing, to Ranson Flowing Springs Pump Station.
6	300±	SRT9	very small amount	Restores buffer capacity to existing system	Only provides modest capacity improvement and does not address future growth	None	A modest increase in the flows to Samuel Street Pump Station	$900,000 to $1,200,000	Upgrade PS 4-5 and new FM to Samuel Street Gravity System for the Southern Rt. 9 collection system.
7	0	FSB	976 from Breckenridge East & possibly more	Could provide capacity for growth in Lower Flowing Springs Basin	This alternative does not provide a collection system for Lower Flowing Springs Basin and would rely on Breckenridge East collection system and does not address Route 9 issues.	None	Could eliminate future flows from the Flowing Springs Basin to Charles Town WWTP	$7,000,000 to $9,000,000	Cooperate with Pleasants to construct a Breckenridge East WWTP and increase capacity by an additional 0.25 MGD.
8	1000±	NRT9 and FSB	2304	eliminates 5 existing p/s, at least 2 proposed p/s, relieves capacity issues within the existing Breckenridge collection system & creates a fairly trouble free gravity system with capacity for foreseable future and allows maximum flexability in directing District flows for treatment. 80% of easements already attained.	Upgrades to Old Standard WWTP would have to be completed to fully utilize option.	Greater capacity through town and would allow Ranson to send flows to Old Standard WWTP	Could eliminate future flows from the Flowing Springs Basin to Charles Town WWTP	$18,000,000 to $21,000,000	Consider constructing the collection system proposed in the Flowing Springs Project and constructing a pump station at the site of the proposed Flowing Springs WWTP and providing the capacity to pump to either the Old Standard plant, the Ranson Flowing Springs pump station or through the existing collection system to the Charles Town WWTP.
9A	55	OS	694	Prepares the Old Standard WWTP for District flows, Provides capacity for future Route 340 growth	This alternative does not provide a collection system for Lower Flowing Springs Basin and would rely on Old Standard collection system .	None	With future collection addition could reduce flows to Charles Town WWTPs	$230,000 to $330,000	Upgrade Old Standard (Add Membranes for up to 0.25 MGD) to handle flows generated in the Flowing Springs Basin. Does not include collection system from the existing Flowing Springs neighborhoods.
9B	55	OS	1389	Prepares the Old Standard WWTP for District flows, Provides capacity for future Route 340 growth	This alternative does not provide a collection system for Lower Flowing Springs Basin and would rely on Old Standard collection system.	None	With future collection addition could reduce flows to Charles Town WWTPs	$7,000,000 to $9,000,000	Upgrade Old Standard to 0.50 MGD (After already upgrading to 0.25 MGD, as above.). Requires a duplicate plant be constructed next to existing plant.
9C	55	OS	2083	Provide transmission capacity to Old Standard WWTP	Does not address the Northern Route 9 issues	Could eliminate flows to the Ranson Flowing Springs Pump Station	Could eliminate future flows from the Flowing Springs Basin to Charles Town WWTP	varies	Consider what upgrades would be necessary at the Breckenridge Pump Station to complement the previous 2 options.


Alternative Route 1
Existing PumpStation
Existing Treatment Plant
To New Pump Station
To Charles Town WTP
Existing Gravity Main
Existing Force Main
Road
Railroad
City of Ranson
City of Charles Town
Present PSD Service Area
Committed PSD Sevice Area
Shenandoah River
0
1,000
2,000
Feet
All proposed main locations are approximate and are for illustration purposes only.
P
M
L
WELSHIRE RD
LEVEL GREEN FARM LN
BASSETT LN
WAPPAMPA BLVD
CREEMS DR
CHARLES TOWN RD
WOODLAND DR
TURTLE LN
WOODLAND CT
ZOAR LN
JOB CORPS RD
CASPIAN WAY
SHADE TREE LN
SPUR CT
GIRTH LN
DANIEL RD
MEDIA FARM LN
FOX RUN WAY
FLOWING SPRING RD
ASPEN DR
WHISKERS WAY
PEPPER ABBEY DR
PEPPER ABBEY PATH
JACK RABBIT PATH
THUMPER DR
BUGS CT
ROSEWOOD DR
BAISTEN
MARIE DR
EVERGREEN DR
REX DR
DIANNE CT
BRIAR RUN DR
FLOWING ACRES RD
REGENT WAY
POLO CT
TROTTING WAY
POSTING WAY
REGENCY WAY
PERRIEN WAY
JOHNS CT
GRAYROCK RD
DEKORD WAY
CAMBRIDGE DR
HARROW RD
PONMEE LN
VILLA LN
BEALHAM MANOR DR
PLEASANTVILLE COUNTRY CLUB RD
CLOVER LEA WAY
STAFFORD LN
SHARP ST
MARA ROSE LN
TANNER CT
GAP VIEW BLVD
GENERAL EARLY DR
NEEDWOOD FARM LN
MUMFORD LN
CLIFFORD CT
OREGON TRL
SHEPHERDSTOWN PKE
AMANDA CT
LEWIS CT
CLARK CT
OLD RIDER RD
CYNARA LN
ELK RUN ESTATES DR
CHEYENNE DR
CARRIAGE DR
COACH CT
ENMAY WIND DR
BAKERTON RD
BOXER WAY
FORT HILL RD
WASHINGTON CT
CAMPGROUND RD
PROSPECT AVE
CHENEY AVE
SPRING ST
POLK ST
ELM ST
WHITMAN AVE
W WASHINGTON ST
ONE KAMAUGA DR
LOOKOUT MOUNTAIN CT
FIVE FORKS DR
SHIPLEY SCHOOL RD
KOONCE RD
ROBERT C BYRD DR
TAPS WAY
NAST APTS HILL RD
MELVILLE RD
PEREGRINE LN
ALSOP LN
OYSTER RD
TABB LN RD
HALLTOWN RD
FARWAY DR
CARY LU CIR
WILLIAM C WILSON FWY
KERNS DR
BLAIR RD
BRADSTONE LN
QUARRY LN
PINE CREST LN
OLYMPIC WAY
DON QUIXOTE DR
NEW THOMAS DR
MARLOW RD
WOLFCRAFT WAY
SOMERSET BLVD
MARKENKEMP WAY
MOUNTAIN LAUREL BLVD
GLENBROOK RD
OVERBROOK RD
SPARKLING BROOK RD
SHALLOW CREEK DR
GEORGIA AVE
FULTON AVE
REAUREGARD BLVD
PIPARIN LN
PINKARD DR
MEADOW BRANCH DR
MEADOW BRANCH PATH
MEADOW BRANCH RD
CHEVROLET DR
WILD GEESE WAY
ROUTE 9
HOLLYWOOD DR
WILLOW SPRING DR
CHERRY TREE DR
STEPHANIE WAY
KILLIAN LN
VICTORIA LN
KEYES FERRY RD
SOUTHERN LN
FLEETWOOD LN
OAKLAND TER
CATTAIL RUN RD
HONEY ST
RENNIE DR
CANYON RD
RIVERMIST LN
GOODE LN
SHENANWOOD DR
JEANIE CRD
LAURIE DR
BARBARA LN
KELLY DR
ESTES WAY
MAPLE LN
LAUREL DR
BEECH DR
TIGGER TRL
CEDAR RUN LN
CAMPSITE TRL
CAMP HILL LN
NEW HARMONY LN
MIDDLE CROSS TRL
RED TREE LN
BLUFF LN
RANGE RD
KEYES GAP RD
STONE BEAR
TWILIGHT TIME
BLOOMERY RD
WORTHLIFE WAY
STARLIGHT LN
LONG LEAF LN
CHESTNUT CT
OAK LN
PERSIMMON PEAR LN
MAPLE RIDGE LN
PAW PAW WAY
CRESTVIEW DR
CRESTVIEW PL
RED BUD LOOP
GREAT OAK LN
WOODLAWN DR
RIVER VIEW DR
BLUE RIDGE LOOP
PROSPERITY LN
PIEDMONT LN
JEFFERSON VILLAGE DR
EDGEMONT AVE
THISTLE RIDGE LN
RURAL RETREAT DR
STONY LN
ALEXIS DR
LONE OAK RD
OLD LEETOWN PIKE
CURRIE RD
WESCOTT DR
MYRTLE GREEN DR
JOSHUA FREEMAN BLVD
WEST VIRGINIA WAY
OAKLEE DR
BAKER DR
MAINPARK BLVD
ROUTE 9
DESTRIER ST
FOAL ST
MARE ST
SALLION ST
STEED ST
INFANTRY BLVD
16TH AVE
ROBERT E LEE DR
CIRCLE ST
AMERITECH ST
MAPLE TREE DR
STAYMAN DR
ORCHARD DR
HICKORY LN
TURF LN
YORK RD
PEACH TREE DR
CRANES LN
PARK AVE
E 18TH AVE
E 17TH AVE
E 16TH AVE
E 15TH AVE
E 14TH AVE
E 13TH AVE
E 12TH AVE
E 11TH AVE
E 10TH AVE
HARRISON ST
NEWMAN ST
PRESTON ST
E BELTLINE AVE
COOKE ST
BAYSHIRE AVE
MARTINSBURG PIKE
BURNS ST
GRASSDALE ST
E 9TH AVE
E 8TH AVE
E 7TH AVE
E 6TH AVE
E 5TH AVE
E 4TH AVE
E 3RD AVE
E 2ND AVE
E 1ST AVE
W 1ST AVE
W 2ND AVE
W 3RD AVE
W 4TH AVE
W 5TH AVE
W 6TH AVE
W 7TH AVE
W SEVENTH AVE
W SIXTH AVE
W FIFTH AVE
W FOURTH AVE
W THIRD AVE
W SECOND AVE
MACDONALD ST
SUMMERALL ST
S SIRRINE BLVD
PARADE ST
BELLE ST
E NORTH ST
E LIBERTY ST
COURT ST
W NORTH ST
W LIBERTY ST
E CONGRESS ST
E LIBERTY ST
E AVIS ST
SCHOOL ST
W ACADEMY ST
W WASHINGTON ST
EAGLE AVE
PARK ST
CENTER ST
W WATER ST
E WATER ST
W WEST ST
E WEST ST
W ANN ST
E ANN ST
CHOCTAW ST
CHEROKEE ST
MASON ST
E TORRES TAIL
MORGAN ST
MORGAN AVE
S MAPLE ST
BROWNING LN
BROWNING AVE
JEFFERSON AVE
GAREN PL
TH CT
RIVER CT
BUSHEY ST
HIGH ST
HALE RD
BRUCE DR
CREEK LN DR
STEVENSWAY
ALSIGE DR
FAIRVIEW DR
FOREST DR
CREAMERY PL
FERRY DR
CRAIGHILL DR
CASSILIS LN
VISTA CT
AUGUSTINE AVE
ROSEMONT WAY
OLD ALTONA LN
MIDDLEWAY PIKE
SUMMIT POINT RD
PROSPERITY LN
PIEDMONT LN
OLD STAGE RD

All propsed main locations are approximate and are for illustration purposes only.

Alternative Route 2

- M Existing PumpStation
- L Existing Treatment Plant
- To New Pump Station
- To Ranson Pump Station
- Existing Gravity Main
- Existing Force Main
- Road
- Railroad
- City of Ranson
- City of Charles Town
- Present PSD Service Area
- Committed PSD Service Area
- Shenandoah River

0 1,000 2,000 Feet


2
3A
3B
3C
Alternative Route 3
Existing PumpStation
Existing Treatment Plant
To Charles Town WTP - 3A
To Ranson Pump Station - 3B
To Charles Town WTP - 3C
Existing Gravity Main
Existing Force Main
Road
Railroad
City of Ranson
City of Charles Town
Present PSD Service Area
Committed PSD Service Area
Shenandoah River
0 1,000 2,000
Feet
All proposed main locations are approximate and are for illustration purposes only.
LUTHER JONES RD
WARM SPRINGS RD
EDMOND RD
W BURR BLVD
ROUTE 9
SHENANDOAH JUNCTION RD
PHILIP AVE
CHARLESTOWN RD
GAP VIEW FARM LN
CLEMS DR
TURTLE LN
WAR ADMIRAL BLVD
N HILDRED ST
MEDIA FARM LN
THUMPER DR
OAK LEE DR
MARIE DR
REX DR
DIANNE CT
FLOWING ACRES RD
GRAYROCK RD
HARROW PL
POMMELL LN
GOLDENROD DR
HANOVERIAN DR
PELHAM LN
POSTING WAY
OLD COUNTRY CLUB RD
BEALLAIR MANOR DR
FLOWING SPRINGS RD
AZALEA DR
DAISY LN
FOX RUN WAY
WHISKERS WAY
WEST VIRGINIA WAY
ROUTE 9
BAKER PL
WESCOTT DR
ROBELEE DR
16TH AVE
FOAL ST
N FAIRFAX BLVD
STALLION ST
MARE ST
AMERITECH ST
PARK AVE
E 12TH AVE
E 15TH AVE
N PRESTON ST
N RETZMANN ST
COOKE ST
E SIXTH AVE
E FIFTH AVE
E THIRD AVE
E SECOND AVE
E FIRST AVE
E NORTH ST
E LIBERTY ST
E AVIS ST
E ACADEMY ST
HUNTER ST
4TH ST
INDEPENDENCE CT
JEFFERSON AVE
MORRISON ST
S MILDRED ST
S SAMUEL ST
S GEORGE ST
S CHARLES ST
S LAWRENCE ST
S MERCER ST
AUGUSTINE AVE
VISTA CT
HEIGH ST
DUNLAP DR
CRAIGHILL DR
BELVEDERE DR
EUCLID AVE
CHERRY TREE DR
WILLOW SPRING DR
HOLLYWOOD DR
E WASHINGTON ST
W WASHINGTON ST
ROSEMONT WAY
EAGLE AVE
W LIBERTY ST
W FIFTH AVE
W FOURTH AVE
W THIRD AVE
W SECOND AVE
W SEVENTH AVE
W SIXTH AVE
W BELTLINE AVE
BURRIS ST
MCDONALD ST
RACETRACK ST
PIMLICO DR
SOMERSET BLVD
MONTE CARLO WAY
NEW THOMAS DR
MARLOW RD
CHEVROLET DR
KILLIAN LN
VICTORIA LN
KEYES FERRY RD
SOUTHERLY LN
CATTAIL RUN RD
FLEETWOOD LN
WILLIAM L WILSON FWY
HALLTOWN RD
FAIRWAY DR
EYSTER RD
HERMLE MOORE RD
KERNS DR
MILLVILLE RD
OLYMPIC WAY
BLAIR RD
QUARRY LN
WOLFCRAFT WAY
SHALLOW CREEK DR
GLENBROOK RD
FULTON AVE
KOONCE RD
PEREGRINE LN
TAPS WAY
AMANDA CT
CHICKAMAUGA DR
LOOKOUT MOUNTAIN CT
FIVE FORKS DR
CARRIAGE DR
CAMPGROUND RD
FORT HILL RD
BOXER WAY
WASHINGTON CT
SHOPE LINE DR
BAKERTON RD
OLD RIDER RD
CYMARA LN
JENNY LIND DR
POTOMAC ST
PROSPECT AVE
CHENEY AVE
POLK ST
DAY ST
MADISON ST
ELM ST
W WASHINGTON ST
CLAY ST
COLUMBIA ST
W RIDGE ST
UNION ST
LONG LEAF LN
PAW PAW WAY
RIVER VIEW DR
POPLAR RD
OLD HICKORY LN
HONEY ST
RENIE DR
BISS RD
RIVERMIST LN
GOODE LN
JEANIE G RD
KELLY DR
BARBARA LN
LAURIE DR
ESTES WAY
LAUREL DR
BEECH DR
TIGGER TRL
KEYES GAP RD
SKYHAWK TRL
OLD OAK LN
BEAR RUN
CEDAR HILL DR
CEDAR RUN LN
NEW HARMONY LN
RANGE RD
BLUFF LN
BLOOMERY RD
WOODCUTTERS LN
SHENANDOAH JUNCTION
MELVIN RD
KIDWILER RD
MYERS LN
JOB CORPS RD
APPLE CROSS RD
TIFFANY CT
MAPLEWOOD CT
REDWOOD CT
CEDARWOOD CT
ENGLE SWITCH RD
ENGLE MOLERS RD
SAM MICHAELS LN
STAFFORD LN
SHARP ST
MARA ROSE LN
JASMINE PL
CHESSIE LN
ZOAR LN
SHADE TREE LN
SPUR CT
GIRTH LN
GAP VIEW BLVD
GENERAL EARLY DR
SHEPHERDSTOWN PIKE
LEWIS CT
OREGON TRL
ANGLERS RIDGE DR
DEER RIDGE DR
BEST RD
TIMBER LN
MAPLE AVE
MEADOW DR
CARTER AVE
HARVEST CT
FRISKY CT
RIVER CLIFF DR
BOSS LN
PRYAL CT
BUFFLEHEAD DR
SMITH MANOR DR
HAYBINE DR
KEPHART DR
RUBY ST
ELK ST
FIRST ST
SECOND ST
3RD ST
4TH ST
5TH ST
7TH ST
RIDGE RD
WOODBURY DR
REYNARD RD
DAVID CT
LEETOWN RD
SEVEN OAKS LN
MEANDERING LN
HITE RD
WILTSHIRE RD
CLENDENNING DR
STEELEY WAY
JAMES BURR BLVD
MCGARREY BLVD
HORNETS NEST CT
GRANT RD
JOHNSONTOWN RD
LANDON WAY
JEFFERSON ORCHARD RD
ROUND OAK LN
OLD LEETOWN PIKE
PARGROUND LN
BASSETT LN
CURRIE RD
CLAYMONT AVE
STAR LN
APEX CIR
ELDER LN
THISTLE RIDGE LN
MAGAHA ST
DOVE HILL DR
HOT WHEELS DR
RURAL RETREAT DR
STONY LN
ALEXIS DR
LONE OAK RD
DARKE LN
DECLARATION DR
PROSPERITY LN
AMBLER RD
CAMERON RUN
STONE PILLAR LN
SAINT ANDREWS DR
MUIRFIELD CT
TALL OAK DR
SUNLITE DR
DEERFIELD DR
BALTUSROL DR
PACKETT DR
CAMDEN DR
DOUGLAS DR
TURNBERRY DR
BROOKLINE DR
SAWGRASS DR
OAKMONT DR
BAY CT
AVENEL CT
TUSCAWILLA DR
CARRELL LN
PIEDMONT LN
MIDDLEWAY PIKE
SUMMIT POINT RD
COLD STORAGE RD
HICKORY LN
AMBROSE DR
YORK RD
PEACH TREE DR
CRANES LN
STAYMAN DR

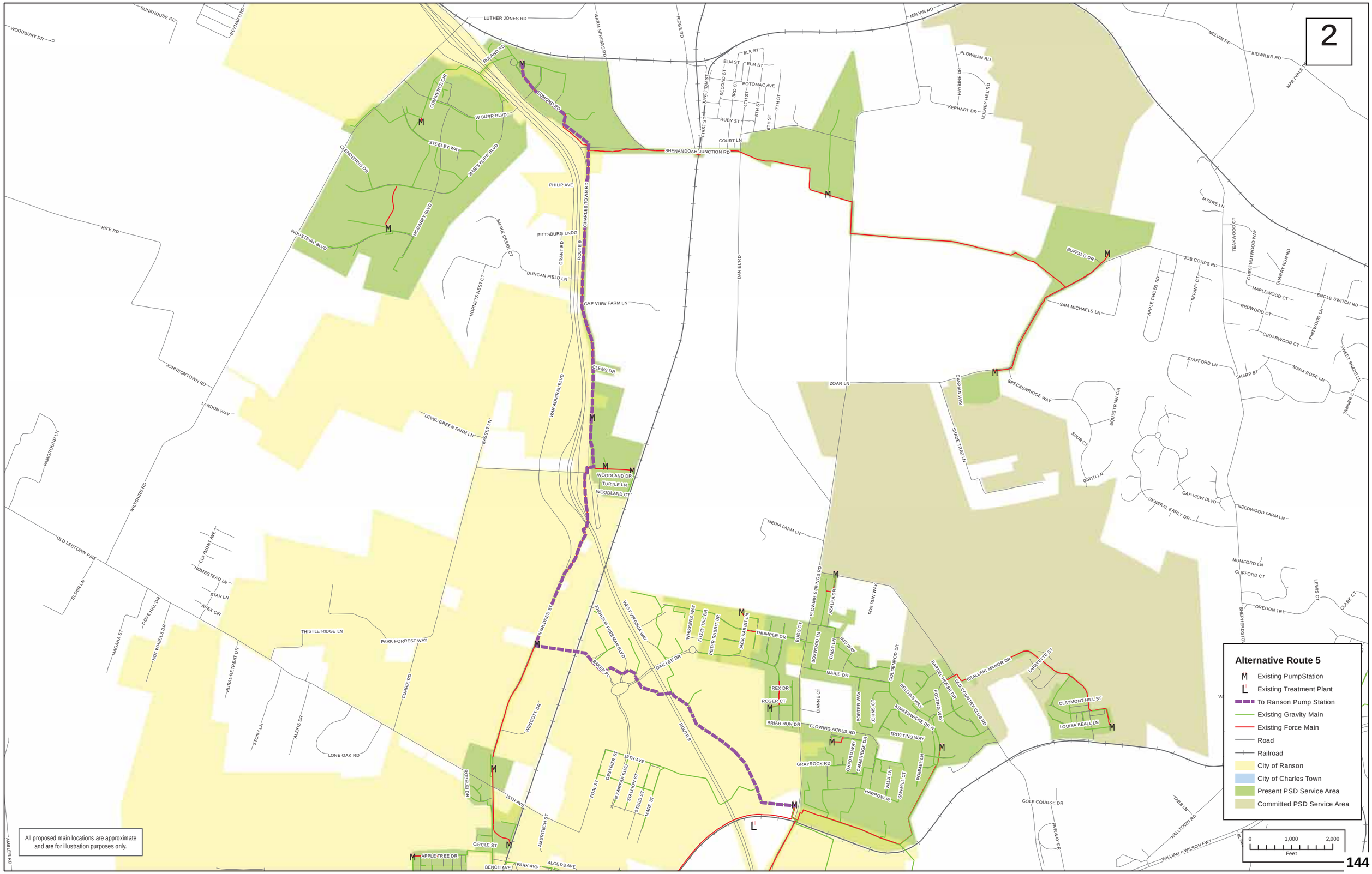
Alternative Route 4

- M Existing PumpStation
- L Existing Treatment Plant
- To Charles Town WTP
- Existing Gravity Main
- Existing Force Main
- Road
- Railroad
- City of Ranson
- City of Charles Town
- Present PSD Service Area
- Committed PSD Service Area
- Shenandoah River

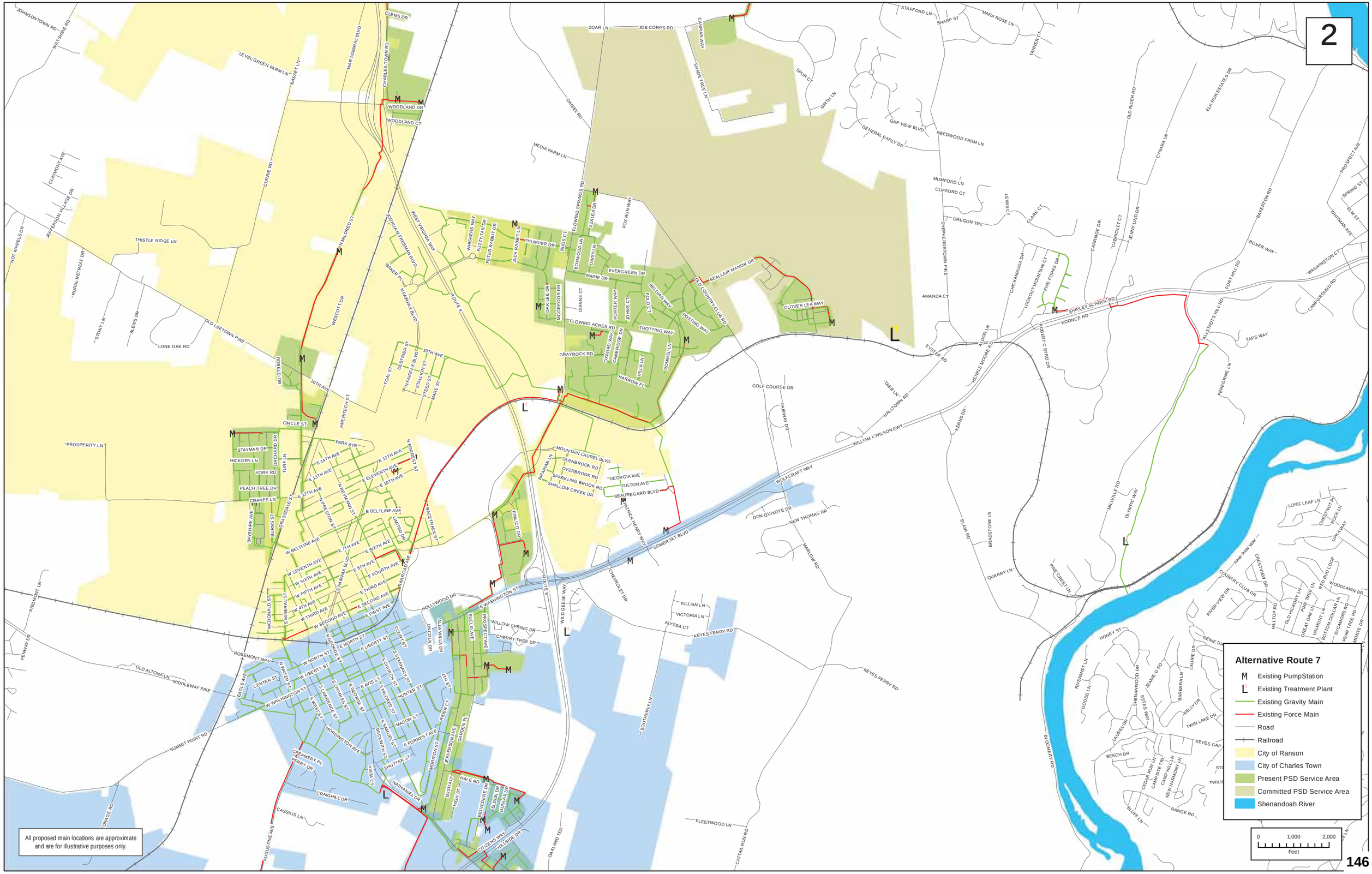
0 1,000 2,000 Feet

All proposed main locations are approximate and are for illustrative purposes only.

2


BUNKHOUSE RD
WOODBURY DR
REYNARD RD
LUTHER JONES RD
WARM SPRINGS RD
RIDGE RD
MELVIN RD
KIDWILER RD
MARYVALE DR
RULAND RD
EDMOND RD
COMMERCE CIR
W BURR BLVD
STEELEY WAY
JAMES BURR BLVD
CLENDENING DR
INDUSTRIAL BLVD
MCGARRY BLVD
PHILIP AVE
PITTSBURG LNDG
SNAKE CREEK CT
DUNCAN FIELD LN
GRANT RD
ROUTE 9
CHARLES TOWN RD
GAP VIEW FARM LN
CLEMS DR
WAR ADMIRAL BLVD
WOODLAND DR
TURTLE LN
WOODLAND CT
HORNE TS NEST CT
DANIEL RD
ELM ST
ELK ST
POTOMAC AVE
JUNCTION ST
FIRST ST
SECOND ST
3RD ST
4TH ST
5TH ST
6TH ST
7TH ST
RUBY ST
COURT LN
SHENANDOAH JUNCTION RD
PLOWMAN RD
HAYBINE DR
KEPHART DR
VOLNEY HILL RD
BUFFALO DR
SAM MICHAELS LN
MYERS LN
JOB CORPS RD
TEAKWOOD CT
CHESTNUTWOOD WAY
QUARRY RUN RD
MAPLEWOOD CT
ENGLE SWITCH RD
REDWOOD CT
CEDARWOOD CT
PINEWOOD LN
APPLE CROSS RD
TIFFANY CT
SWEET SHADE LN
STAFFORD LN
SHARP ST
MARA ROSE LN
TANNER CT
ZOAR LN
CASPIAN WAY
BRECKENRIDGE WAY
SHADE TREE LN
EQUESTRIAN CIR
SPUR CT
GIRTH LN
GAP VIEW BLVD
GENERAL EARLY DR
NEEDWOOD FARM LN
MEDIA FARM LN
GOLF COURSE DR
FAIRWAY DR
HALLTOWN RD
WILLIAM L WILSON FWY
7468 LN
HITE RD
JOHNSONTOWN RD
LANDON WAY
FAIRGROUND LN
WILTSHIRE RD
LEVEL GREEN FARM LN
BASSET LN
OLD LEETOWN PIKE
ELBER LN
CLAYMONT AVE
HOMESTEAD LN
STAR LN
APEX CIR
DIXIE HILL DR
HOT WHEELS DR
MAGNOLIA ST
RURAL RETREAT DR
STONY LN
ALEXIS DR
THISTLE RIDGE LN
PARK FORREST WAY
CURRIE RD
LONE OAK RD
AMBLER RD
N MILDRED ST
WESCOTT DR
JOSHUA M FREEMAN BLVD
BAKER PL
WEST VIRGINIA WAY
OAK LEE DR
ROBELEI DR
16TH AVE
19TH AVE
DESTRIER ST
FOAL ST
N FAIRFAX BLVD
STALLION ST
STEED ST
MARE ST
AMERITECH ST
CIRCLE ST
APPLE TREE DR
BENCH AVE
PARK AVE
ALGERS AVE
WHISKERS WAY
FLIZZYTAIL DR
PETER RABBIT DR
JACK RABBIT LN
THUMPER DR
BUGS CT
FLOWING SPRINGS RD
AZALEA DR
FOX RUN WAY
ROXWOOD LN
DAISY LN
IRIS WAY
MARIE DR
GOLDENROD DR
REX DR
ROGER CT
DIANNE CT
PORTER WAY
JOHNS CT
BELGIAN WAY
POSTING WAY
KIMBERWICKE DR N
BARREL HORSE DR
OLD COUNTRY CLUB RD
BEALLAIR MANOR DR
LAFAYETTE ST
CLAYMONT HILL ST
LOUISA BEALL LN
BRIAR RUN DR
FLOWING ACRES RD
TROTTING WAY
GRAYROCK RD
OXFORD WAY
CAMBRIDGE DR
HARROW PL
VILLA LN
SAWMILL CT
POMMEL LN
MUMFORD LN
CLIFFORD CT
LEWIS CT
CLARK CT
OREGON TRL
SHEPHERDSTOWN PIKE
Alternative Route 5
Existing PumpStation
Existing Treatment Plant
To Ranson Pump Station
Existing Gravity Main
Existing Force Main
Road
Railroad
City of Ranson
City of Charles Town
Present PSD Service Area
Committed PSD Service Area
All proposed main locations are approximate and are for illustration purposes only.
0
1,000
2,000
Feet


W WASHINGTON ST
SUMMIT POINT RD
W AVIS ST
W ACADEMY ST
W ANN ST
WEIRICK ROW
MORNINGTON AVE
BLAKELEY PL
S MILDRED ST
MASON ST
S CHURCH ST
S SEMINARY ST
GREEN ST
E FORREST AVE
BECKWITH ST
E WALL ST
SHUTTER ST
MORISON ST
BROWNVILLE LN
JEFFERSON AVE
GARNER PL
SOUTHERLY LN
AUGUSTINE AVE
CREAMERY PL
SHUTT CT
PERRY DR
MOORE CT
CRAIGHILL DR
SPRING DALE DR
VISTA CT
S GEORGE STREET EXT
S SAMUEL ST
NATHANIEL DR
S GEORGE ST
BUSH ALY
HALE RD
BELVEDERE DR
ELDON DR
DUNAAP DR
BRUCE DR
CRAWFORD WAY
CRESCENT DR
HOLMES WAY
HIGH ST
CASSILIS LN
CITIZENS WAY
ROUTE 9
HILLSIDE DR
BRAMBLE DR
STERNWAY DR
EDAW DR
BARLEY LN
BAILEY BROOKS WAY
BERRYVILLE PIKE
OAKLAND TER
FLEETWOOD LN
CATTAIL RUN RD
CAMPBELL DR
REVERE DR
BARKSDALE CT
BARKSDALE DR
FARLEIGH DR
GRAPES WAY
NORTHWINDS DR
CROSSWINDS DR
WIND SHEAR DR
GENTLE BREEZE LN
CHARLESTOWN RD
CAMPBELL DR
CANDLEWOOD DR
CANDLEWOOD DR
BURBERRY LN
SANTMYER WAY
Flow To Pump Station 4-5
Flow To Norborne Glebe Pump Station
VINTON LN
PAGE JACKSON SCHOOL RD
GIBSONTOWN RD
OLD CAVE RD
KABLETOWN RD
FAIRVIEW DR
M
L
P
All proposed main locations are approximate and are for illustraion purposes only.
Alternative Route 6
M Existing PumpStation
L Existing Treatment Plant
Proposed Gravity Main
Proposed Force Main
Existing Gravity Main
Existing Force Main
Road
Railroad
City of Ranson
City of Charles Town
Present PSD Service Area
Committed PSD Service Area
0
500
1,000
Feet


2
Alternative Route 7
Existing PumpStation
Existing Treatment Plant
Existing Gravity Main
Existing Force Main
Road
Railroad
City of Ranson
City of Charles Town
Present PSD Service Area
Committed PSD Service Area
Shenandoah River
All proposed main locations are approximate and are for illustrative purposes only.
0
1,000
2,000
Feet
JOHNSONTOWN RD
WITSHIRE RD
LEVEL GREEN FARM LN
BASSET LN
WAR ADMIRAL BLVD
CLEMS DR
CHARLES TOWN RD
WOODLAND DR
WOODLAND CT
CURRIE RD
CLAYMONT AVE
JEFFERSON VILLAGE DR
HOT WHEELS DR
THISTLE RIDGE LN
RURAL RETREAT DR
STONY LN
ALEXS DR
LONE OAK RD
OLD LEETOWN PIKE
N MILDRED ST
WESCOTT DR
ROBELEE DR
16TH AVE
AMERITECH ST
CIRCLE ST
FOAL ST
DESTRIER ST
INFAIRFAX BLVD
19TH AVE
STALLION ST
STEED ST
MARE ST
PROSPERITY LN
STAYMAN DR
HICKORY LN
YORK RD
PEACH TREE DR
CRANES LN
ORCHARD DR
TURF LN
PARK AVE
E 14TH AVE
E 13TH AVE
E 12TH AVE
E 11TH AVE
E 10TH AVE
N FORREST ST
N NEWMANN ST
N PRESTON ST
E BELTLINE AVE
W BELTLINE AVE
BAYSHIRE AVE
BURNS ST
GRASSDALE ST
PACETRACK ST
LIMITED DR
E 7TH AVE
E SIXTH AVE
W SEVENTH AVE
W SIXTH AVE
E 5TH AVE
E FOURTH AVE
W FIFTH AVE
E THIRD AVE
W 4TH AVE
E SECOND AVE
W THIRD AVE
W SECOND AVE
E FIRST AVE
S PARK BLVD
RAILROAD AVE
MCDONALD ST
S MINERAL ST
JOSHUA M FREEMAN BLVD
WEST VIRGINIA WAY
BAKER PL
N FAIRFAX BLVD
ROUTE 9
WHISKERS WAY
FLIZZYTAIL DR
PETER RABBIT DR
JACK RABBIT LN
THUMPER DR
BUDS CT
FLOWING SPRINGS RD
AZALEA DR
FOX RUN WAY
BOXWOOD LN
DAISY LN
EVERGREEN DR
MARIE DR
OAK LEE DR
MCGREGOR DR
DIANNE CT
PORTER WAY
JOHN CT
POLO CT
BELGIAN WAY
OLD COUNTRY CLUB RD
BEALLAIR MANOR DR
CLOVER LEA WAY
POSTING WAY
TROTTING WAY
POMMEL LN
FLOWING ACRES RD
GRAYROCK RD
OXFORD WAY
CAMBRIDGE DR
VILLA LN
HARROW PL
ZOAR LN
JOB CORPS RD
CASPIAN WAY
SHADE TREE LN
SPUR CT
GIRTH LN
DANIEL RD
MEDIA FARM LN
GOLF COURSE DR
FAIRWAY DR
TABB LN
HALLTOWN RD
WILLIAM L WILSON FWY
KERNS DR
STAFFORD LN
SHARP ST
MARA ROSE LN
TANNER CT
GAP VIEW BLVD
GENERAL EARLY DR
NEEDWOOD FARM LN
MUMFORD LN
CLIFFORD CT
OREGON TRL
SHEPHERDSTOWN PIKE
LEWIS CT
CLARK CT
AMANDA CT
CHICKAMAUGA DR
LOOKOUT MOUNTAIN CT
FIVE FORKS DR
CARRIAGE DR
CABRIOLET CT
JENNY LIND DR
CYNARA LN
OLD RIDER RD
ELK RUN ESTATES DR
PROSPECT AVE
SPRING ST
ELM ST
WHITMAN AVE
BAKERTON RD
BOXER WAY
WASHINGTON CT
FORT HILL RD
CAMP GROUND RD
SHIPLEY SCHOOL RD
KOONCE RD
ALDOR LN
HENKLE MOORE RD
ROBERT C BYRD DR
ALLSTOTS HILL RD
TAPS WAY
PEREGRINE LN
E 1ST ST
ROSEMONT WAY
OLD ALTONA LN
MIDDLEWAY PIKE
EAGLE AVE
CENTER ST
W WASHINGTON ST
W LIBERTY ST
W NORTH ST
E NORTH ST
E LIBERTY ST
N GEORGE ST
S CHURCH ST
S SEMINARY ST
S CHARLES ST
S GEORGE ST
E AVIS ST
S MILDRED ST
HUNTER ST
4TH ST
RIDER CT
MASON ST
E FORREST AVE
GARDEN PL
JEFFERSON AVE
MORISON ST
BECKWITH ST
S SAMUEL ST
MORNINGTON AVE
SHUTTER ST
VISTA CT
NATHANIEL DR
CREAMERY PL
PERRY DR
CRAIGHILL DR
CASSILIS LN
AUGUSTINE AVE
SUMMIT POINT RD
ORAGE RD
PIEDMONT LN
FENWAY DR
HOLLYWOOD DR
E WASHINGTON ST
ALLA WILLA DR
LINCOLN DR
EUCLID AVE
PROSPECT AVE
WILLOW SPRING DR
CHERRY TREE DR
HALE RD
BUSHKAY
HIGH ST
BELVEDERE DR
ELDON DR
DUNLAP DR
CITIZENS WAY
HILLSIDE DR
OAKLAND TER
WOLFCRAFT WAY
SOMERSET BLVD
PATRICK HENRY WAY
PIMLICO DR
CHEVROLET DR
WILD GEESE WAY
KILLIAN LN
VICTORIA LN
ALYSSA CT
KEYES FERRY RD
SOUTHERLY LN
FLEETWOOD LN
CATTAIL RUN RD
DON QUIXOTE DR
NEW THOMAS DR
MARLOW RD
BLAIR RD
BRADSTONE LN
QUARRY LN
PINE CREST LN
MILLVILLE RD
OLYMPIC WAY
MOUNTAIN LAUREL BLVD
GLENBROOK RD
OVERBROOK RD
SPARKLING BROOK RD
SHALLOW CREEK DR
RIPARIAN LN
GEORGIA AVE
FULTON AVE
BEAUREGARD BLVD
LONG LEAF LN
CHESTNUT PL
ROCK LN
LUKA WAY
PAW PAW WAY
CRESTVIEW DR
COUNTRY CLUB DR
RIVER VIEW DR
WOODLAWN DR
RED BUD LOOP
HILLTOP RD
OLD HICKORY LN
PINE TREE LN
GREAT OAK LN
VALMONT LN
BOTTOM DOLLAR LN
SYCAMORE RD
PEAR TREE RD
MONTE DR
RENNIE DR
HONEY ST
RIVERMIST LN
GOODE LN
JEANIE G RD
SHENANDOAH DR
ESTES WAY
LAURIE DR
BARBARA LN
KELLY DR
TWIN LAKE DR
KEYES GAP
LAUREL DR
BEECH DR
CEDAR RUN LN
CAMP SITE TRL
CAMP HILL LN
NEW HARMONY LN
BLUFF LN
RANGE RD
BLOOMERY RD
TWILIGHT LN

2

All proposed main locations area approximate and are for illustration purposes only.

Alternative Route 8

- M Existing PumpStation
- L Existing Treatment Plant
- To New Pump Station
- To Ranson Pump Station
- To Old Standard WTP
- To Charles Town WTP
- Existing Gravity Main
- Existing Force Main
- Road
- Railroad
- City of Ranson
- City of Charles Town
- Present PSD Service Area
- Committed PSD Service Area
- Shenandoah River

0 1,000 2,000 Feet

2

9c - Construct a main to connect Flowing Springs Basin to upgraded Old Standard Plant

9b - Construct a duplicate wastewater treatment plant to increase capacity from .25 mgd to .50 mgd

9a - Add additional membranes to Old Standard Wastewater Treatment Plant to increase capacity from .125 mgd to .25 mgd

All proposed main locations are approximate and are for illustration purposes only.

Alternative Route 9

- Existing PumpStation
- Existing Treatment Plant
- To Old Standard WTP
- Existing Gravity Main
- Existing Force Main
- Road
- Railroad
- City of Ranson
- City of Charles Town
- Present PSD Service Area
- Committed PSD Service Area
- Shenandoah River

0 1,000 Feet

Appendix 2

Remove Flows from Ranson System

City of Ranson Letter - Offer to Assist

Charles Town Utility Board Letter

Region 9 Planning and Development Council Letter

Jefferson County Commission Letter

Jefferson County Development Authority

City of Ranson

Office of the City Manager
312 South Mildred Street
Ranson, West Virginia 25438-1621
Phone (304) 724-3872 FAX (304) 728-8579
E-mail: ablake@cityofransonwv.net

Council Members
Dave Cheshire
Scott Coulter
Donnie Haines
Duke Pierson
Mike Anderson

A. David Hamill - Mayor Debbie McClure – Recorder

June 27, 2014

Susanne Lawton, General Manager
340 Edmond Road, Suite A
Kearneysville, West Virginia 25430

Dear Sue:

As you may be aware, our community and the City is Ranson are starting to see signs of recovery from the Great Recession. City building permit issuance has increased and large subdivision plans are again starting to be processed through the City's Community Development Department.

As we have previously discussed and as I have shared with the Ranson City Council, I am somewhat concerned about the Jefferson County's PSD usage of the City's sanitary sewer collector system. The Ranson City Council shares my concern. The City's sanitary sewer collector system was not designed to handle the capacity of the City's sewer flow along with the PSD's usage. The PSD's usage of the main line on Mildred Street is currently hampering urban redevelopment efforts within Old Town. This concern extends to the PSD's usage of the Flowing Springs pump station. The Flowing Springs pump station was designed to handle current and future development capacity within the City's Flowing Springs District. The PSD's continuing and expanding usage of the Flowing Springs Pump Station is and will take away from the City's capacity and economic development opportunities. Moreover, the City has expended substantial maintenance costs over the previous five years while the PSD's flow within the Flowing Springs pump station far exceeds the City's usage.

Therefore, I would respectfully request that the PSD immediately develop and execute plans to alleviate the capacity and flow issues caused by the PSD's usage of Ranson's main lines and Flowing Springs pump station.

I am available, as always, to have a conversation about how we can work together to meet our community's needs.

Sincerely,

Andrew P. Blake

Andrew P. Blake, Esq.

City of Ranson

Office of the City Manager

312 South Mildred Street
Ranson, West Virginia 25438-1621
Phone (304) 724-3872 FAX (304) 728-8579
E-mail: ablake@cityofransonwv.net

A. David Hamill - Mayor *Stacey A. Dodson Platizgraff – City Clerk*

Council Members
Dave Cheshire
Scott Coulter
Donnie Haines
Duke Pierson
Mike Anderson
Debbie McClure

October 3, 2014

Susanne Lawton, General Manager
340 Edmond Road, Suite A
Kearneysville, West Virginia 25430

Dear Sue:

As you know, on June 27, 2014, I wrote you a letter expressing the City of Ranson's concerns about the lack of capacity in main collection lines within Ranson which are utilized by the Jefferson County PSD. I asked the PSD to immediately develop and execute plans to alleviate the capacity issues in order to avoid a possible moratorium in certain areas of the City and County. Over the last couple of months, we have been evaluating our system to try to determine a solution to the problem that does not hinder economic growth while trying to figure out the best method to efficiently and most economically serve existing and future customers.

Per our discussions, the City of Ranson proposes a solution that will potentially save the PSD millions of dollars; alleviates immediate capacity issues in Old Town Ranson largely caused by PSD's current flow; provides new capacity to the Jefferson County Business and Industrial Park and Route 9 corridor; and, utilizes an existing pump station and force main that has excess capacity. Below is a bullet-pointed summary of the proposal that I am ready to discuss with the Ranson City Council:

- The City of Ranson would amend its existing agreement with the PSD to allow the PSD to increase flows to the Flowing Spring Pump Station and into the existing force main to transport sewage to the Charles Town Wastewater Treatment Plant subject to negotiated conditions concerning maintenance and upkeep. The best alternative, if possible, would be for the PSD to utilize the existing force main and bypass the pump station to maximize the force main to its utmost potential. Either way, this proposed solution alleviates the need for the PSD to construct a new force main through Charles Town to transport sewage to the Charles Town Sewer Plant and saves the PSD millions of dollars by utilizing existing infrastructure and avoids the construction of a new force main that goes to the same treatment facilities as the Flowing Springs Pump Station force main (part of planned Phase 1). The PSD would collect the approved Flowing Springs Pump Station Capacity Improvement Fee to reimburse the Ranson Builders' Consortium for the cost of originally constructing the infrastructure. If funds are left after fully reimbursing the Ranson Builders' Consortium, the additional funds can be set aside for future needed infrastructure improvements to the aforesaid facilities.
- In consideration of Ranson amending the agreement, the PSD would immediately construct its planned Phase 2 of the collection line along the

Route 9 corridor which will provide immediate needed capacity to the Jefferson County Industrial Park, Jefferson Orchards, Tackley Mill, Blackford Village and other developments within the County. The immediate construction of Phase 2 would allow for the bypassing of sewerage transportation through Old Town Ranson main collection lines by the PSD; and thereby, creating additional needed capacity for Old Town Ranson. Capacity through Old Town Ranson is an urgent need and the construction of Phase 2 line to the Flowing Springs Pump Station would alleviate capacity issues in the very short-term. It is estimated that the collection line serving Old Town Ranson only has approximately 50 EDUs left. This is the same line that serves the County's Industrial and Business Park. If Phase 2 is not constructed, capacity issues will not be resolved in Old Town Ranson or the Route 9 corridor which will be detrimental.

- PSD and Ranson would agree on a method and strategy for how to expand the Flowing Springs Pump Station and force main when the need arises to assure capacity for the five developments the Flowing Springs Pump Station was originally constructed to handle. Alternatively, the parties would agree to a strategy of how to divert some flow from the Flowing Springs Pump station when the time arises to new Jefferson County PSD infrastructure (i.e. new collection lines and/or PSD sewer plant). It should be noted that the proposal outlined above should provide a short and intermediate remedy to capacity issues and new infrastructure to handle new capacity could be delayed for several years. I must stress, however, the importance to Ranson of still being able to fully utilize the pump station for the purpose for which is was designed – to handle the economic development and growth within the Flowing Springs Development District and any such agreement must not limit Ranson's future ability to serve customers within this growth area which is important to the City, Jefferson County and the region.
- Ranson and the PSD would reach a mutually beneficial agreement to pay a transportation fee to the PSD for Ranson to utilize the collection line along Route 9 to serve future Ranson customers (Jefferson Orchard, Tackley Mill, Blackford Village, Locust Knoll).

If the PSD is not interested in this proposal, I totally understand, but this is the best option that Ranson currently can offer to alleviate the capacity concerns that Ranson believes is of utmost importance to remedy. As always, the details matter and will have to be discussed and agreement reached, but I do believe this proposal could be a good example of inter-agency cooperation, cost savings and the efficient and effective use of current infrastructure that the State agency decision makers can look upon positively. I am available, as always, to have further conversations about how we can work together to meet our community's needs.

Sincerely,

Andrew P. Blake, Esq.
City Manager

cc: Mayor A. David Hamill
Ranson City Council
John Reisenwebber, JCEDA Director

Charles Town
Utility Board

832 S. George Street, P.O. Box 359, Charles Town, WV 25414
Phone: (304) 725-2316 ♦ Fax: (304) 725-4313 ♦ Web: www.ctubwv.com

October 22, 2014

Jefferson County Public Service District
Attn: Chairman Peter L. Appignani
340 Edmond Road, Suite A
Kearneysville, WV 25430

CHAIRMAN
Dave Mills

UTILITY BOARD
Pat Kubic
Charles W. Klim
Tommy Stocks
Kristen Stolipher

UTILITY MANAGER
Jane E. Arnett

Honorable Chairman Peter L. Appignani,

I am writing to you on behalf of the Charles Town Utility Board (CTUB) regarding a new Jefferson County Public Service District (JCPSD) project. At the Utility Board meeting held on October 8, 2014, Sue Lawton and Bill Strider presented the latest option utilizing the existing 12" force main through Ranson. This option is different from the option RK&K (working with Thrasher) presented at the Utility Board meeting on September 24th that involved sending flows to the Willow Springs Treatment Facility. The JCPSD summarized their collection system project that will utilize, along with Ranson, the available capacity of the Ranson Flowing Springs Pump Station (FSPS) 12-inch forcemain which discharges to the Charles Town Evitts Run Interceptor.

At that meeting, JCPSD requested a letter from CTUB to the District indicating that up to 2 MGD of flow from the Ranson FSPS 12-inch forcemain at its current discharge location in the Charles Town Evitts Run Interceptor is acceptable. The JCPSD staff also referenced a new pump station at Halltown. Mr. Strider indicated that this project would be before the Infrastructure Council on November 10, 2014 and that this letter would be helpful in the District's Application to the WV IJDC.

While the CTUB can concur with the concept briefly presented, up to the existing Charles Town treatment capacity, additional information will be required in order to further support the JCPSD projects. This includes:

1. Review of the Preliminary Engineering Report.
2. Review of Conceptual Design and Full Design Documents.
3. An evaluation of reasonable plan time frames, based upon developer estimates of build-outs of new projects and historical evaluations. The request for 2 MGD seems unrealistic, however, if developer projections are providing this justification, CTUB would also need to take appropriate action.
4. Flow data from 18" Evitts Run gravity interceptor to 24" interceptor.

5. Evaluation of large diameter sewer lines and proposal for communication, financial contribution, maintenance and monitoring of these lines. The CTUB has recently experienced significant costs and maintenance items associated with flows coming from long distances and septicity. The CTUB has been the sole bearer of costs associated with addressing these items to date and if the JCPSD/Ranson lines are contributing to these issues, there should be coordination and financial contribution to address these items. It should also be noted that the JCPSD mentioned that measures were being taken to address septicity and odor issues in their lines through the addition of chemicals into the lines. This is an example of the critical requirement for communication between utilities. Any addition of chemicals or additives can have a detrimental effect on our treatment system. The CTUB requests the JCPSD provide a protocol for communication, financial contribution, maintenance and monitoring to ensure that the downstream network to the Charles Town Wastewater Treatment Facility is unaffected by the current plan. I&I metering. The CTUB requests a plan for inflow and infiltration metering on the JCPSD/Ranson lines.

CTUB clearly recognizes its obligation as the regional provider of wastewater treatment. As such, as detailed above, it is critical to have necessary plans in place to address all items that are needed to have a successful collection and treatment system. We are very interested in reviewing the above items as well as the JCPSD's Strategic Plan to ensure that we are adequately forecasting and providing current and future treatment needs. The CTUB looks forward to working with JCPSD and providing necessary support for projects that will best serve the Customer's of this community.

Very truly yours,

Dave Mills
Chairman, Charles Town Utility Board

cc: Jefferson County Commission
Mayor and Council of City of Charles Town
Mayor and Council of the Corporation of Ranson

December 8, 2014

Sue Lawton, General Manager
Jefferson County Public Service District
340 Edmond Road, Suite A
Kearneysville, WV 25430

Re: Support for Jefferson County Public Service District Sewer Collection System Improvements

Dear Ms. Lawton

The Eastern Panhandle Regional Planning and Development Council (Region 9) would like to express its support of the Jefferson County PSD's Sewer Collection System Improvements Project. Economic development cannot thrive without the very basics of infrastructure, the collaboration made with this project between the PSD, the Jefferson County EDA, Ranson, Charles Town and the Jefferson County Commission will serve to ensure the future economic sustainability for the residents and business owners.

Our review of the project shows that it meets with the overall goals and objectives as set forth by the Regional Council. As a regional representative, I would strongly encourage funding consideration be given to this project.

Sincerely,

William Clark
Executive Director

jlo

JEFFERSON COUNTY COMMISSION

124 East Washington Street, P.O. Box 250, Charles Town, WV 25414
Phone: (304) 728-3284 - **Fax:** (304) 725-7916
Web: www.jeffersoncountywv.org

PRESIDENT
Walt Pellish

VICE PRESIDENT
Jane Tabb

COMMISSIONER
Dale Manuel

COMMISSIONER
Patsy Noland

COMMISSIONER
Lyn Widmyer

December 8, 2014

Jim Ellars
Executive Director
WV Infrastructure and Jobs Development Council
1009 Bullitt St.
Charleston, WV 25301

RE: Jefferson County PSD, IJDC Project Number 2014S-1538

Dear Mr. Ellars:

The Jefferson County Commission writes to note to the West Virginia Infrastructure and Jobs Development Council ("IJDC") its support for the amended application for funding from the Jefferson County Public Service District ("District") for its sewer projects.

The Amended application includes many cost savings and efficiencies over the original application. These efficiencies came about due to the collaborative efforts of IJDC members, the District, the Cities of Ranson and Charles Town, and the Jefferson County Economic Development Authority. The amended project will enable the District to replace transmission facilities which are operating at design limits and are at the end of expected useful lives. Many pump stations will be taken out of service and replaces with gravity lines. The amended project will provide transmission capacity for potential job expansions at Jefferson County industrial and business parks and provide the District's existing customers with reliable wastewater transmission service going forward. Every effort has been made to reduce costs and reduce negative impacts on current ratepayers.

The Amended project is in harmony with the Jefferson County Commission's long term draft comprehensive plan for the County.

We ask the IJDC to find an appropriate funding package for this badly needed project.

Very Truly Yours,

Jane M. Tabb

Jane Tabb, Vice President

cc: Susanne Lawton
Andy Blake
David Mills
John Reisenweber

County Administrator
Debbie Keyser

Deputy County Administrator
Sandy Slusher McDonald

Jefferson County
Development Authority

Board of Directors
2014-2015

Eric Lewis
President

Debra Lee Hovatter
Vice President

Mike Chapman
Secretary/Treasurer

Andy Blake
Helen Dettmer
Shelli Dronsfield
Chuck Ellison
Annette Gavin
Conrad Hammann
Joshua Householder
David Marshall
Howard Mills
David Mills
Walter Pellish
Michael Shepp
Andrew Skinner
Lyle Tabb
Karan Townsend
Harry Wilkins

John Reisenweber
Executive Director

PO BOX 237
CHARLES TOWN
WV 25414

304.728.3255
304.725.3133 fax

www.JCDA.net

December 9, 2014

Ms. Sue Lawton, General Manager
Jefferson County Public Service District
340 Edmond Road, Suite A
Kearneysville, WV 25430

Dear Ms. Lawton,

On behalf of the Board of Directors of the Jefferson County Development Authority (JCDA), I write to express our support of the Jefferson County Public Service District's (PSD) Sewer Collection System Modifications and Improvements Project.

Infrastructure is essential to economic development and to the advancement and prosperity of Jefferson County. In order to provide jobs for Jefferson County residents, attract new business, and increase the tax base, we must have the capacity to serve the needs of large manufacturers and other industries that are essential to growing the local economy. Without the proposed improvements to the current sewer system, economic development in Jefferson County will be adversely impacted. In fact, these sewer improvements will address capacity issues in the Burr Business Park which will allow the JCDA to continue selling lots and service our existing debt with both the West Virginia Infrastructure and Jobs Development Council and the West Virginia Economic Development Authority.

Through the collaboration of the PSD, the cities of Ranson and Charles Town, and the JCDA, the project costs have been significantly reduced by sharing existing infrastructure and other resources. JCDA is confident these organizations have found a viable solution that will resolve the sewer issues currently facing Jefferson County.

In closing, this project will contribute to the overall economic sustainability of Jefferson County and the JCDA will continue to support the PSD in any way we can.

Sincerely,

John W. Reisenweber
Executive Director

Appendix 3

O&M Projections

OPERATION AND MAINTENANCE COSTS - Provide existing and proposed annual operation and maintenance costs for all categories as listed in the PSC annual report. (JCPSD)

Table 8

Account No.	COLLECTION EXPENSES	Existing (2014)	Proposed
	Operation:		
701.1	Salaries and Wages - Employees	$23,404	$23,404
704.1	Employee Pensions and Benefits	$3,412	$3,412
720.1	Materials and Supplies	$1,046	$1,046
	Total Operation	$27,862	$27,862
Account No.	PUMPING EXPENSES		
	Operation:		
701.3	Salaries and Wages - Employees	$76,655	$76,655
704.3	Employee Pensions and Benefits	$15,862	$15,862
715.3	Purchased Power	$39,611	$32,287
716.3	Fuel for Power Production	$9,739	$9,739
720.3	Materials and Supplies	$48,344	$92,344
775.3	Miscellaneous Expenses	$12,570	$12,570
	Total Operation	$202,781	$239,457
	Maintenance:		
720.4	Materials and Supplies	$63,604	$63,604
	Total Maintenance	$63,604	$63,604
	Total Pumping Expenses	$266,385	$303,061

TREATMENT AND DISPOSAL EXPENSES			
Account No.	Description	Current Cost	Future Cost
	Operation:		
701.5	Salaries and Wages - Employees		
704.5	Employee Pensions and Benefits		
710.5	Purchased Wastewater Treatment	$783,523	$783,523
711.5	Sludge Removal Expense		
715.5	Purchased Power	$2,513	$2,513
716.5	Fuel for Power Production		
718.5	Chemicals (metal salts and membrane cleaning)		
720.5	Materials and Supplies	$1,837	$1,837
731.5	Contractual Services (Lab)		
756.5	Insurance		
767.5	Regulatory Commission Expense		
775.5	Miscellaneous Expenses		
	Total Treatment Expense	$787,873	$787,873
CUSTOMER ACCOUNTS EXPENSES			
Account No.	Description	Current Cost	Future Cost
701.7	Salaries and Wages - Employees	$127,221	$127,221
770.7	Bad Debt Expense	$12,670	$12,670
		$138,891	$138,891

ADMINISTRATIVE AND GENERAL EXPENSES			
Account No.	Description	Current Cost	Future Cost
701.8	Salaries and Wages - Employees	$159,239	$159,239
703.8	Salaries and Wages - Officers, Directors and Majority Stockholders	$8,050	$8,050
704.8	Employee Pensions and Benefits	$173,998	$173,998
716.8	Fuel for Power Production	$19,993	$19,993
720.8	Materials and Supplies	$44,082	$44,082
731.8-736.8	Contractual Services	$138,993	$138,993
741.8	Rental of Building/Real Property	$79,791	$79,791
750.8	Transportation Expenses	$6,702	$6,702
756.8-759.8	Insurance	$17,966	$17,966
775.8	Miscellaneous Expenses	$66,987	$66,987
	Total Administrative and General Expenses	$715,791	$715,791

Notes:

1. Pumping - Purchased Power was reduced by the retirement of PS-157 or $154, 10 or $2,491, 11 or $1,427, 12 or $1,811 & 13 or $1,441(total - $7,324), and Breckenridge PS & Proposed Breckenridge East assumed to have similar operating conditions.
2. Pumping – Materials & Supplies – Bioxide at 60 gpd on average (higher in summer & lower in winter from Evoqua) x $3.50 per gallon x 365 days/year or $76,700 less $33,482 (2014 cost) or $43,168 use $44,000 increase in Bioxide

Jefferson County Public Service District
Sewer Project - WV IJDC #2014S-1538, Rt 9 & Flowing Springs Basins Interceptor,
Breckenridge E PS Pump Flows to Charles Town WWTP

OPERATION AND MAINTENANCE COSTS - Provide existing and proposed annual operation and maintenance costs for all categories as listed in the PSC annual report. (JCPSD)

Account No.	COLLECTION EXPENSES	Existing (2014)	Proposed
	Operation:		
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720.3	Materials and Supplies	$48,344	$92,344
775.3	Miscellaneous Expenses	$12,570	$12,570
	Total Operation	$202,781	$250,457
	Maintenance:		
720.4	Materials and Supplies	$63,604	$63,604
	Total Maintenance	$63,604	$63,604
	Total Pumping Expenses	$266,385	$314,061

TREATMENT AND DISPOSAL EXPENSES			
Account No.	Description	Current Cost	Future Cost
	Operation:		
701.5	Salaries and Wages - Employees		
704.5	Employee Pensions and Benefits		
710.5	Purchased Wastewater Treatment	$783,523	$783,523
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720.5	Materials and Supplies	$1,837	$1,837
731.5	Contractual Services (Lab)		
756.5	Insurance		
767.5	Regulatory Commission Expense		
775.5	Miscellaneous Expenses		
	Total Treatment Expense	$787,873	$787,873
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Account No.	Description	Current Cost	Future Cost
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770.7	Bad Debt Expense	$12,670	$12,670
		$138,891	$138,891

Jefferson County Public Service District
Sewer Project - WV IJDC #2014S-1538, Rt 9 & Flowing Springs Basins Interceptor,
Breckenridge E PS Pump Flows to Charles Town WWTP

ADMINISTRATIVE AND GENERAL EXPENSES			
Account No.	Description	Current Cost	Future Cost
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775.8	Miscellaneous Expenses	$66,987	$66,987
	Total Administrative and General Expenses	$715,791	$715,791

Notes:

1. Pumping - Purchased Power was reduced by the retirement of PS-157 or $154, 10 or $2,491, 11 or $1,427, 12 or $1,811 & 13 or $1,441(total - $7,324), and Breckenridge PS & Proposed Breckenridge East preliminary design calls for a 150 HP pump to pump to the CTWWTP and a 88 HP pump to pump to the Ranson FS PS. Therefore, assume that the power costs will be $11,000 more per year or $3,676 more than existing
2. Pumping – Materials & Supplies – Bioxide at 60 gpd on average (higher in summer & lower in winter from Evoqua) x $3.50 per gallon x 365 days/year or $76,700 less $33,482 (2014 cost) or $43,168 use $44,000 increase in Bioxide

Appendix 4

Line Sizing Calculation

Jefferson County Public Service District - Sewer Upgrade and Extension 2014
Analysis of JCPSD Collection System with no flows from Ranson

A **RT 9 Current**

48,000 GPD 266.67 Ex EDU's
1440 min/day
33 GPM
4 PF
133 @4 PF

Rt 9 Future

154,560 GPD

Future Users NRT9

Harvest Hills	392	EDU
Burr/Bardane Ind. Park	200	EDU
Subtotal	**592**	**EDU**
	180	GPD/EDU
Additional Flows expected over 20 Years	106,560	GPD
Existing (PS 1-10 (2013))	48,000	GPD
Projected Future Flows to the End of the Proposed Gravity Interceptor	**154,560**	**GPD**
	1440	min/day
	107	GPM
Peak Flow in Interceptor	429	@ 4 PF

859 **Existing and Future EDU's**

Delivery by Pump Stations

B **Flows entering the line before the Existing Breck PS (Between NRT9 and the existing Berck. PS)**

Additional Flows expected over Next 20 Years

Daniels Forest	192	EDU
Stonecrest aka Forest View	192	EDU
Aspen Green	203	EDU
Butler Farm	216	EDU
Cambridge	82	EDU
Sum EDU's	**885**	**EDU**
	180	GPD/EDU
Projected Gallons Per Day	159,300	GPD
	1440	min/day
	111	GPM
Flow with Peak Factor	443	@ 4 PF
Future RT9 Flows, see above	429	NRT9
Subtotal Flows	**872**	**Total GPM**

Gallon per minute per EDU Calculation:

180	Gal Per EDU
4	Peak Factor
720	Peak Flow Value
1440	(min/day)
0.5	Gallons per minute per EDU w /Peak Factor

Analysis of Alternatives

Prior to the existing Breckenridge PS

1477 **New EDU's from Rt 9 area**

1,744 **Total EDU's prior to existing Breckenridge PS**

Remaining Line Capacity Calculation for the 15 inch gravity line:

GPM	
1,122	Line Capacity
949	Projected Flow
173	Unspecified Reserve capacity
15.42%	% Unspecified reserve capacity
346	EDU's of Unspecified Reserve Capacity

USE a Mininum of a 15" Pipe

Breckenridge PS (existing)	**182,000**	**GPD**
	1440	min/day
	126	GPM
	4	PF
	506	**GPM**
Add NRT9 and Flows Between NRT9 and Breckenridge PS	**872**	**NRT9**
Future - Sum Breckenridge PS and NRT9	**1,377**	**GPM**

Delivery by Gravity

1,011 **Existing EDU's to Breckenridge PS**

2,488 **Total Future EDU's**

C **Below Existing Breckenridge PS**

Future Users

Beallair	304	EDU
Beallair West	137	EDU
Breckenridge East	976	EDU
Sub Total	**1417**	**EDU**
	180	GPD/EDU
Projected Flows from New Users	**255,060**	**GPD**
	1440	min/day
Average Flow in GPM	177	GPM
Peak Factor	4	PF
Required Pumping Rate for New Users Below Breckenridge PS	709	GPM
Future - Sum Breckenridge and NRT9	1,377	GPM
Total Future Flow to Breckenridge East PS	**2,086**	**GPM**

Delivery by Gravity

Remaining Line Capacity Calculation for the 24 inch gravity line:

GPM	
2,872	Line Capacity
2,086	Projected Flow
786	Unspecified Reserve capacity
27.37%	% Unspecified reserve capacity
1,572	EDU's of Unspecified Reserve Capacity

D

USE Mininum of 24" Dia.

3,905 **Total**

Evaluate Pipes

15"	**18"**	**21"**	**24"**	
1,122	1,634	2,248	2,872	GPM @ Minimum Grade
1,440	1,440.00	1,440.00	1440	min/day
1,615,680	**2,352,960**	**3,237,120**	**4,135,680**	**GPD Peak Flow Capacity**

Pipe analysis assumes that there will be one section of line at minimum grade

		GPD
A	**RT 9 Current**	75,600
	Additional Flows expected over 20 Years	106,560
	Total	182,160
B	**Flows entering the line before the Existing Breck PS**	159,300
	(Between NRT9 and the existing Berck. PS)	341,460
	Breckenridge PS (existing)	255,240
		596,700
C	**Below Existing Breckenridge PS**	182,000
D	**Total Future Flow to Breckenridge East PS**	**778,700** GPD
		1,440 min/day
		541 GPM
		4 Peak Factor
		2,163 **GPM Pumping Rate Reqired**

Appendix 5

Environmental Contact Data

The map on the following page was sent with all environmental inquiries.

CHARLES TOWN QUADRANGLE
WEST VIRGINIA—VIRGINIA—MARYLAND
7.5 MINUTE SERIES (TOPOGRAPHIC)

ELIMINATE
PUMP STATION 1-10.

ELIMINATE
PUMP STATION 1-157

ELIMINATE
PUMP STATION 1-11

15,518 LF - 30 INCH DIAMETER
INTERCEPTOR THIS PROJECT

BEGIN NEW 36" DIAMETER INTERCEPTOR
AT BRECKENRIDGE PUMP STATION.
DECOMISSION EXISTING PUMP STATION.

ELIMINATE BEALLAIR
PUMP STATION
PROPOSED 208 LF 8"

PROPOSED BRECKENRIDGE
EAST PUMP STATION
1.0 MGD

SHERIDAN PUMP
STATION NO. 1

SHERIDAN PUMP
STATION NO. 2

RANSON FLOWING
SPRINGS PUMP
STATION

6,145 LF - 36 INCH DIAMETER INTERCEPTOR
THIS PROJECT

EXISTING GRAVITY
AND FORCE MAIN

EXISTING GRAVITY TO
OLD STANDARD WWTP

OLD STANDARD
WWTP

PUMP STATION 3-6

PUMP STATION 4-2

SAMUEL STREET
PUMP STATION

2000' 0 2000' 4000'

Pentree
Incorporated
Consulting Engineers ©
P.O. BOX 1309, PRINCETON, WEST VIRGINIA 24740-1309

JEFFERSON COUNTY PSD
BRECKENRIDGE EAST PUMP
STATION AND ASSOCIATED LINES

Pentree Incorporated
Consulting Engineers
A Resource Engineering Group Company

1428 Main Street
P.O. Box 1309
Princeton, WV 24740
304-431-7800 Phone
304-425-0445 Fax

June 5, 2014

West Virginia Division of Natural Resources
Natural Heritage Program
PO Box 67
Ward Road
Elkins, WV 26241

Attn: Ms. Barbara Sargent

Re: Breckenridge East Pump Station and Associated Lines
Pentree Project Number #020-1212
Jefferson County, WV

Dear Ms. Sargent,

While the proposed project has not been defined as a Federal Action and no lead government agency has been identified, it is likely that the proposed project will involve some level of public funding and permitting. Accordingly, it is assumed that the provisions of the National Environmental Policy Act (NEPA) may apply during future funding and permitting of the project and an official Environmental Assessment (EA) is being prepared by Pentree, Inc. As such, Pentree, Inc. is hereby requesting a project review by the West Virginia Division of Natural Resources, Natural Heritage Program for potential impact to critical wildlife and natural resources.

For clarification, Pentree, Inc. is under contract with the Jefferson County Public Service District (JCPSD) for the study of this project. This review request is being submitted on behalf of the JCPSD.

Project Background

The Public Service Commission of WV (PSC) denied the Jefferson County Public Service District's (District) application of convenience and necessity to construct the Flowing Springs WWTP and associated collection system. The District had deferred upgrades to its collection system to the Evitts Run Charles Town WWTP since the Flowing Springs project would have radically changed the way it collected and treated the sewage generated in its service area. Since the project was denied, the District now needs to upgrade its collection system to properly handle the flows it is responsible for.

This project will provide the collection system reviewed previously by your Division (Flowing Springs Wastewater Treatment System, July 2008), construct a pump station

in lieu of a wastewater treatment plant and expand the scope of the line portion of the project by adding force mains and upgrades to the existing gravity and force main lines which will convey the flows to the Charles Town Evitts Run WWTP along the route of the Districts previously constructed collection system.

Technical Details:

The project concept can be separated into 5 portions.

Portion 1 begins at the existing pump station (PS 1-10) located east of Route 9 as indicated in the attached illustrations and involves the installation of a new 30" gravity sewer line from the pump station 1-10 site to the existing Breckenridge Subdivision pump station near Old Country Club Road. This line is highlighted in yellow in the attached illustrations. Pump station 1-10 pump station will be replaced with a manhole during startup of the project.

PS 1-10 Latitude 39° 20' 12" N, Longitude 77° 51' 17" W

Portion 1 consists of the following:

11, 850 LF new construction through previously disturbed area (fields and railroad crossing)
1 RR Crossing
1,000 LF new construction along Country Club Road
1,500 LF new construction through previously disturbed area (fields)
2,500 LF new construction through previously disturbed area (Breckenridge Subdivision)

Portion 2 begins at the Breckenridge Subdivision pump station and installs a new 36' gravity sewer line to the east to the proposed Breckenridge East pump station. In addition, portion 2 includes the installation of two force mains in the same trench running parallel to the gravity lined discussed previously in this paragraph back to the existing Breckenridge pump station location (6,200 LF). The Breckenridge pump station will be replaced with a manhole during startup of the project. This line is highlighted in light blue on the attached illustrations.

Breckenridge PS Latitude 39° 18' 51" N, Longitude 77° 49' 31" W

Portion 2 consists of the following:

4244 LF new construction through previously disturbed area (Subdivision green area, golf course and access road to Bellaire Subdivision.
1239 lf new construction through previously not disturbed area. (woodland along

Flowing Springs Run)

642 LF new construction through previously disturbed area (old road bed)

Two stream crossings

6,200 LF of two force mains in the same trench running parallel to the gravity line through the areas described above

Portion 3 involves the construction of a new wastewater pumping station (Breckenridge East pump station). The pump station will be constructed on a previously disturbed area (farmland) in the Halltown area of Jefferson County. The site will consist of 1 acre of existing pasture and feral pasture which has trees mostly less than 12 inches in diameter. This is the site previously approved for construction of the Flowing Springs WWTP.

Breckenridge East PS Latitude 39° 18' 53" N, Longitude 77° 48' 21" W

Portion 3 consists of the following:

One 1.0 million gallon per day pump station and associated access road.

Portion 4 involves the construction of two force mains in the same trench and they will run parallel to the existing force main from the Breckenridge pump station site to the Ranson Flowing Springs pump station (5,500 LF) which is located adjacent to Flowing Springs Road. There will be an automated valve vault adjacent to the Ranson Flowing Springs pump station on ground which was previously disturbed during the pump station construction which will allow directing flows to the Ranson Flowing Springs pump station or along the following route.

Ranson Flowing Springs PS Latitude 39° 18' 37 " N, Longitude 77° 50' 16" W

From the Ranson pump station, two force mains in the same trench will continue to run parallel to the existing force main in the existing right of way in a North-Northwest direction to Route 9 which they will cross under and then along the Flowing Springs road (3,800 LF) to an upgraded gravity sewer (700 LF) to a new (replacement) pump station 3-6 on the corner or Flowing Springs Road and Fifth Avenue. The pump station is adjacent to the Applebee's.

New PS 3-6 Latitude 39° 18' 3 " N, Longitude 77° 50' 41" W

From the new pump station 3-6 the two force mains in the same trench (3,300 LF) will continue to run parallel to the existing force main in the existing right of way to East Washington Street where the flow will enter an upgraded gravity sewer (1,300 LF) Ms.

which will run along County Route 340/7 to an alley that runs to a new (replacement) pump station 4-2 located next to Wall Alley and the Wendy's restaurant.

New PS 4-2 Latitude 39° 17' 31 " N, Longitude 77° 50' 57" W

From the new PS 4-2 two force mains in the same trench (1,800 LF) will continue to run parallel to the existing force main in the existing right of way to and along Jefferson Avenue where it will enter an upgraded gravity sewer (4,300 LF) to the Samuel street pump station and that is where this portion of the project ends. This line is highlighted in beige on the attached illustrations.

Portion 5 consists of running a force main from the Breckenridge East pump station (constructed this project) to the Sheridan Subdivision and its pump station number 2 (4,800 LF) where the force main will then run parallel to a force main from their PS No. 2 to the Sheridan Pump Station number 1 (1,500 LF). The route of the force main from the Breckenridge East pump station will follow the access road to the pump station (approved during the Flowing Springs WWTP project) to Shepherdstown Pike (Route 230) and then withing the right of way of the Shepherdstown Pike through Halltown to the Sheridan Subdivision.

Sheridan PS No. 1 Latitude 39° 18' 57 " N, Longitude 77° 47' 18" W

Sheridan PS No. 2 Latitude 39° 18' 56 " N, Longitude 77° 47' 298" W

The force main will then run parallel to the existing Sheridan PS force main (4,300 LF) to the Old Standard WWTP in the existing right of way to the gravity sewer serving the Old Standard WWTP which is the end of this project. The force main is highlighted in green on the attached illustrations. The gravity sewer was sized to handle this flow when it was designed.

End of Project Latitude 39° 18' 43 " N, Longitude 77° 46' 54" W

Old Standard WWTP Latitude 39° 17' 54 " N, Longitude 77° 46' 28" W

Proposed Area of Impact

With the exception of the pump station site and access road, the project proposes a permanent 15' easement for the proposed lines. In addition, a temporary 40' wide construction easement is proposed for installation. Above ground impacts related to the sewer lines are limited to the construction phase as all areas will be restored and vegetated following installation other than for a manhole cover, installed no more then 12 inches above the ground surface in remote areas and flush with the ground along

roads and in subdivisions, approximately every 300 feet.

Based upon the proposed route, minimal clearing of mature vegetation is anticipated. Necessary clearing would be done selectively, within the proposed construction easement, and only as necessary for the installation of the proposed lines.

Designated wetland areas are known to exist in the vicinity of the project path. Wetland disturbances and stream crossings will be addressed through normal US Army Corps of Engineers and WV DEP permitting process.

No designated wildlife refuges or preservation areas are known to exist within the project path. Furthermore, based upon the underground nature of the proposed lines, the proposed route, the assumption of proper construction techniques, and the location of the pump station site in an open and previously disturbed agricultural field, it is not anticipated that the proposed project will pose any direct and permanent impact to wildlife habitat. In addition, it is not anticipated that the proposed project will pose any impacts other than temporary visual impacts during construction of any historic areas, nor will it impact any archeological resources based on a Phase I Archeological Survey of portions 1, 2 or 3 of this project prepared for the Flowing Springs WWTP project and the fact that the lines in the other portions of the project will be buried and located in previously disturbed areas.

Conclusion

On behalf of JCPSD, Pentree, Inc. is requesting a comprehensive review by the WV Division of Natural Resources for the proposed project and that an official opinion regarding potential impact to natural resources be issued by the Department.

If you have any questions, or should you require additional information to prepare your comments, please do not hesitate to contact us.

Sincerely,

PENTREE, INCORPORATED

J. Zane Summerfield, Jr.
Analyst

Attachment

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Operations Center
P.O. Box 67
Elkins, West Virginia 26241-3235
Telephone (304) 637-0245
Fax (304) 637-0250

Earl Ray Tomblin
Governor

Frank Jezioro
Director

RECEIVED
JUL 03 2014
PENTREE, INC.

June 30, 2014

Mr. J. Zane Summerfield
Pentree, Inc.
PO Box 1309
Princeton, WV 24740

Dear Mr. Summerfield:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the proposed Breckenridge East Pump Station and Associated Lines project in Jefferson County, WV (Project #020-1212).

We have no known records of any RTE species or sensitive habitats within the project area. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state, and further consultation may be required. Additionally, any concurrence requirements for federally listed species must come from the US Fish and Wildlife Service.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, or barbara.d.sargent@wv.gov. Enclosed please find an invoice.

Sincerely,

Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Unit

enclosure

S:\Monthly\Barb\Invoices\Pentree.doc

SCANNED

Pentree
Incorporated
Consulting Engineers
A Resource Engineering Group Company

1428 Main Street
P.O. Box 1309
Princeton, WV 24740
304-431-7800 Phone
304-425-0445 Fax

June 5, 2014

U.S. Fish and Wildlife Service
Route 250 South, Elkins Shopping Plaza
694 Beverly Pike
Elkins, WV 26241

Re: Breckenridge East Pump Station and Associated Lines
Pentree Project Number #020-1212
Jefferson County, WV

Dear Review Staff,

While the proposed project has not been defined as a Federal Action and no lead government agency has been identified, it is likely that the proposed project will involve some level of public funding and permitting. Accordingly, it is assumed that the provisions of the National Environmental Policy Act (NEPA) may apply during future funding and permitting of the project and an official Environmental Assessment (EA) is being prepared by Pentree, Inc. As such, Pentree, Inc. is hereby requesting a project review by the U.S. Fish and Wildlife Service (USFWS) for potential impact to critical wildlife and natural resources.

For clarification, Pentree, Inc. is under contract with the Jefferson County Public Service District (JCPSD) for the study of this project. This review request is being submitted on behalf of the JCPSD.

Project Background

The Public Service Commission of WV (PSC) denied the Jefferson County Public Service District's (District) application of convenience and necessity to construct the Flowing Springs WWTP and associated collection system. The District had deferred upgrades to its collection system to the Evitts Run Charles Town WWTP since the Flowing Springs project would have radically changed the way it collected and treated the sewage generated in its service area. Since the project was denied, the District now needs to upgrade its collection system to properly handle the flows it is responsible for.

This project will provide the collection system reviewed previously by your Division (Flowing Springs Wastewater Treatment System, July 2008), construct a pump station in lieu of a wastewater treatment plant and expand the scope of the line portion of the project by adding force mains and upgrades to the existing gravity and force main lines

which will convey the flows to the Charles Town Evitts Run WWTP along the route of the Districts previously constructed collection system.

Technical Details:

The project concept can be separated into 5 portions.

Portion 1 begins at the existing pump station (PS 1-10) located east of Route 9 as indicated in the attached illustrations and involves the installation of a new 30" gravity sewer line from the pump station 1-10 site to the existing Breckenridge Subdivision pump station near Old Country Club Road. This line is highlighted in yellow in the attached illustrations. Pump station 1-10 pump station will be replaced with a manhole during startup of the project.

PS 1-10 Latitude 39° 20' 12" N, Longitude 77° 51' 17" W

Portion 1 consists of the following:

11, 850 LF new construction through previously disturbed area (fields and railroad crossing)
1 RR Crossing
1,000 LF new construction along Country Club Road
1,500 LF new construction through previously disturbed area (fields)
2,500 LF new construction through previously disturbed area (Breckenridge Subdivision)

Portion 2 begins at the Breckenridge Subdivision pump station and installs a new 36' gravity sewer line to the east to the proposed Breckenridge East pump station. In addition, portion 2 includes the installation of two force mains in the same trench running parallel to the gravity lined discussed previously in this paragraph back to the existing Breckenridge pump station location (6,200 LF). The Breckenridge pump station will be replaced with a manhole during startup of the project. This line is highlighted in light blue on the attached illustrations.

Breckenridge PS Latitude 39° 18' 51" N, Longitude 77° 49' 31" W

Portion 2 consists of the following:

4244 LF new construction through previously disturbed area (Subdivision green area, golf course and access road to Bellaire Subdivision.
1239 lf new construction through previously not disturbed area. (woodland along Flowing Springs Run)
642 LF new construction through previously disturbed area (old road bed)

Two stream crossings
6,200 LF of two force mains in the same trench running parallel to the gravity line through the areas described above

Portion 3 involves the construction of a new wastewater pumping station (Breckenridge East pump station). The pump station will be constructed on a previously disturbed area (farmland) in the Halltown area of Jefferson County. The site will consist of 1 acre of existing pasture and feral pasture which has trees mostly less than 12 inches in diameter. This is the site previously approved for construction of the Flowing Springs WWTP.

Breckenridge East PS Latitude 39° 18' 53" N, Longitude 77° 48' 21" W

Portion 3 consists of the following:

One 1.0 million gallon per day pump station and associated access road.

Portion 4 involves the construction of two force mains in the same trench and they will run parallel to the existing force main from the Breckenridge pump station site to the Ranson Flowing Springs pump station (5,500 LF) which is located adjacent to Flowing Springs Road. There will be an automated valve vault adjacent to the Ranson Flowing Springs pump station on ground which was previously disturbed during the pump station construction which will allow directing flows to the Ranson Flowing Springs pump station or along the following route.

Ranson Flowing Springs PS Latitude 39° 18' 37 " N, Longitude 77° 50' 16" W

From the Ranson pump station, two force mains in the same trench will continue to run parallel to the existing force main in the existing right of way in a North-Northwest direction to Route 9 which they will cross under and then along the Flowing Springs road (3,800 LF) to an upgraded gravity sewer (700 LF) to a new (replacement) pump station 3-6 on the corner or Flowing Springs Road and Fifth Avenue. The pump station is adjacent to the Applebee's.

New PS 3-6 Latitude 39° 18' 3 " N, Longitude 77° 50' 41" W

From the new pump station 3-6 the two force mains in the same trench (3,300 LF) will continue to run parallel to the existing force main in the existing right of way to East Washington Street where the flow will enter an upgraded gravity sewer (1,300 LF) which will run along County Route 340/7 to an alley that runs to a new (replacement) pump station 4-2 located next to Wall Alley and the Wendy's restaurant.

New PS 4-2 Latitude 39° 17' 31 " N, Longitude 77° 50' 57" W

From the new PS 4-2 two force mains in the same trench (1,800 LF) will continue to run parallel to the existing force main in the existing right of way to and along Jefferson Avenue where it will enter an upgraded gravity sewer (4,300 LF) to the Samuel street pump station and that is where this portion of the project ends. This line is highlighted in beige on the attached illustrations.

Portion 5 consists of running a force main from the Breckenridge East pump station (constructed this project) to the Sheridan Subdivision and its pump station number 2 (4,800 LF) where the force main will then run parallel to a force main from their PS No. 2 to the Sheridan Pump Station number 1 (1,500 LF). The route of the force main from the Breckenridge East pump station will follow the access road to the pump station (approved during the Flowing Springs WWTP project) to Shepherdstown Pike (Route 230) and then withing the right of way of the Shepherdstown Pike through Halltown to the Sheridan Subdivision.

Sheridan PS No. 1 Latitude 39° 18' 57 " N, Longitude 77° 47' 18" W

Sheridan PS No. 2 Latitude 39° 18' 56 " N, Longitude 77° 47' 298" W

The force main will then run parallel to the existing Sheridan PS force main (4,300 LF) to the Old Standard WWTP in the existing right of way to the gravity sewer serving the Old Standard WWTP which is the end of this project. The force main is highlighted in green on the attached illustrations. The gravity sewer was sized to handle this flow when it was designed.

End of Project Latitude 39° 18' 43 " N, Longitude 77° 46' 54" W

Old Standard WWTP Latitude 39° 17' 54 " N, Longitude 77° 46' 28" W

Proposed Area of Impact

With the exception of the pump station site and access road, the project proposes a permanent 15' easement for the proposed lines. In addition, a temporary 40' wide construction easement is proposed for installation. Above ground impacts related to the sewer lines are limited to the construction phase as all areas will be restored and vegetated following installation other than for a manhole cover, installed no more then 12 inches above the ground surface in remote areas and flush with the ground along roads and in subdivisions, approximately every 300 feet.

Based upon the proposed route, minimal clearing of mature vegetation is anticipated. Necessary clearing would be done selectively, within the proposed construction easement, and only as necessary for the installation of the proposed lines.

Designated wetland areas are known to exist in the vicinity of the project path. Wetland disturbances and stream crossings will be addressed through normal US Army Corps of Engineers and WV DEP permitting process.

No designated wildlife refuges or preservation areas are known to exist within the project path. Furthermore, based upon the underground nature of the proposed lines, the proposed route, the assumption of proper construction techniques, and the location of the pump station site in an open and previously disturbed agricultural field, it is not anticipated that the proposed project will pose any direct and permanent impact to wildlife habitat. In addition, it is not anticipated that the proposed project will pose any impacts other than temporary visual impacts during construction of any historic areas, nor will it impact any archeological resources based on a Phase I Archeological Survey of portions 1, 2 or 3 of this project prepared for the Flowing Springs WWTP project and the fact that the lines in the other portions of the project will be buried and located in previously disturbed areas.

Conclusion

On behalf of JCPSD, Pentree, Inc. is requesting a comprehensive review by the U.S. Fish and Wildlife Service for the proposed project and letter response as appropriate.

If you have any questions, or should you require additional information to prepare your comments, please do not hesitate to contact us.

Sincerely,

PENTREE, INCORPORATED

J. Zane Summerfield, Jr.
Analyst

Attachment

Pentree
Incorporated
Consulting Engineers
A Resource Engineering Group Company

1428 Main Street
P.O. Box 1309
Princeton, WV 24740
304-431-7800 Phone
304-425-0445 Fax

June 5, 2014

U.S. Army Corps of Engineers
1000 Liberty Avenue
Pittsburgh, PA 15222

Attn: Scott Hans

Re: Breckenridge East Pump Station and Associated Lines
Pentree Project Number #020-1212
Jefferson County, WV

Dear Mr. Hans,

On behalf of the Jefferson County Public Service District (Project Sponsors), Pentree, Inc. (Project Engineer) is submitting the referenced project for your review and comment.

While the proposed project has not been defined as a Federal Action and no lead government agency has been identified, it is likely that the proposed project will involve some level of public funding and permitting. Accordingly, it is assumed that the provisions of the National Environmental Policy Act (NEPA) may apply during future funding and permitting of the project and an official Environmental Assessment (EA) is being prepared by Pentree, Inc. As such, Pentree, Inc. is hereby requesting a project review by the U.S. Army Corps of Engineers and a letter response as appropriate.

For clarification, Pentree, Inc. is under contract with the Jefferson County Public Service District (JCPSD) for the study of this project. This review request is being submitted on behalf of the JCPSD.

Project Background

The Public Service Commission of WV (PSC) denied the Jefferson County Public Service District's (District) application of convenience and necessity to construct the Flowing Springs WWTP and associated collection system. The District had deferred upgrades to its collection system to the Evitts Run Charles Town WWTP since the Flowing Springs project would have radically changed the way it collected and treated the sewage generated in its service area. Since the project was denied, the District now needs to upgrade its collection system to properly handle the flows it is responsible for.

This project will provide the collection system reviewed previously by the USACE (Flowing Springs Wastewater Treatment System, July 2008), construct a pump station in lieu of a wastewater treatment plant and expand the scope of the line portion of the project by adding force mains and upgrades to the existing gravity and force main lines which will convey the flows to the Charles Town Evitts Run WWTP along the route of the Districts previously constructed collection system.

Technical Details:

The project concept can be separated into 5 portions.

Portion 1 begins at the existing pump station (PS 1-10) located east of Route 9 as indicated in the attached illustrations and involves the installation of a new 30" gravity sewer line from the pump station 1-10 site to the existing Breckenridge Subdivision pump station near Old Country Club Road. This line is highlighted in yellow in the attached illustrations. Pump station 1-10 pump station will be replaced with a manhole during startup of the project.

PS 1-10 Latitude 39° 20' 12" N, Longitude 77° 51' 17" W

Portion 1 consists of the following:

11, 850 LF new construction through previously disturbed area (fields and railroad crossing)

1 RR Crossing

1,000 LF new construction along Country Club Road

1,500 LF new construction through previously disturbed area (fields)

2,500 LF new construction through previously disturbed area (Breckenridge Subdivision)

Portion 2 begins at the Breckenridge Subdivision pump station and installs a new 36' gravity sewer line to the east to the proposed Breckenridge East pump station. In addition, portion 2 includes the installation of two force mains in the same trench running parallel to the gravity lined discussed previously in this paragraph back to the existing Breckenridge pump station location (6,200 LF). The Breckenridge pump station will be replaced with a manhole during startup of the project. This line is highlighted in light blue on the attached illustrations.

Breckenridge PS Latitude 39° 18' 51" N, Longitude 77° 49' 31" W

Portion 2 consists of the following:

4244 LF new construction through previously disturbed area (Subdivision green area, golf course and access road to Bellaire Subdivision.
1239 lf new construction through previously not disturbed area. (woodland along Flowing Springs Run)
642 LF new construction through previously disturbed area (old road bed)
Two stream crossings
6,200 LF of two force mains in the same trench running parallel to the gravity line through the areas described above

Portion 3 involves the construction of a new wastewater pumping station (Breckenridge East pump station). The pump station will be constructed on a previously disturbed area (farmland) in the Halltown area of Jefferson County. The site will consist of 1 acre of existing pasture and feral pasture which has trees mostly less than 12 inches in diameter. This is the site previously approved for construction of the Flowing Springs WWTP.

Breckenridge East PS Latitude 39° 18' 53" N, Longitude 77° 48' 21" W

Portion 3 consists of the following:

One 1.0 million gallon per day pump station and associated access road.

Portion 4 involves the construction of two force mains in the same trench and they will run parallel to the existing force main from the Breckenridge pump station site to the Ranson Flowing Springs pump station (5,500 LF) which is located adjacent to Flowing Springs Road. There will be an automated valve vault adjacent to the Ranson Flowing Springs pump station on ground which was previously disturbed during the pump station construction which will allow directing flows to the Ranson Flowing Springs pump station or along the following route.

Ranson Flowing Springs PS Latitude 39° 18' 37 " N, Longitude 77° 50' 16" W

From the Ranson pump station, two force mains in the same trench will continue to run parallel to the existing force main in the existing right of way in a North-Northwest direction to Route 9 which they will cross under and then along the Flowing Springs road (3,800 LF) to an upgraded gravity sewer (700 LF) to a new (replacement) pump station 3-6 on the corner or Flowing Springs Road and Fifth Avenue. The pump station is adjacent to the Applebee's.

New PS 3-6 Latitude 39° 18' 3 " N, Longitude 77° 50' 41" W

From the new pump station 3-6 the two force mains in the same trench (3,300 LF) will continue to run parallel to the existing force main in the existing right of way to East Washington Street where the flow will enter an upgraded gravity sewer (1,300 LF) which will run along County Route 340/7 to an alley that runs to a new (replacement) pump station 4-2 located next to Wall Alley and the Wendy's restaurant.

New PS 4-2 Latitude 39° 17' 31 " N, Longitude 77° 50' 57" W

From the new PS 4-2 two force mains in the same trench (1,800 LF) will continue to run parallel to the existing force main in the existing right of way to and along Jefferson Avenue where it will enter an upgraded gravity sewer (4,300 LF) to the Samuel street pump station and that is where this portion of the project ends. This line is highlighted in beige on the attached illustrations.

Portion 5 consists of running a force main from the Breckenridge East pump station (constructed this project) to the Sheridan Subdivision and its pump station number 2 (4,800 LF) where the force main will then run parallel to a force main from their PS No. 2 to the Sheridan Pump Station number 1 (1,500 LF). The route of the force main from the Breckenridge East pump station will follow the access road to the pump station (approved during the Flowing Springs WWTP project) to Shepherdstown Pike (Route 230) and then withing the right of way of the Shepherdstown Pike through Halltown to the Sheridan Subdivision.

Sheridan PS No. 1 Latitude 39° 18' 57 " N, Longitude 77° 47' 18" W

Sheridan PS No. 2 Latitude 39° 18' 56 " N, Longitude 77° 47' 298" W

The force main will then run parallel to the existing Sheridan PS force main (4,300 LF) to the Old Standard WWTP in the existing right of way to the gravity sewer serving the Old Standard WWTP which is the end of this project. The force main is highlighted in green on the attached illustrations. The gravity sewer was sized to handle this flow when it was designed.

End of Project Latitude 39° 18' 43 " N, Longitude 77° 46' 54" W

Old Standard WWTP Latitude 39° 17' 54 " N, Longitude 77° 46' 28" W

Proposed Area of Impact

With the exception of the pump station site and access road, the project proposes a permanent 15' easement for the proposed lines. In addition, a temporary 40' wide construction easement is proposed for installation. Above ground impacts related to

the sewer lines are limited to the construction phase as all areas will be restored and vegetated following installation other than for a manhole cover, installed no more then 12 inches above the ground surface in remote areas and flush with the ground along roads and in subdivisions, approximately every 300 feet.

Based upon the proposed route, minimal clearing of mature vegetation is anticipated. Necessary clearing would be done selectively, within the proposed construction easement, and only as necessary for the installation of the proposed lines.

Designated wetland areas are known to exist in the vicinity of the project path. Wetland disturbances and stream crossings will be addressed through normal US Army Corps of Engineers and WV DEP permitting process.

No designated wildlife refuges or preservation areas are known to exist within the project path. Furthermore, based upon the underground nature of the proposed lines, the proposed route, the assumption of proper construction techniques, and the location of the pump station site in an open and previously disturbed agricultural field, it is not anticipated that the proposed project will pose any direct and permanent impact to wildlife habitat. In addition, it is not anticipated that the proposed project will pose any impacts other than temporary visual impacts during construction of any historic areas, nor will it impact any archeological resources based on a Phase I Archeological Survey of portions 1, 2 or 3 of this project prepared for the Flowing Springs WWTP project and the fact that the lines in the other portions of the project will be buried and located in previously disturbed areas.

Conclusion

On behalf of JCPSD, Pentree, Inc. is requesting a comprehensive review by the U.S. Army Corps of Engineers for the proposed project and letter response as appropriate..

If you have any questions, or should you require additional information to prepare your comments, please do not hesitate to contact us.

Sincerely,
PENTREE, INCORPORATED

J. Zane Summerfield, Jr.
Analyst

Attachment

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
WILLIAM S. MOORHEAD FEDERAL BUILDING
1000 LIBERTY AVENUE
PITTSBURGH, PA 15222-4186

REPLY TO
ATTENTION OF

RECEIVED
JUN 27 2014
PENTREE, INC.

June 25, 2014

Operations Division
Regulatory Branch
2014-475

Jefferson County Public Service District
340 Edmond Road
Kearneysville, West Virginia 25430

To Whom It May Concern:

I refer to a letter with attachments, received in this office June 16, 2014, sent in on your behalf by Pentree, Inc. regarding the Breckenridge East Pump Station and Associated Lines Project. Jefferson County Public Service District is proposing to upgrade its collection system to properly handle the flows it is responsible for in Jefferson County, West Virginia. (Pentree, Inc. Project #020-1212 Location Map enclosed)

Your project will likely qualify for an Individual Permit. Due to the fact that your letter and Preliminary Engineering Report do not clearly identify each aquatic resource, it is unclear if work in jurisdictional waters is proposed, we recommend that you hire a qualified wetland consultant to evaluate the entire project area in order to determine if any jurisdictional streams or wetlands are present. Enclosed is a list of wetland consultants.

You must also submit the following information to this office to ensure compliance with applicable Federal permit requirements:

1. A project narrative describing all proposed impacts to water courses, wetlands and/or waterbodies
2. Detailed drawings and maps showing all stream and wetland impacts
3. Department of Army Application Form (ENG4345)
4. Wetland Delineation Report including plans
5. West Virginia Agency correspondence: WV Department of Natural Resources (WVDNR); U.S. Fish & Wildlife Service (USF&WS); West Virginia Division of Culture & History; West Virginia Department o Environmental Protection (WVDEP)

SCANNED
JUN 27 2014

6. Please note, a mitigation plan may also be required

Every effort should be made to avoid and minimize impacts to the aquatic resources on-site. We will continue to work with you in order to protect any aquatic resources that may be present.

This project has been assigned Department of the Army Permit Number **2014-475**. Please refer to this number in all future correspondence. If you have any questions, please contact Linda Everley at 412-395-7152 or by e-mail: Linda.L.Everley@usace.army.mil.

Sincerely,

/signed/
Joshua D. Shaffer *for*
Jon T. Coleman
Chief, South Section, Regulatory Branch

Enclosures

Copy Furnished:

J. Zane Summerfield, Jr.
Penntree, Inc.
1428 Main Street
P.O. Box 1309
Princeton, WV 24740

Pentree
Incorporated
Consulting Engineers
A Resource Engineering Group Company

1428 Main Street
P.O. Box 1309
Princeton, WV 24740
304-431-7800 Phone
304-425-0445 Fax

June 5, 2014

U.S. Fish and Wildlife Service
Route 250 South, Elkins Shopping Plaza
694 Beverly Pike
Elkins, WV 26241

Re: Breckenridge East Pump Station and Associated Lines
Pentree Project Number #020-1212
Jefferson County, WV

Dear Review Staff,

While the proposed project has not been defined as a Federal Action and no lead government agency has been identified, it is likely that the proposed project will involve some level of public funding and permitting. Accordingly, it is assumed that the provisions of the National Environmental Policy Act (NEPA) may apply during future funding and permitting of the project and an official Environmental Assessment (EA) is being prepared by Pentree, Inc. As such, Pentree, Inc. is hereby requesting a project review by the U.S. Fish and Wildlife Service (USFWS) for potential impact to critical wildlife and natural resources.

For clarification, Pentree, Inc. is under contract with the Jefferson County Public Service District (JCPSD) for the study of this project. This review request is being submitted on behalf of the JCPSD.

Project Background

The Public Service Commission of WV (PSC) denied the Jefferson County Public Service District's (District) application of convenience and necessity to construct the Flowing Springs WWTP and associated collection system. The District had deferred upgrades to its collection system to the Evitts Run Charles Town WWTP since the Flowing Springs project would have radically changed the way it collected and treated the sewage generated in its service area. Since the project was denied, the District now needs to upgrade its collection system to properly handle the flows it is responsible for.

This project will provide the collection system reviewed previously by your Division (Flowing Springs Wastewater Treatment System, July 2008), construct a pump station in lieu of a wastewater treatment plant and expand the scope of the line portion of the project by adding force mains and upgrades to the existing gravity and force main lines

which will convey the flows to the Charles Town Evitts Run WWTP along the route of the Districts previously constructed collection system.

Technical Details:

The project concept can be separated into 5 portions.

Portion 1 begins at the existing pump station (PS 1-10) located east of Route 9 as indicated in the attached illustrations and involves the installation of a new 30" gravity sewer line from the pump station 1-10 site to the existing Breckenridge Subdivision pump station near Old Country Club Road. This line is highlighted in yellow in the attached illustrations. Pump station 1-10 pump station will be replaced with a manhole during startup of the project.

PS 1-10 Latitude 39° 20' 12" N, Longitude 77° 51' 17" W

Portion 1 consists of the following:

11, 850 LF new construction through previously disturbed area (fields and railroad crossing)

1 RR Crossing

1,000 LF new construction along Country Club Road

1,500 LF new construction through previously disturbed area (fields)

2,500 LF new construction through previously disturbed area (Breckenridge Subdivision)

Portion 2 begins at the Breckenridge Subdivision pump station and installs a new 36' gravity sewer line to the east to the proposed Breckenridge East pump station. In addition, portion 2 includes the installation of two force mains in the same trench running parallel to the gravity lined discussed previously in this paragraph back to the existing Breckenridge pump station location (6,200 LF). The Breckenridge pump station will be replaced with a manhole during startup of the project. This line is highlighted in light blue on the attached illustrations.

Breckenridge PS Latitude 39° 18' 51" N, Longitude 77° 49' 31" W

Portion 2 consists of the following:

4244 LF new construction through previously disturbed area (Subdivision green area, golf course and access road to Bellaire Subdivision.

1239 lf new construction through previously not disturbed area. (woodland along Flowing Springs Run)

642 LF new construction through previously disturbed area (old road bed)

Two stream crossings
6,200 LF of two force mains in the same trench running parallel to the gravity line through the areas described above

Portion 3 involves the construction of a new wastewater pumping station (Breckenridge East pump station). The pump station will be constructed on a previously disturbed area (farmland) in the Halltown area of Jefferson County. The site will consist of 1 acre of existing pasture and feral pasture which has trees mostly less than 12 inches in diameter. This is the site previously approved for construction of the Flowing Springs WWTP.

Breckenridge East PS Latitude 39° 18' 53" N, Longitude 77° 48' 21" W

Portion 3 consists of the following:

One 1.0 million gallon per day pump station and associated access road.

Portion 4 involves the construction of two force mains in the same trench and they will run parallel to the existing force main from the Breckenridge pump station site to the Ranson Flowing Springs pump station (5,500 LF) which is located adjacent to Flowing Springs Road. There will be an automated valve vault adjacent to the Ranson Flowing Springs pump station on ground which was previously disturbed during the pump station construction which will allow directing flows to the Ranson Flowing Springs pump station or along the following route.

Ranson Flowing Springs PS Latitude 39° 18' 37 " N, Longitude 77° 50' 16" W

From the Ranson pump station, two force mains in the same trench will continue to run parallel to the existing force main in the existing right of way in a North-Northwest direction to Route 9 which they will cross under and then along the Flowing Springs road (3,800 LF) to an upgraded gravity sewer (700 LF) to a new (replacement) pump station 3-6 on the corner or Flowing Springs Road and Fifth Avenue. The pump station is adjacent to the Applebee's.

New PS 3-6 Latitude 39° 18' 3 " N, Longitude 77° 50' 41" W

From the new pump station 3-6 the two force mains in the same trench (3,300 LF) will continue to run parallel to the existing force main in the existing right of way to East Washington Street where the flow will enter an upgraded gravity sewer (1,300 LF) which will run along County Route 340/7 to an alley that runs to a new (replacement) pump station 4-2 located next to Wall Alley and the Wendy's restaurant.

New PS 4-2 Latitude 39° 17' 31 " N, Longitude 77° 50' 57" W

From the new PS 4-2 two force mains in the same trench (1,800 LF) will continue to run parallel to the existing force main in the existing right of way to and along Jefferson Avenue where it will enter an upgraded gravity sewer (4,300 LF) to the Samuel street pump station and that is where this portion of the project ends. This line is highlighted in beige on the attached illustrations.

Portion 5 consists of running a force main from the Breckenridge East pump station (constructed this project) to the Sheridan Subdivision and its pump station number 2 (4,800 LF) where the force main will then run parallel to a force main from their PS No. 2 to the Sheridan Pump Station number 1 (1,500 LF). The route of the force main from the Breckenridge East pump station will follow the access road to the pump station (approved during the Flowing Springs WWTP project) to Shepherdstown Pike (Route 230) and then withing the right of way of the Shepherdstown Pike through Halltown to the Sheridan Subdivision.

Sheridan PS No. 1 Latitude 39° 18' 57 " N, Longitude 77° 47' 18" W

Sheridan PS No. 2 Latitude 39° 18' 56 " N, Longitude 77° 47' 298" W

The force main will then run parallel to the existing Sheridan PS force main (4,300 LF) to the Old Standard WWTP in the existing right of way to the gravity sewer serving the Old Standard WWTP which is the end of this project. The force main is highlighted in green on the attached illustrations. The gravity sewer was sized to handle this flow when it was designed.

End of Project Latitude 39° 18' 43 " N, Longitude 77° 46' 54" W

Old Standard WWTP Latitude 39° 17' 54 " N, Longitude 77° 46' 28" W

Proposed Area of Impact

With the exception of the pump station site and access road, the project proposes a permanent 15' easement for the proposed lines. In addition, a temporary 40' wide construction easement is proposed for installation. Above ground impacts related to the sewer lines are limited to the construction phase as all areas will be restored and vegetated following installation other than for a manhole cover, installed no more then 12 inches above the ground surface in remote areas and flush with the ground along roads and in subdivisions, approximately every 300 feet.

Based upon the proposed route, minimal clearing of mature vegetation is anticipated. Necessary clearing would be done selectively, within the proposed construction easement, and only as necessary for the installation of the proposed lines.

Designated wetland areas are known to exist in the vicinity of the project path. Wetland disturbances and stream crossings will be addressed through normal US Army Corps of Engineers and WV DEP permitting process.

No designated wildlife refuges or preservation areas are known to exist within the project path. Furthermore, based upon the underground nature of the proposed lines, the proposed route, the assumption of proper construction techniques, and the location of the pump station site in an open and previously disturbed agricultural field, it is not anticipated that the proposed project will pose any direct and permanent impact to wildlife habitat. In addition, it is not anticipated that the proposed project will pose any impacts other than temporary visual impacts during construction of any historic areas, nor will it impact any archeological resources based on a Phase I Archeological Survey of portions 1, 2 or 3 of this project prepared for the Flowing Springs WWTP project and the fact that the lines in the other portions of the project will be buried and located in previously disturbed areas.

Conclusion

On behalf of JCPSD, Pentree, Inc. is requesting a comprehensive review by the U.S. Fish and Wildlife Service for the proposed project and letter response as appropriate.

If you have any questions, or should you require additional information to prepare your comments, please do not hesitate to contact us.

Sincerely,

PENTREE, INCORPORATED

J. Zane Summerfield, Jr.
Analyst

Attachment

Pentree Incorporated
Consulting Engineers
A Resource Engineering Group Company

1428 Main Street
P.O. Box 1309
Princeton, WV 24740
304-431-7800 Phone
304-425-0445 Fax

June 5, 2014

West Virginia Division of Culture and History
1900 Kanawha Blvd. East
Charleston, WV 25305

Attn: Ms. Susan Pierce
Deputy State Historic Preservation Officer

Re: Breckenridge East Pump Station and Associated Lines
Pentree Project Number #020-1212
Jefferson County, WV

Dear Ms. Pierce,

On behalf of the Jefferson County Public Service District (Project Sponsors), Pentree, Inc. (Project Engineer) is submitting the referenced project for your review and comment.

While the proposed project has not been defined as a Federal Action and no lead government agency has been identified, it is likely that the proposed project will involve some level of public funding and permitting. Accordingly, it is assumed that the provisions of the National Environmental Policy Act (NEPA) may apply during future funding and permitting of the project and an official Environmental Assessment (EA) is being prepared by Pentree, Inc. As such, Pentree, Inc. is hereby requesting a project review by the West Virginia Division of Culture and History and a letter response as appropriate.

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Project Background

The Public Service Commission of WV (PSC) denied the Jefferson County Public Service District's (District) application of convenience and necessity to construct the Flowing Springs WWTP and associated collection system. The District had deferred upgrades to its collection system to the Evitts Run Charles Town WWTP since the Flowing Springs project would have radically changed the way it collected and treated the sewage generated in its service area. Since the project was denied, the District now needs to upgrade its collection system to properly handle the flows it is responsible for.

This project will provide the collection system reviewed previously by your Division (Flowing Springs Wastewater Treatment System, July 2008 **FR# 08-385-JF-5, Portions 1, 2 & 3 this project**), construct a pump station in lieu of a wastewater treatment plant and expand the scope of the line portion of the project by adding force mains and upgrades to the existing gravity and force main lines which will convey the flows to the Charles Town Evitts Run WWTP along the route of the Districts previously constructed collection system.

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The project concept can be separated into 5 portions.

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Conclusion

On behalf of JCPSD, Pentree, Inc. is requesting a comprehensive review by the West Virginia Division of Culture and History for the proposed project and letter response as appropriate..

If you have any questions, or should you require additional information to prepare your comments, please do not hesitate to contact us.

Sincerely,
PENTREE, INCORPORATED

J. Zane Summerfield, Jr.
Analyst

Attachment

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX B
CTUB 2021 SEWER STRATEGIC PLAN



SEWER STRATEGIC PLAN

2021-2024

CHARLES TOWN UTILITY BOARD

661 South George Street, Suite 101
Charles Town, West Virginia 25414

Phone: (304) 725-2316
Email: info@ctubwv.com

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Charles Town Utility Board (CTUB)
Sewer Strategic Plan
2021-2024

Adopted:

April 28, 2021

BOARD OF DIRECTORS

Daryl Hennessy, **Chairman**, City of Charles Town City Manager

Pete Kubic, **Vice Chairman**, Professional Representative

Thomas Stocks, **Treasurer**, City of Charles Town Representative

Keith Pierson, City of Ranson Mayor, City of Ranson Representative

Jacquelyn Milliron, Jefferson County Representative

Caleb Hudson, Jefferson County Commission Liason

CTUB MANAGEMENT

Kristen M. Stolipher, Utility General Manager – kstolipher@ctubwv.com

April L. Shultz, Assistant Utility Manager – ashultz@ctubwv.com

EXECUTIVE SUMMARY

Purpose

The purpose of this Sewer Strategic Plan (SSP) is to document the Charles Town Utility Board's (CTUB) existing wastewater collection and treatment system to establish a plan for conveyance of all wastewater that will be generated within the region to the CTUB wastewater treatment plants during current and future periods of growth. The plan will evaluate future plans and implementation strategies both physically and financially. Another major purpose of this SSP is the identification of wastewater peak flows and the evaluation of the capacity of the existing collection and conveyance system to convey these peak flows without backups of wastewater into homes and businesses and without sanitary sewer overflows. The City of Charles Town, by and through CTUB first published a SSP in 2007. The most recent revision to the SSP was approved by CTUB on April 25, 2018. Pursuant to a resolution for a tri-annual SSP update, the current revision serves as the required April 2021 update. The SSP is adopted by the CTUB Board of Directors. Upon adoption, development of actions to implement the SSP can begin. The SSP provides an overall high-level direction to prioritize resources and achieve future success.



Since the adoption of the last SSP, CTUB, through the City of Charles Town, acquired the assets of the City of Ranson Sewer System and the Jefferson County Public Service District. These acquisitions occurred on July 1, 2018 and January 1, 2019, respectively. The wastewater treatment and collection systems of the consolidated regional utility are reviewed herein. Growth has been increasing in the region and will be monitored to ensure that appropriate measures are taken to address future capital improvements, operation and maintenance as well as capacity needs. Growth projections are included in this SSP, and will be, in part, considered in determining the timing of those future capital improvements. Communication with local planning and zoning authorities to acquire accurate growth projections is essential for successful monitoring of growth. This plan details the growth within the system based on growth projections provided by the local planning and zoning agencies.

Scope

The principal issues examined as part of this revision to the SSP include the following:

- Customer satisfaction and public education
- Analyze growth scenarios and develop plant and collection system expansion needs.
- Evaluate the existing wastewater collection system and treatment process in relation to future flows, loads and discharge standards.
- Assess system improvement needs, including capital costs and O&M requirements.
- Develop timeframes associated with necessary system improvements to encompass the plants and collection system.
- Update planning for future sewerage facilities to serve existing and expanded service area.

Plan Updates

CTUB has committed to updating this document on a tri-annual basis. Adjustments to the SSP are based on the condition and performance of the overall system, updated construction data and new information regarding growth. Previously published SSP's serve as guidance to achieve accuracy in planning and to enhance the development of current and historical data. The accuracy of the planning process continues to be enhanced through the development of current data and historical data captured in previous SSP's. CTUB makes every effort to involve customers, officials and stakeholders in this process.

Tri-annual updating is expected to proceed in accordance with the following schedule:

- January New data, information, and comments solicited from stakeholders
- February Plan updated. Board of Directors review DRAFT SSP
- March Draft Plan issued for comments
- April Plan revised, adopted and published

Project Planning

Since the last SSP was adopted, the consolidation of utilities has provided the opportunity to evaluate efficiencies and operational modifications to allow for costs savings and value engineering of capital improvements. This SSP serves as a framework for decision making outlining the specific goals, strategies and objectives for the purpose of planning for future capital improvements based on a 10-year planning period from 2021 to the year 2031. The Renewal and Replacement project detailed below has been discussed in prior SSP's and addresses needs at the CTWWTP and TWWTP as a result of aging infrastructure and critical equipment replacement. There are also numerous collection system projects that are currently designed or in design that will address improved efficiencies and upgrade or decommission pump stations to reduce operation and maintenance costs. Based on analysis of available information the following recommendation outline projected near and long-term improvements:

- Completion of Renewal and Replacement project
    - Charles Town Wastewater Treatment Plant (CTWWTP)
        - One fine screen
        - Grit removal
        - Three (3) influent pumps and control upgrades
        - SBR control panel upgrade
        - UV system upgrade
        - Sludge handling system and building
        - Lime Feed System
        - Main Utility Disconnect, ATS and MCC-1 Replacement
        - Wiring/Conduit and SCADA Replacement
    - Tuscawilla Wastewater Treatment Plant (TWWTP)
        - Two fine screens and channel modifications/Removal of existing fine drum screens
        - MBR Equipment upgrades
- Completion of the 2021 collection system projects
- Fairfax Crossing Parallel Line
- Forrest Avenue Pump Station relocation
- Future - Expansion of CTWWTP from 1.5 MGD to 3.5-4.0 MGD
- Future - Tuscawilla Phase 2 Upgrade to 1.0 MGD.

Project Recommendations

Critical infrastructure upgrades will be detailed in this SPP. This will include a review of completed projects and future capital improvements. Since the last version of the SSP, consolidation of the CTUB, Ranson and JCPSD sewer utilities has been executed which was a monumental accomplishment for the regional utility. Several projects noted above were initiated prior to consolidation and remain necessary for proper operation of the system. In addition to the system wide improvements, it is necessary to begin planning and engineering for expansion of the CTWWTP in the next 10 years.

Financial

The projected costs associated with the projects outlined above are detailed in this plan. CTUB is in the process of initiating a four-step process of rate equalization as well as development of a Capital Improvement Plan that will initiate evaluation of Capacity Improvement fees which may impact how these projects are financed. CTUB continues to pursue a strategy for funding upgrades, and expansions in a manner that will minimize the burden to the current and future ratepayers. The Board intends to fund the costs for the renewal and replacement project and the facility expansions through conventional rate impacts, payment of prior bonds and Capacity Improvement Fees (CIFs). The CTWWTP and TWWTP Phase 2 Upgrade to 1.0 MGD would require separate funding strategies in a future SSP publication. CTUB is also currently developing a class cost of service study to reassess rate and connection fees that need to be implemented to adequately fund operation and maintenance as well as future capital and growth-related projects. If the current sewer rates are insufficient to generate funds prior to the next phase of expansion, the City can consider increasing rates to defray the capital costs.

INTRODUCTION

Background

The Mission of the Charles Town Utility Board (CTUB) is to provide reliable water and sewer services that protect public health and the environment with financial accountability, regional stewardship, and superior customer service. Specific goals and key areas of focus are:

Customer Service – Provide efficient and effective level of service to meet customer and stakeholder expectations.

Environmental Stewardship – Take advantage of opportunities to invest in energy efficiency, renewable energy, water and sustainable practices that protect the environment. Meet all applicable regulatory notification and reporting requirements.

Infrastructure Maintenance – Properly manage, operate and maintain all parts of the wastewater collection system and provide best service in a cost-effective manner to the customer.

Financial Stability – Manage the CTUB finances to support the Utility needs and maintain reasonable sewer rates.

Workforce Planning and Development – Provide team-oriented workforce that is fully trained, fairly compensated, and accountable with clearly defined career paths for the evolving work environment.

Operational Optimization – Improve functions that support the administrative, financial, technical and field activities and provide the best service to the customer.

CTUB is a combined water and sewer utility that provides sanitary sewerage collection and treatment services for approximately 8,015 sewer customers comprising residential, commercial, industrial and public authority entities within the municipalities of the City of Charles Town, the City of Charles Town as well as the surrounding areas within Jefferson County. The County has a population of just over 57,000 and encompasses 212 square miles.

CTUB has a five (5) member Board of Directors that meets twice monthly to consider issues of substance for Utility operations, making recommendations to the Utility Manager regarding infrastructure management, finances and other policy questions. Subsequent to the Utility consolidation, the Board of Directors has representation from the City of Ranson and Jefferson County (including a voting member and non-voting County Commission liaison). The Board of Directors are appointed by the Mayor and Council of the City of Charles Town and serve staggered four-year terms. In addition to the appointment of the Board of Directors, the City of Charles Town is responsible for the following as it pertains to CTUB:

1) Retains ownership of the assets of the system
2) Authorization of all changes in rates and charges for the water and sewer system
3) Issuance of bonds, notes and other debt obligations secured by the gross revenues of the system
4) Approval of capital projects for the water and sewer system which are not in the "normal course of business"; and
5) Approval of real property condemnations for the System.

CTUB has 31 full-time employees, 2 part-time employees and a sewer operating budget of roughly $6 million annually. Infrastructure assets include three (3) wastewater treatment plants, 125 miles (over 100 miles of gravity and over 25 miles of force main) and 47 pump stations.

Utility Consolidation



Consolidation has been discussed for many years and throughout various SSP's. On July 1, 2018 and January 1, 2019, the acquisition of the City of Ranson Sewer system and JCPSD, respectively, by the City of Charles Town were complete. The consolidation efforts included incorporation of both the City of Ranson and JCPSD current rates and charges to the City of Charles Town Sewer Tariff. This acquisition can be attributed to the dedicated agencies and officials from Charles Town, Ranson and Jefferson County that had the foresight to acknowledge the environmental and operational efficiencies as well as economies of scale of utility consolidation. Thanks to all of those that participated in this monumental accomplishment.

Post consolidation, CTUB operates three wastewater facilities: the Charles Town Wastewater Treatment Plant (CTWWTP), the Tuscawilla Wastewater Treatment Plant (TWWTP) and the Deerfield Sewer Treatment Plant (not connected to the larger CTUB system as it serves the Deerfield residential development near Shepherdstown).

CTUB maintains over 125 miles of collection lines and 47 pumping stations which transfer flows from the customer point of connection to the treatment facilities. CTUB has the ability to treat flows interchangeably between the CTWWTP and TWWTP facilities through the Huntfield Transfer Pump stations.

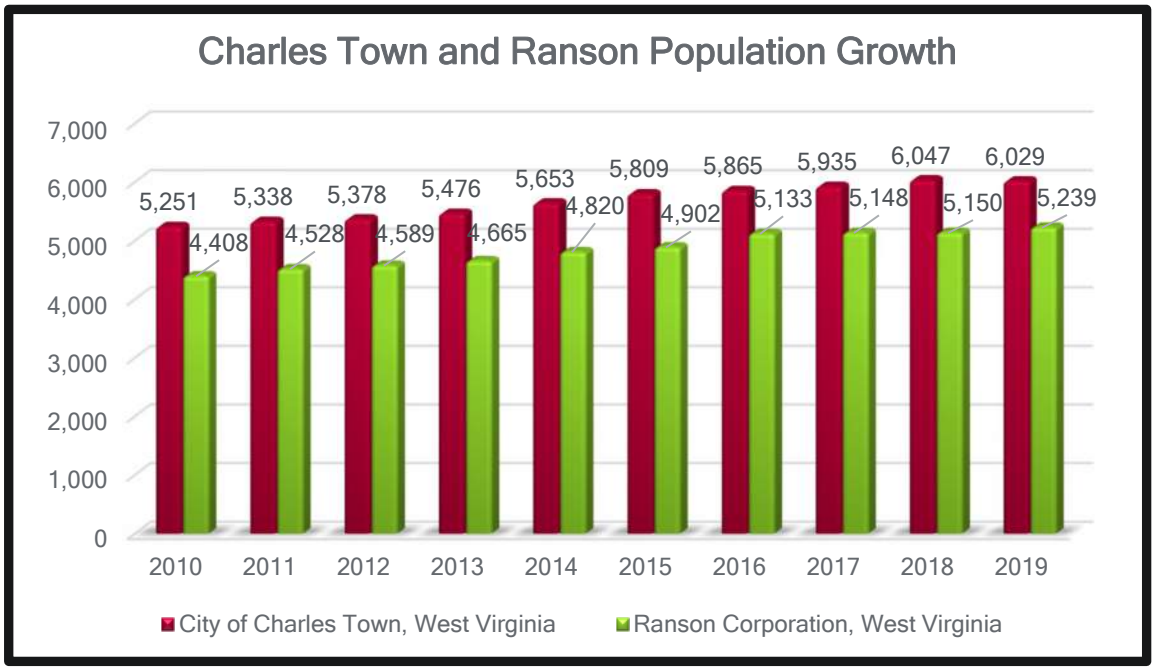
Facilities Plan Summary

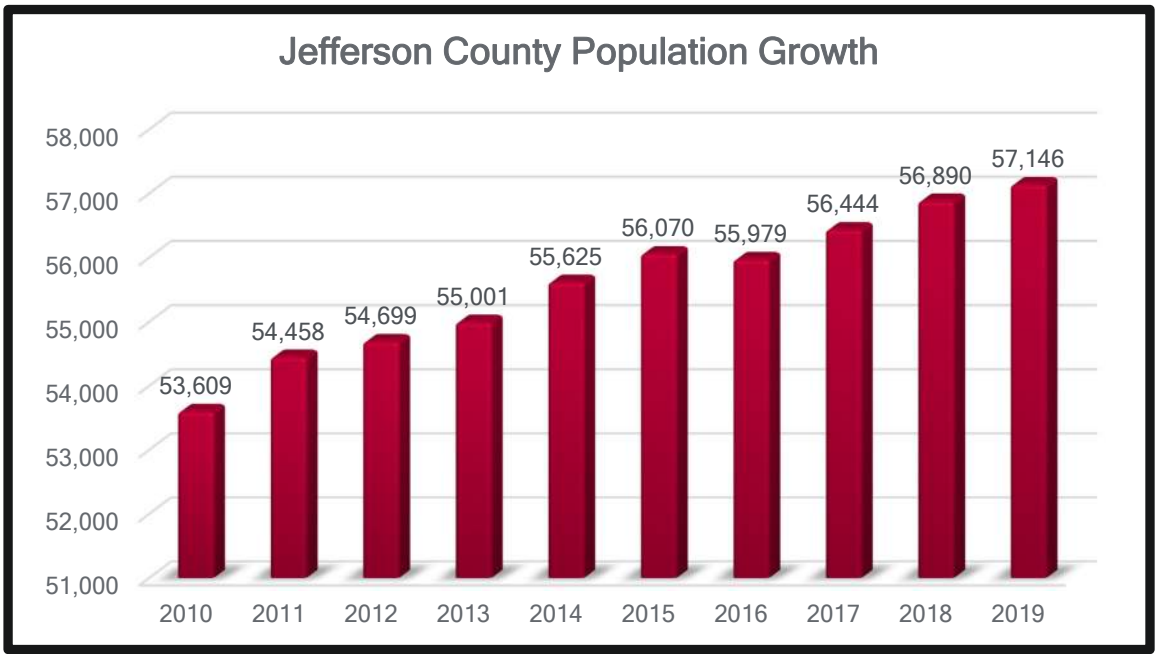
The period used for planning efforts for the Renewal and Replacement projects and 2021 collection system projects are based on a 10-year planning period. This period is the basis for evaluating population growth, estimating treatment capacity requirements, operational needs and evaluating treatment process alternatives. The overall planning period extends from 2021 to 2031 which includes short-term and long-term planning objectives. CTUB intends to complete a sewer master plan in 2021 upon completion of the sewer modeling efforts to assist with development of updated capacity improvement fees requirements and capital improvement projects for the next 15 years. Any capital projects identified in the sewer master plan will be included in future SSP's.

EXISTING CONDITIONS

Regional Growth and Service Area

The City of Charles Town, City of Ranson and Jefferson County have continued to experience consistent growth since the issuance of the last SSP. A demonstrated in the charts below, the growth rates in the region have maintained a steady 1% growth increase on an annual basis:





Reference: Annual Estimates of the Resident Population for Incorporated Places in West Virginia: April 1, 2010 to July 1, 2019 (SUB-IP-EST2019-ANNRES-54). Source: U.S. Census Bureau, Population Division, Release Date: May 2020.

The City of Charles Town, City of Ranson and the Jefferson County Department of Planning, Zoning and Engineering have provided information regarding permits obtained since the issuance of the last SSP. Table 1.1 illustrates the past three years of residential and commercial development data. This historical data shows that an average of 129 residential units are built per year.

Table 1.1 - Development Growth Trend 2018-2020

			New Connections		
Region	**Subdivision**	**Type**	**2018**	**2019**	**2020**
County	Deerfield	Residential	2	1	2
County	Aspen Greens	Residential	10	10	18
County	Beallair	Residential	3	7	3
County	Locust Hill	Residential	6	6	0
County	Walnut Grove	Residential	1	0	2
County	Burr Park	Commercial	2	2	4
County	Somerset	Commercial	1	0	0
County	Cambridge	Residential	0	5	0
County	Woodland MHP	Residential	0	2	0
County	Charles Town	Residential	0	6	4
County	Tuscawilla	Residential	0	1	0
County	Orchard Hills	Residential	0	0	1
Charles Town	CT Limits	Commercial	1	1	1
Charles Town	CT Limits	Residential	6	3	5
Ranson	Ranson Limits	Commercial	0	0	2
Ranson	Ranson Limits	Residential	4	3	1
Ranson	President's Pointe	Residential	0	0	70
Ranson	Shenandoah Springs	Residential	34	30	7
Ranson	Briar Run	Residential	21	31	21
Ranson	Jefferson Crossing	Residential	24	0	36

Total Residential Building Permits	**111**	**105**	**170**
Total Commercial Building Permits	**4**	**3**	**7**

Future Development Projections

In addition to the historical information that was provided, future development forecasts were obtained from the City of Charles Town, City of Ranson and Jefferson County Department of Planning Zoning and Engineering that will be monitored to determine necessary improvements to the sewer system. For the purposes of these future projections and average annual build-out of 20 units per year for larger subdivisions/developments was used based on the historical trends of building within the County. These projections may vary depending on various economic factors such as growth and development trends. Details of the projections are presented in Table 1.2 and known historical data has been utilized for future volumetric capacity forecasting. A full copy of the Development Forecast is included in Appendix A. Refer to Exhibit 1-2 in Appendix C for the location of projected developments.

	Appendix A - CTUB Sewer Strategic Plan 2021-2040 Development Forecast																		
Map Reference	Development	Total Design EDUs	Total Built as of 2021	20 year forecast to be built	Total Flow	Beyond 20 year forecast	Year 1 2021	Year 2 2022	Year 3 2023	Year 4 2024	Year 5 2025	Year 6 2026	Year 7 2027	Year 8 2028	Year 9 2029	Year 10 2030	Years 11-20 2031-2040	TOTAL @ Year 20	TOTAL REMAINING
1	American Heritage (Huntwell)	500	0	500	75,000	200	0	0	0	20	20	20	20	20	20	20	160	300	200
2	Aspen Green	203	46	157	30,450	0	20	20	20	20	20	20	20	17	0	0	0	157	0
3	Beallair	372	112	260	55,800	0	20	20	20	20	20	20	20	20	20	20	60	260	0
4	Blackford Village	338	0	338	50,700	0	0	0	20	20	20	20	20	20	20	20	178	338	0
5	Breckenridge East	300	0	300	45,000	100	0	0	0	0	0	0	0	0	0	0	200	200	100
6	Briar Run	131	122	9	19,650	0	9	0	0	0	0	0	0	0	0	0	0	9	0
7	Burr Industrial Park & Bardane	200	170	30	30,000	0	3	3	3	3	3	3	3	3	3	3	0	30	0
8	Cambridge	134	85	49	20,100	0	5	5	0	0	0	0	0	0	0	0	39	49	0
9	Charles Town Infill	250	0	250	37,500	150	5	5	5	5	5	5	5	5	5	5	50	100	150
10	Clayhill Farm	300	0	300	45,000	20	0	0	0	0	0	20	20	20	20	20	180	280	20
11	Daniels Forest	192	0	192	28,800	0	0	0	0	0	0	20	20	20	20	20	92	192	0
12	Fritts Property	370	0	370	55,500	50	0	0	0	0	20	20	20	20	20	20	200	320	50
13	Harvest Hills	392	6	386	58,800	166	0	0	0	0	0	0	0	0	0	20	200	220	166
14	Huntfield	3,200	421	2,779	480,000	2,459	0	0	0	0	20	20	20	20	20	20	200	320	2459
15	Jefferson Heights North	262	0	262	39,300	122	0	0	20	20	15	15	15	15	15	15	10	140	0
16	Tate Manor	80	0	80	12,000	0	20	20	20	20	0	0	0	0	0	0	0	80	0
17	Lakeland Place / Lloyd's	600	0	600	90,000	220	0	20	20	20	20	20	20	20	20	20	200	380	220
18	Jefferson Orchards	888	0	888	133,200	688	0	0	0	0	0	0	0	0	0	0	200	200	688
19	Langlet	1,000	0	1,000	150,000	800	0	0	0	0	0	0	0	0	0	0	200	200	800
20	Lloyd Property	500	0	500	75,000	300	0	0	0	0	0	0	0	0	0	0	200	200	300
21	Locust Knoll	359	0	359	53,850	59	0	0	0	0	0	20	20	20	20	20	200	300	59
22	Magnolia Springs	300	0	300	45,000	0	20	20	20	20	20	20	20	20	20	20	100	300	0
23	Norborne Glebe	1,050	246	804	157,500	484	0	0	0	20	20	20	20	20	20	20	180	320	484
24	Old Town Ranson - Infill	250	0	250	37,500	150	5	5	5	5	5	5	5	5	5	5	50	100	150
25	Potomac Marketplace	54	0	54	8,100	0	0	5	5	5	5	5	5	5	5	5	9	54	0
26	President's Pointe	1,100	77	1,023	165,000	0	50	50	50	50	50	50	50	50	50	50	523	1,023	0
27	Prospect Place	170	0	170	25,500	0	0	0	0	0	9	9	25	25	25	25	52	170	0
28	Ranson Gateway / Boulevard	1,175	0	1,175	176,250	835	0	0	0	20	20	20	20	20	20	20	200	340	835
29	Shenandoah Springs	705	259	446	105,750	46	20	20	20	20	20	20	20	20	20	20	200	400	46
30	Stolipher	324	0	324	48,600	124	0	0	0	0	0	0	0	0	0	0	200	200	124
31	Washington Landing	274	0	274	41,100	0	0	0	0	50	50	50	50	50	24	0	0	274	0
32	Winchester Cold Storage	675	0	675	101,250	125	0	0	0	0	0	0	0	0	0	50	500	550	125
33	Windmill Crossing	150	146	4	22,500	0	1	1	1	1	0	0	0	0	0	0	0	4	0
	Total Projected Development	**7,086**	**728**	**6,358**	**1,062,900**	**2,123**	**96**	**101**	**101**	**191**	**199**	**219**	**235**	**235**	**209**	**235**	**0**	**4,235**	**2,123**
* See Exhibit 1-2 Projected Development for locations																			

The housing market in the region has continued in an upward trend with several large housing developments currently under construction. Commercial growth and the completion of the Rockwool Facility since the development of the last SSP have contributed to growth in the CTUB system.

WASTEWATER TREATMENT

Description of Existing Treatment Systems

CTUB operates three wastewater plants: the Charles Town Wastewater Treatment Plant (CTWWTP), the Tuscawilla Wastewater Treatment Plant (TWWTP) and the Deerfield Sewer Treatment Plant. These wastewater facilities are designed to process the wastewater collected throughout the community and return the treated water to the environment. The treat methods included a number of physical and biological processes designed to provide optimal conditions for nutrient removal. CTUB is regulated by the West Virginia Department of Environmental Protection (WVDEP) through the U.S. Environmental Protection Agency (EPA).

Charles Town Wastewater Treatment Plant (CTWWTP)

The CTWWTP is located on WV route 115 in Charles Town. The facility is a Sequencing Batch Reactor (SBR) treatment facility which operates as an Intermittent Cycle Extended Aeration System (ICEAS) and has a hydraulic capacity of 1.75 million gallons per day (MGD). Wastewater treatment components include preliminary treatment consisting of one (1) grinder (Muffin Monster) removed from service on April 8, 2019, one (1) coarse bar screen and compactor, one (1) grit removal system with a washer/compactor, one wet well with three (3) submersible pumps, an influent distribution box, three (3) SBR process trains operated in parallel with chemical addition for phosphorus removal, one (1) post SBR equalization tank, six (6) denitrification filters operated in parallel (currently bypassed) with chemical addition for phosphorus removal and carbon addition for denitrification, one (1) ultraviolet (UV) disinfection system and a utility water system (currently not in use). The solids handling consists of three (3) aerobic digesters operated in parallel, that were converted from secondary clarifiers, one (1) "day tank" digester, one (1) 573,000-gallon aerobic digester (currently not in use), one (1) sludge transfer pump, one (1) belt filter press with conveyor and one (1) lime silo with one (1) dry feed system and screw auger. The belt filter solids are land applied on farms permitted by the WV DEP.

The Charles Town facility originally consisted of primary treatment, activated sludge tanks, secondary settling basins, disinfection by chlorination, aerobic sludge digestion and sand drying beds. The plant was expanded in 1987 to include a third aeration basin and settling basin. Additionally, the plant added an open-channel Ultraviolet Disinfection (UV) unit and a belt filter press with the associated structures. The sand drying beds were removed as part of this expansion.

The plant was upgraded in 2001 and converted the SBR to an ICEAS process. The current influent pump station, headworks building and blower building were also constructed as part of this upgrade. The 573,000-gallon aerobic digester tank was added to the facility during an upgrade in 2005. The digester tank was built to provide additional sludge processing time and increased storage capacity in an effort to produce higher quality solids. Additionally, denitrification filters were installed at the facility in 2016, which included chemical addition facilities for a coagulant for phosphorus precipitation and carbon for denitrification.



The CTWWTP accepts non-domestic wastewater from the Charles Town Water Plant. The Utility Board currently hauls approximately 6,000-9,000 gallons per week of non-domestic liquid

water treatment facility sludge from their existing plant to the CTWWTP digester for processing and thickening. This sludge which is 2-6% solids, consists primarily of river laden material such as sand and dirt along with an aluminum-based coagulant from the sedimentation basins and conventional sand filters. The contents are generally rich in total organic carbon (TOC) from the river source and are difficult to press with the existing Ashbrook belt filter press. The filtrate from the press is returned back to the headworks. The maximum daily permitted volume is 10,000 gallons. The designated NPDES discharge is Outlet No. 001.

The water treatment plant sludge requires a significant amount of polymer addition and adds to the total amount of generated dry tons. It also increases the amount of lime needed for raising the solids pH content. CTUB is currently pursing alternative options to treat and dispose of the water treatment facility sludge. The future plans consist of completely eliminating the sludge from the wastewater treatment facility process.

The CTWWTP operates under the West Virginia NPDES No. WV0022349. The current permit, reissued on July 21, 2016, expires on June 30, 2021. The permit renewal application to WVDEP was submitted in December 2020 and CTUB will be working with WVDEP on the permit renewal in the first half of 2021. The permit renewal will incorporate the CTWWTP and TWWTP along with the JCPSD Permit WV0083461 which includes the Industrial Users connected to the CTUB system.

The CTWWTP is permitted for an annual average flow of 1.75 million gallons per day (MGD). Additionally, if the facility discharges 90% (1.58 MGD) or more of its permitted flow over 3 consecutive months, a Plan of Action must be developed and submitted to the Department. The 2018 monthly average effluent flows for November and December exceeded 1.58 MGD. The monthly average influent flows during 2018 compared to the same month's monthly average effluent flow ranged from 0.239 to 0.808 MGD greater.

This facility serves a population equivalent of approximately 17,500 persons in the City of Charles Town, the City of Ranson and the surrounding areas of Jefferson County and discharges treated wastewater through Outlet No. 001 to Evitts Run, approximately 4.5 miles from its mouth, of the Shenandoah River of the Potomac River.

CTWWTP Flows and Loading

Historical flow and loading data have been compiled and analyzed for the system. This data provides the basis for projecting future flows and loadings to better understand the timing when a capacity restriction may occur at one of the treatment processes and thus must be addressed in order to provide adequate capacity to serve future growth. Table 1.3 summarize the historical and current values for flow for the CTWWTP.

TABLE 1.3: CTWWTP PLANT FLOWS 2018-2020

2018			2019			2020		
	TOTAL	AVERAGE		TOTAL	AVERAGE		TOTAL	AVERAGE
JANUARY	32.66	1.05	JANUARY	51.37	1.66	JANUARY	39.05	1.26
FEBRUARY	30.25	1.08	FEBRUARY	43.72	1.56	FEBRUARY	36.74	1.27
MARCH	32.34	1.04	MARCH	44.32	1.43	MARCH	36.76	1.19
APRIL	31.04	1.04	APRIL	37.29	1.24	APRIL	33.32	1.11
MAY	52.19	1.68	MAY	45.1	1.45	MAY	35.50	1.15
JUNE	39.84	1.33	JUNE	33.83	1.13	JUNE	33.44	1.11
JULY	39.86	1.29	JULY	39.09	1.26	JULY	34.45	1.11
AUGUST	43.63	1.41	AUGUST	33.33	1.08	AUGUST	32.65	1.05
SEPTEMBER	42.24	1.41	SEPTEMBER	30.89	1.03	SEPTEMBER	32.43	1.08
OCTOBER	45.50	1.47	OCTOBER	32.86	1.06	OCTOBER	33.91	1.09
NOVEMBER	50.36	1.68	NOVEMBER	30.65	1.02	NOVEMBER	33.49	1.12
DECEMBER	50.97	1.64	DECEMBER	36.55	1.18	DECEMBER	40.39	1.3
Annual Total	**490.87**	**1.34**	**Annual Total**	**459**	**1.26**	**Annual Total**	**422.13**	**1.15**

Table 1.4 below summarizes the historical plant flow for the CCWWTP from 2016 through 2020. The percent plant capacity on a Maximum 3-month average daily flow basis varied from 71% to 95%. The plant expansion has been noted in the past several SSP's and is further discussed in the future projects section of this SSP. Growth has continued to increase and will be monitored to ensure that appropriate measures are taken to address sewer infrastructure and capacity needs in order to meet the needs of the regional utility.

It should be noted that 2018 was a year of extraordinary rainfall, however the 2019 running average approached the permit conditions as well. Based on this review, there are several optimization efforts that have been recommended by CTUB Engineer's Gwin, Dobson & Foreman in advance of the CTWWTP expansion that may extend the service life of the existing facility, enhance process operations and provide additional capacity and improve treatment efficiencies. These optimization efforts include proper digesting of sludge through the addition of equipment which will reduce costs for sludge handling and disposal.

Table 1.4: Historical Plant Flow CTWWTP

Year	Total Annual Flow (MG)	Annual Average Daily Flow (MGD)	Average Daily Flow (3 month max.)	Permit Capacity (MGD)	Percent Capacity (Average 3 month max/Permit)
2016	419	1.14	1.26	1.75	72%
2017	393	1.25	1.43	1.75	82%
2018	491	1.34	1.67	1.75	95%
2019	459	1.25	1.56	1.75	89%
2020	420	1.15	1.25	1.75	71%

The CTWWTP and TWWTP Facilities share total effluent loading limits to the Chesapeake Bay via Outfall 003. Table 1.5 below details the outlets associated with WV0022349:

Table 1.5: WV/NPDES WV0022349 Outfall Descriptions	
Outfall ID	**Project Description**
001	Charles Town Plant outlet to Evitts Run
002	Tuscawilla Plant outlet regardless of whether it is discharged to Evitts Run or used for spray irrigation
202	Contribution of the total load from the Tuscawilla Plant that is used by the golf course for spray irrigation
203	Contribution of the total load from the Tuscawilla Plant that is discharged directly to Evitts Run through the new effluent line
003	Total load actually discharged to Evitts Run. This is the calculated sum of the loads determined from Outlet 001 and Internal Outlet 203.

The effluent limits for Outfall 001 are listed below in Tables 1.6 through 1.8 and the minimum sampling and monitoring frequencies are listed in Table 1.6. The tables below include the following parameters:

Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Ammonia (NH3), Total Nitrogen (TN) Total Phosphorous (TP). TN and TP concentrations.

Table 1.6: NPDES EFFLUENT LIMITS (OUTLET 001) BOD5, TSS AND AMMONIA-NITROGEN						
Effluent Characteristics	**Monthly Average Loading Rate, lbs./day**	**Weekly Average Loading Rate, lbs./day**	**Max Daily Loading Rate, lbs./day**	**Monthly Average Concentration, mg/L**	**Weekly Average Concentration, mg/L**	**Max Daily Concentration, mg/L**
BOD5	301	N/A	601	20.6	N/A	41.2
TSS*	438	N/A	876	30	N/A	60
Ammonia-Nitrogen as N	60	N/A	120	4.1	N/A	8.2

Table 1.7: TMDL ANNUAL WASTELOAD ALLOCATIONS: NITROGEN AND PHOSPHOROUS			
Effluent Characteristics	Charles Town Plant (Outfall 001)	Tuscawilla Plant (Outfall 203)	Annual Total Load Limit (Outfall 003)
Total Nitrogen	32,115 lbs.	10,740 lbs.	42,855 lbs.
Total Phosphorus	3,577 lbs.	1,790 lbs.	5,367 lbs.

Table 1.8: EFFLUENT LIMITS (OUTFALL OO1); COLIFORM, RESIDUAL CHLORINE, Ph AND D.O.		
Effluent Characteristics	**Maximum**	**Minimum**
Fecal Coliform	200 Counts/100 mL (Geo. Mean) 400 Counts/100 mL (Maximum)	N/A
pH	9	6
Dissolved Oxygen (All Year)	N/A	6.0 mg/L at anytime

Table 1.9: ANNUAL NPDES PERMIT MINIMUM MONITORING REQUIREMENTS (OUTLET 001)		
Effluent Characteristics	**Measurement Frequency**	**Sample Type**
BOD5	Once per week	24-hour composite
BOD5 % Removal	Four per month	Calculated
Total Suspended Solids (TSS)	Once per week	24-hour composite
Suspended Solids % Removal	Four per month	Calculated
Fecal Coliform	Once per week	Grab
pH	Once per week	Grab
Dissolved Oxygen	Once per week	Grab
Ammonia Nitrogen	Once per week	24-hour composite
Total Nitrogen as N (Monthly)	Once per week	24-hour composite
Total Nitrogen as N (Yearly)	Once per year	Calculated
Total Phosphorous (Monthly)	Once per week	24-hour composite
Total Phosphorous (Yearly)	Once per year	Calculated
Total Copper	Once per quarter	24-hour composite
Total Lead	Once per year	24-hour composite
Total Zinc	Once per year	24-hour composite
Total Arsenic as As	Once per year	24-hour composite
Total Cadmium	Once per year	24-hour composite
Hexavalent Chromium	Once per year	24-hour composite
Cyanide	Once per year	Grab
Total Mercury as Hg	Once per month	Grab
Total Nickel	Once per year	24-hour composite
Total Silver	Once per year	24-hour composite
Total Hardness as CaCO3	Once per 6-month period	Grab
Total Aluminum	Once per quarter	24-hour composite
Chloride as Cl	Once per quarter	24-hour composite
Chronic Tox. - Cerlodaphina Dubia	Once per year	24-hour composite
Chronic Tox. - Pimephales Promelas	Once per year	24-hour composite
Flow	Continuous	Measured

Annual effluent loading limits contained in the permit were established under the Chesapeake Bay Total Maximum Daily Load (TMDL) for total nitrogen (TN) and total phosphorus (TP). The Charles Town and Tuscawilla Facilities share total effluent loading limits to the Chesapeake Bay via Outfall 003. The other discharge limits are typical water quality - based limitations developed by the West Virginia Department of Environmental Protection.

Table 1.10: SUMMARY CTWWTP FLOW DATA AND LOADING REVIEW

Flow Type	Measurement Frequency	Remarks
Minimum Hourly Flow *	0.138	Minimum daily flow for the period from January 2016-December 2019
Monthly Average Flow*	1.5	Monthly average flow for the period from January 2016- December 2019
Permitted Plant Capacity*	1.75	WVDEP Permitted Plant Capacity
Permitted Maximum 3 Month Average Flow	1.58	90% Permitted Plant Capacity
Maximum Monthly Average Flow*	2.22	Maximum monthly average flow occurred in September 2018
Maximum Weekly Flow	1.39	Log Pearson Type III analysis of 50% probability occurrence of all from January 2016 through December 2019 flow events
35% Probability Occurrence, Peak Flow	1.55	Log Pearson Type III analysis of 35% probability occurrence of all from January 2016 through December 2019 flow events
20% Probability Occurrence, Peak Flow	1.9	Log Pearson Type III analysis of 20% probability occurrence of all from January 2016 through December 2019 flow events
Maximum 3 month Running Average	2	Log Pearson Type III analysis of 9% probability occurrence of all from January 2016 through December 2019 flow events
Maximum Daily Flow	2.2	Log Pearson Type III analysis of 5% probability occurrence of all from January 2016 through December 2019 flow events
Peak Hourly Flow	2.56	Log Pearson Type III analysis of 2% probability occurrence of all from January 2016 through December 2019 flow events
Peak Instantaneous Flow*	4.34	Maximum system flow of 4.339 MGD recorded from January 2016 through December 2019

Tuscawilla Wastewater Treatment Plant (TWWTP)

The TWWTP is a Biological Nutrient Removal (BNR) intergraded with a Membrane Bio-Reactor (MBR) treatment facility having a hydraulic capacity of 0.50 million gallons per day (MGD). Wastewater treatment components include preliminary treatment consisting of one (1) coarse bar screen and compactor, one (1) grit removal system with a washer/compactor, one (1) flow equalization impoundment, one (1) wet well with four (4) submersible pumps and two (2) fine drum screens and compactor, two (2) BNR process treatment trains operated in parallel, chemical addition for phosphorus removal and carbon addition for denitrification, three (3) MBR basins operated in parallel, one (1) ultraviolet (UV) disinfection system and a utility water system. The solids handling consists of an aerobic digester. Liquid aerobic sludge is transported to the CTWWTP for further processing and disposal. The facility primarily serves the Tuscawilla Hills Subdivision and Locust Hills area. Treated wastewater is discharged to the Tuscawilla Golf Course ponds and irrigation system (to the west) and also into Evitts Run, which is a tributary to the Shenandoah River, via a pumping system (to the east). The upgraded TWWTP has been in operation since 2014. In August of 2020 the MBR filters in Basin #3 were replaced with Toray Filters. The TWWTP operates under the West Virginia NPDES No. WV0022349. The current permit, reissued on July 21, 2016, expires on June 30, 2021. The permit renewal application to WVDEP was submitted in December 2020 and CTUB will be working with WVDEP on the permit renewal in the first half of 2021. The permit renewal will incorporate the CTWTTP and TWWTP along with the JCPSD Permit WV0083461 which includes the Industrial Users connected to the CTUB system. The TWWTP is permitted for an annual average flow of 0.5 million gallons per day (MGD).

TWWTP Flows and Loading

Historical flow and loading data have been compiled and analyzed for the system. This data provides the basis for projecting future flows and loadings to better understand the timing when a capacity restriction may occur at one of the treatment processes and thus must be addressed in order to provide adequate capacity to serve future growth. Table 2.1 summarize the historical and current values for flow, BOD, TSS, NH3, TN and TP concentrations.

TABLE 2.1: TWWTP PLANT FLOWS 2018-2020

2018		
	TOTAL	AVERAGE
JANUARY	4.00	0.13
FEBRUARY	3.52	0.13
MARCH	3.71	0.12
APRIL	3.79	0.13
MAY	6.29	0.20
JUNE	8.27	0.28
JULY	5.97	0.19
AUGUST	7.42	0.24
SEPTEMBER	8.94	0.30
OCTOBER	7.10	0.23
NOVEMBER	10.90	0.36
DECEMBER	8.31	0.27
Annual Total	**78.22**	**0.21**

2019		
	TOTAL	AVERAGE
JANUARY	6.25	0.2
FEBRUARY	4.98	0.18
MARCH	7.53	0.24
APRIL	5.28	0.18
MAY	7.88	0.25
JUNE	3.75	0.12
JULY	4.2	0.14
AUGUST	3.75	0.12
SEPTEMBER	3.64	0.12
OCTOBER	3.97	0.13
NOVEMBER	3.66	0.12
DECEMBER	0.35	0.01
Annual Total	**55.24**	**0.15**

2020		
	TOTAL	AVERAGE
JANUARY	0	0
FEBRUARY	0	0
MARCH	0	0
APRIL	0	0
MAY	0	0
JUNE	0	0
JULY	0	0
AUGUST	1.09	0.16
SEPTEMBER	0	0
OCTOBER	0	0
NOVEMBER	0	0
DECEMBER	0	0
Annual Total	**1.09**	**0.013**

Table 2.2 summarizes the historical plant flow for the TWWTP from 2016 through 2020. The percent plant capacity on a Maximum 3-month average daily flow basis varied from 35% to 65%.

Table 2.2: Historical Plant Flow TWWTP

Year	Total Annual Flow (MG)	Annual Average Daily Flow (MGD)	Average Daily Flow (3 month max.)	Permit Capacity (MGD)	Percent Capacity
2016	49	0.13	0.32	0.5	65%
2017	48	0.14	0.28	0.5	56%
2018	78	0.21	0.31	0.5	63%
2019	55.24	0.15	0.22	0.5	45%
2020	1.09**	0.16	0.16	0.5	32%

* Data for 2013 and 2014 are excluded due to start-up of the new facility.

** TWWTP was offline for the majority of 2020 due to MBR replacement

Table 2.3: NPDES EFFLUENT LIMITS (OUTLET 002) BOD5, TSS AND AMMONIA-NITROGEN

Effluent Characteristics	Monthly Average Loading Rate, lbs./day	Max Daily Loading Rate, lbs./day	Monthly Average Concentration, mg/L	Max Daily Concentration, mg/L
BOD5	42	83	10	20
TSS*	125	250	30	60
Ammonia-Nitrogen	8.3	16.7	2	4

Table 1.7: TMDL ANNUAL WASTELOAD ALLOCATIONS: NITROGEN AND PHOSPHOROUS

Effluent Characteristics	Charles Town Plant (Outfall 001)	Tuscawilla Plant (Outfall 203)	Annual Total Load Limit (Outfall 003)
Total Nitrogen	32,115 lbs.	10,740 lbs.	42,855 lbs.
Total Phosphorus	3,577 lbs.	1,790 lbs.	5,367 lbs.

Table 2.4: EFFLUENT LIMITS (OUTFALL OO2); COLIFORM, RESIDUAL CHLORINE, Ph AND D.O.

Effluent Characteristics	Maximum	Minimum
Fecal Coliform	200 Counts/100 mL (Geo. Mean) 400 Counts/100 mL (Maximum)	N/A
pH	9	6
Dissolved Oxygen (All Year)	N/A	6.0 mg/L at anytime

Annual effluent loading limits contained in the permit were established under the Chesapeake Bay Total Maximum Daily Load (TMDL) for total nitrogen (TN) and total phosphorus (TP).

Nutrient offsets continue to enhance the City's ability to expand wastewater treatment capacity in light of the nutrient removal requirements of the Chesapeake Bay Program. Because the Tuscawilla WWTP is adjacent to the Locust Hills Golf Course, a portion of its effluent flow is utilized for course irrigation. Telemetry triggers the use of the Tuscawilla Effluent Line for direct discharge to Evitts Run (Outlet 203) when flows exceed Golf Course irrigation use.

Annual reports are submitted to WVDEP for reporting period September through August. Table 2.5 demonstrates CTUB's ability to achieve Chesapeake Bay nutrient limits:

Table 2.5: Nutrient Reporting

Year	CTWWTP Nitrogen lbs/year	CTWWTP Phosphorous lbs/year	TWWTP Nitrogen lbs/year	TWWTP Nitrogen lbs/year	Total Nitrogen (Outlet 003) ***Annual Limit 42,855***	Total Phosphorous (Outlet 003) ***Annual Limit 5,367***	Golf Course Total Nitrogen (Outlet 202)	Golf Course Total Phosphorous (Outlet 202)
2016-2017	20,755	1,396	1,633	254	20,922	1,422	1,466	228
2017-2018	20,544	1,523	1,623	303	21,260	1,675	906	151
2018 - 2019	23,235	1,898	3,410	709	26,250	2,351	395	256
2019-2020	29,699	2,520	1,185	194	29,701	2,520	1,183	194

Deerfield Treatment Plant

The Deerfield Sewer Treatment Plant is located off Route 480 on Southpaw Lane between Route 9 and Shepherdstown. The facility consists of two adjacent Ashco re-circulating sand filter wastewater treatment plants, one pump station and twelve septic tanks with associated piping. The effluent from this system is distributed just below ground level into two disposal fields.

The Deerfield operates under the West Virginia Department of Environmental Protection Underground Injection Control Permit No. 1503-20-037. The current permit was renewed in December 2020 with an expiration date of 2026. The monitoring requirements are detailed in Table 3.1:

Table 3.1: DEERFIELD PERMIT MINIMUM MONITORING REQUIREMENTS

Effluent Characteristics	Measurement Frequency	Sample Type
Dissolved Oxygen	Once per 6 months	Grab
BOD, 5-day	Once per 6 months	Grab
Total Suspended Solids (TSS)	Once per 6 months	Grab
Total Nitrogen	Once per 6 months	Grab
Total Phosphorous	Once per 6 months	Grab
Flow	Once per 6 months	Grab
Fecal Coliform	Once per 6 months	Grab
pH	Once per 6 months	Grab

Performance and Capacity of Existing Treatment Systems

Effluent results indicate that both the CTWWTP and TWWTP facilities produce effluent water quality consistently meeting the permit requirements. The effluent data demonstrates that BOD and TSS concentrations are generally below the 30-day average permit value. Average monthly effluent NH3 concentrations are also observed to be below the minimum daily maximum permit values.

Flow projections for the CTWWTP indicate expansion improvements will be necessary within the next ten years. The 2018 SSP indicated expansion of the CTWWTP to 2.25 MGD and a potential future expansion of the TWWTP Phase 2 Expansion to 1.0 MGD. Based on the data in Table 1.10, growth projections in Table 1.2 and Appendix A, CTUB will begin preliminary evaluation of options for regional wastewater facility needs and expansion in 2024/2025 based on the extensive time required to design and permit a substantial plant upgrade. It is anticipated that the CTWWTP upgrade may need to be increased based on growth projections to 3.5 – 4.0 MGD. This is substantiated by the flow data and anticipated growth in the region.

Nutrient Management

Nutrient Management continues to be critical in the regulatory permitting and treatment of sanitary sewer. Previous versions of the SSP documented the history of the implementation of US Environmental Protection Agency (USEPA) 2010 Chesapeake Bay Watershed Initiative. As a headwater partner in the Chesapeake Bay Program, West Virginia established permitted Total Nitrogen and Total Phosphorous pounds. CTUB continues to follow changes in the regulatory requirements to determine necessary changes that may be forthcoming in the Watershed Implementation Program (WIP). CTUB is compliant with nutrient management requirements. CTUB must report nutrient removal for the annual period September 1 to August 31. Table 4.1 depicts permitted pounds and actual pounds removed for the period 2017 through current reporting.

Table 4.1: Nutrient Management

	Total Permitted Nitrogen (lbs/yr)	Total Reported (lbs/yr)		Total Permitted Phosphorous (lbs/yr)	Total Reported (lbs/yr)
2017-2018	42,855	21,260		5,367	1,675
2018-2019	42,855	26,250		5,367	2,351
2019-2020	42,855	29,701		5,367	2,520

Forecasted capacity must now also be based on nutrient limitations. In addition to volumetric capacity, nutrient limits will be a factor in determining the timing of capital projects. The ability to achieve the reported levels, as shown in Table 4.1, will eliminate the need for the CTWWTP Nutrient Removal Phase 2 Project.

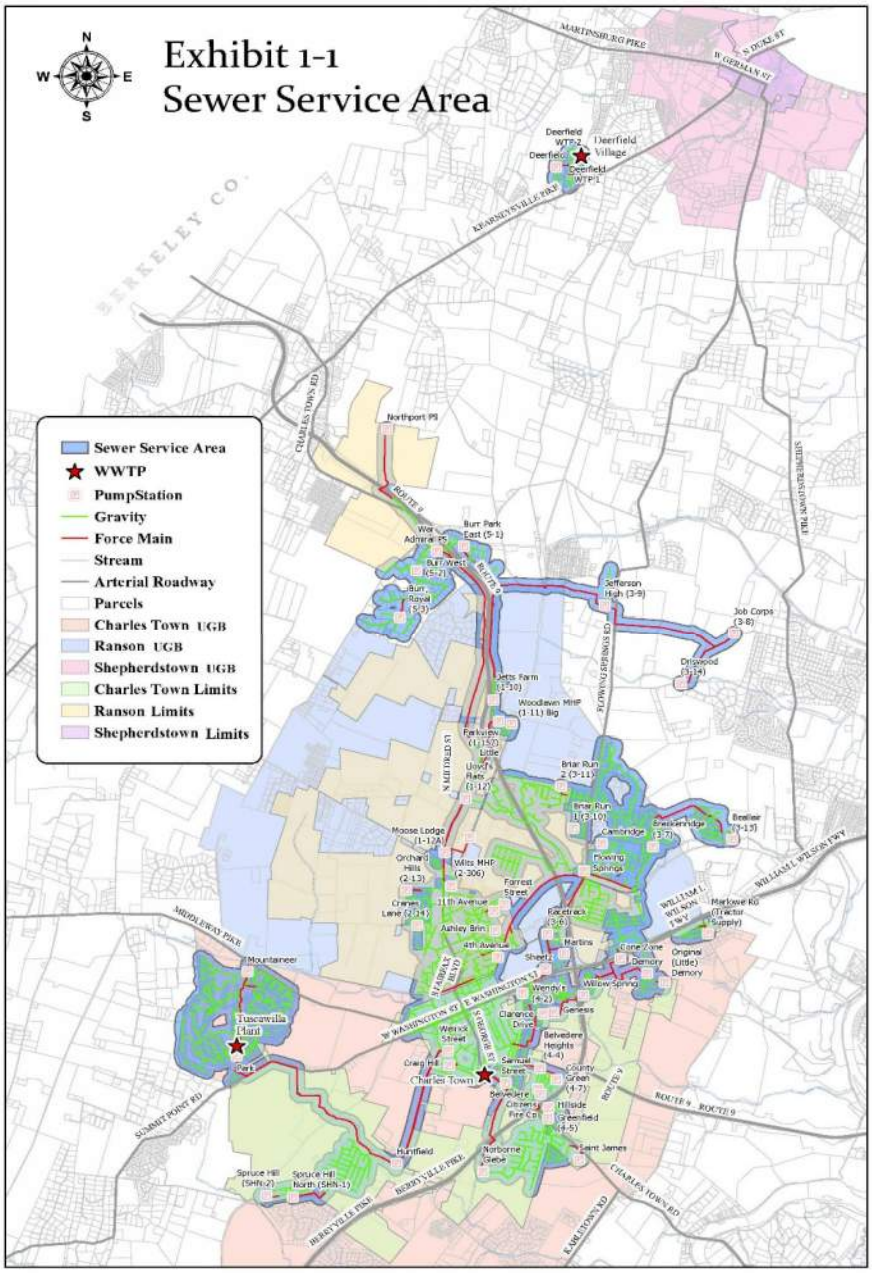
Sludge Disposal

Sludge Management is covered under the West Virginia NPDES No. WV0022349. The current permit, reissued on July 21, 2016, expires on June 30, 2021. The permit renewal application to WVDEP was submitted in December 2020 and CTUB will be working with WVDEP on the permit renewal in the first half of 2021. The permit renewal will likely incorporate provisions for alternatives to the current process for sludge disposal as the approved land application site owners may not wish to continue the partnership after the current agreement term ends in August 2022. Alternatives may include other land application sites or landfill disposal. These alternatives and costs will be reviewed in 2021. The requirements for sludge management reporting are

extensive and are covered in the permit. The Charles Town Plant currently accepts all of the waste sludge from Tuscawilla as well as the water treatment plant process waste. An upgrade to the sludge process is included with the Renewal and Replacement project. Additionally, the waste from the water treatment plant creates operational issues at the Charles Town Plant. Alternative disposal methods will be considered in 2021.

COLLECTION SYSTEM, TRANSMISSION MAINS AND PUMP STATIONS

CTUB provides wastewater service to over 8,000 sewer customers through a network of collection and transmission systems through over 125 miles (over 100 miles of gravity and over 25 miles of force main) and 47 pump stations to the three (3) treatment facilities noted in the previous section. Refer to Exhibit 1-1 and Appendix B for the current collection system service area and pump station locations. The service has been expanded to include the Route 9 Sewer Project from the latest SSP. This area extends up Route 9 towards Martinsburg approximately 3 miles from previous service boundary.



Collection System and Pumping Stations



The collection system includes gravity and force mains that range from 1.5 to 24 inches in diameter. The collection system comprises of varying pipe materials including asbestos-cement, clay, ductile, cast and PVC piping. There are significant portions of the collection system that are aging and will likely need of repairs or replacement. A sewer hydraulic model was completed in January 2021 that identified several portions of the conveyance system that may need to be addressed due to capacity concerns. Specifically, the study identified capacity concerns along the Evitt's Run interceptor as well as the gravity line through Jefferson Memorial Park. Additionally, studies have focused on manholes structures throughout the system that need to be repaired or replaced in the near future. To the extent possible these will be achieved within the annual operation and maintenance budgets. CTUB will continue to perform flow monitoring throughout the system to assess capacity constraints.

Pump stations and force mains are used to pump flows to another gravity collection system, to a master pump station or directly to the wastewater treatment facilities. There are 47 pump stations in the CTUB system. As a result of utility consolidation, efficiencies have been realized that allow for the installation of gravity sewer mains and decommissioning of pump stations. Where possible, the efficiencies will be pursued to reduce overall operation and maintenance expenses. To the extent possible these projects may be performed in-house to reduce overall project costs. Since 2019, two pump stations have been decommissioned resulting in significant operation and maintenance expenses. In the next two years, CTUB expects to decommission another four (4) pump stations with construction of gravity lines. One (1) new pump station is anticipated to be added in Magnolia Springs.

Fats, Oils and Grease

Overflows and sewer backups are commonly caused by fats, oil and grease (FOG). FOG gets into the sewer from household drains and neglected grease interceptors at businesses and restaurants. The FOG blocks sewer pipes, causing health hazards and leading to expensive fixes. CTUB will focus on community education and outreach to reduce the damage to the utility sewer system.

Inflow and Infiltration

Inflow occurs when stormwater flows directly into the sewer collection system. This may be through a manhole cover, or a cross connection between a storm drain and the sewer collection system. Infiltration is typically caused by ground water entering the collection system at defects in mains, laterals or manholes. CTUB has initiated efforts to evaluate Inflow and Infiltration (I&I) in the combined system with a most recent smoke testing study completed in 2019. Staff is working on completing all recommendations in the Condition Assessment Report which included repairs to laterals, mains and manholes to address I&I. Another component that remains to be addressed is disconnection of any cross connections of storm drains to the sewer system which are considered illegal connections. CTUB is working with the City of Charles Town staff and officials to determine the appropriate enforcement actions to remove the illegal connections from the sewer system.

PROJECT REVIEW

Completed Projects

Since the last issuance of the SSP, significant improvements have been made throughout the treatment and collection system. Necessary upgrades and improvements to the CTWWTP and TWWTP were completed to address WVDEP Inspection requirements as well as operation and maintenance improvements to the collection and pump station network have been made as a result of consolidation into a regional utility. These improvements include elimination of pump stations through installation of gravity lines which reduce operation and maintenance expenses as well as projects that address rehabilitation of aging pump stations and lines to further reduce utility expenses.

Table 5.1: Projects Completed since 2018 SSP

Year	Project Description
2018	CTWWTP Basin Lining
2018	New Gorman Rupp pump installation at Park Pump Station
2019	New Pump installation at Flowing Springs Pump Station
2019	Smoke Testing Efforts completed, including 122,025 linear feet of sewer mains, manholes and cleanouts.
2019	Orchard Hills Pump Station rehabilitation
2019	Cranes Lane Pump Station rehabilitation
2020	Route 9 Sewer Project Completed. Including two pump stations, 9,400 linear feet of gravity line and 16,000 linear feet of forcemain.
2020	Decommissioning of Euclid Pump Station
2020	Decommissioning of Parkview MHP Pump Station
2020	Installation of MBR Filters in Basin #3 at Tuscawilla Plant

It should be noted that with the completion of the Route 9 Sewer Project noted in Table 5.1, as well as the consolidation of utilities, a project to divert flows from the northern region into the Route 9 sewer line can be completed which will allow for additional capacity in other portions of the sewer system. This project is detailed in the *Current Development and Projects* section herein.

Additionally, as noted above CTUB has completed a first phase of a hydraulic wastewater model through RK&K Engineers. This model includes the larger diameter portions of the collection system along with all of the pump stations. Hydraulic models are generally used to assist with identification of areas where additional capacity is needed to convey projected long-term flows to the treatment facilities. As this hydraulic model was recently completed at the end of 2020, CTUB staff will be evaluating the results of this model over the next several months to identify additional capital improvements needed for the collection system likely after adoption of this SSP.

Current Development and Projects

There are numerous on-going sewer projects that CTUB is evaluating:

Inflow and Infiltration Studies

CTUB has completed a first phase of Inflow and Infiltration (I&I) investigation, through smoke testing, in selected areas of the collection system. The study which was conducted by Hydrostructures in 2019 identified numerous defects in the sewer system that needed to be repaired or investigated further. CTUB is nearly 95% complete with these efforts and will likely focus on other aging segments of the system to conduct similar studies with the goal of reducing I&I.

Sewer Modeling Efforts

CTUB completed an initial step in sewer modeling efforts late in 2020 that considered the larger portions of the system along with the pump stations. The model will be evaluated to determine where bottlenecks and capacity issues may exist in the system as funding allows. This effort aligns with recent projects such as cooperative efforts with the Magnolia Springs Development which have afforded operation and maintenance cost savings through upsizing of a new pump station and ability for CTUB to decommission two (2) existing upstream pump stations that would have required significant upgrades in coming years.

Shenandoah Junction Public Sewer Corporation (SJPS)

This private sewer corporation has expressed interest to connect to the CTUB system. This request will require payment of CIF's to CTUB, decommissioning of the existing wastewater plant and construction of a pump station by SJPS. The connection of 187 customers has been evaluated and the connection can be made with no modification of the existing CTUB system. It is unknown at this time when this connection might be made.

Cave Quarter Estates Utility Acquisition and Development Expansion

CTUB has evaluated route alternatives and cost for extending service to Cave Quarter Estates that includes 45 existing homes and 140 proposed single-family homes. While this development has not been annexed into the City of Charles Town, this land is in the Charles Town Growth Boundary. Connection to public water and sewer could be viable with the extension of services to and through adjacent annexed parcels. It is unknown at this time when this connection might be made.

2021 Collection System Project (formerly JCPSD Flowing Springs Project/Modified Flowing Springs Plan)

On March 23, 2017, the WV PSC issued an Order in CASE NO. 16-0616-PSD-PC-CN wherein the Commission granted the application for a certificate of convenience and necessity and approved a Post-Project rate increase. Funding for the Project consisted of (i) a $3,575,000 USDA RD loan at a 2.5 percent interest rate over 40 years. And (ii) a DEP SRF loan of $2,844,984 at .25 percent interest, and a .25 percent administrative fee for a term up to 40 years, and debt forgiveness in the amount of $500,000 per the January 17, 2017 DEP assurance letter. During the consolidation of utilities, CTUB committed to the WV PSC completing necessary components of the Flowing Springs project through submission of a Modified Flowing Springs Plan in March 2018. Since the utility consolidation and completion of the Route 9 sewer project, CTUB has evaluated efficiencies and operational alternatives to significantly reduce components and costs of the Modified Flowing Springs Plan. The Flowing Springs Project and Modified Flowing Springs plan have evolved into a 2021 Collection System projects which consists of necessary improvements to the CTUB collection system. The Route 9 Sewer Project is now complete, with the exception of minor punch-list items, to serve the Rockwool Facility and adjacent Jefferson Orchards property customers along the Route 9 corridor. The construction of this project allows for diversion of flows from northeastern region to the new Route 9 sewer infrastructure thereby freeing up capacity in other segments of the system for future customers. Table 5.2 includes a summary of the anticipated components and costs of this project.

Forrest Avenue Pump Station Relocation and Fairfax Crossing Parallel Gravity Project

As part of the acquisition of the City of Ranson Sewer System in July 2018, some preliminary evaluation of collection system improvements were anticipated to include approximately $2 million in projects. One of the projects included the relocation of the existing Forrest Avenue Pump station along with provisions for future capacity for areas within the sewer shed that could flow to the pump station. Additionally, as a result of the Route 9 Sewer project alignment easement acquisition through the Fairfax Crossing/Potomac Marketplace, CTUB committed to the installation of a parallel 10" gravity line from the railroad track bordering the western boundary of Fairfax Crossing to Route 9. This will include the installation of approximately 2,600 linear feet of 10" gravity line. Table 5.2 includes a summary of the anticipate components and costs of this project.

2021 Renewal and Replacement Project for CTWWTP and TWWTP

In 2019 Gwin, Dobson and Foreman (GDF) prepared an assessment of the CTWWTP and TWWTP facilities which indicated several opportunities for optimization and improvement as follows:

- Headworks screening at both plants are in need of upgrades. Operations at the Charles Town Plant are severely hindered by poor headworks screening and the previous operation of a grinder ahead of the screen. Fine and stringy material is passing through the headworks screen which leads to debris accumulation downstream and is causing havoc on the treatment units. Given the age and current operating condition of the grit system at Charles Town, a new grit removal facility should be considered. The Tuscawilla Plant requires improved fine screening equipment due to current screening operational and maintenance issues.





- The influent and effluent pump stations as well as the UV disinfection system at the Charles Town Plant are in need of replacement, as the units have reached the end of useful life.
- The membrane modules at the Tuscawilla Facility are in need of replacement due to excessive sludge buildup and irreversible fouling. It is recommended to implement a membrane module and hose replacement program along with enhanced cleaning operations and process adjustments to maximize membrane life and lower the operating transmembrane pressure (TMP).





- The Charles Town Plant currently accepts all of the waste sludge from Tuscawilla as well as the water treatment plant process waste. There is no backup for the sludge pump or belt filter press at the plant. A redundant dewatering system should be considered in the short term to ensure sludge produced by any of the facilities may continue to be processed during shut down or failure of the sludge pump or belt press. Additionally, the waste from the water treatment plant creates operational issues at the Charles Town Plant. Alternative disposal methods should be considered.
- Both facilities require significant Supervisory Control and Data Acquisition (SCADA) system modifications to improve the treatment process along with additional online instrumentation devices which will aid in plant optimization.

Table 5.2 below illustrates the anticipated costs associated with the 2021 projects:

Table 5.2: 2021 Projects Summary	
Route 9- Northern Region Improvements	
DESCRIPTION	TOTAL COST
RK&K Task 7 Parkview MHP Pump Station Decommission	To be completed in-house
RK&K Task 7 Jett's Farm Option 2: PS and FM Modifications	$362,300.00
RK&K Task 7 Lloyd's Flat Pump Station Decommission	To be completed in-house
RK&K Task 7 Moose Lodge Option 2: Forcemain and PS Mod.	$194,200.00
RK&K Task 4 Northern/Burr Flow Diversion	$580,600.00
Upgrade Existing Ranson FS PS	$300,000.00
Route 9 - Northern Region Improvements Total	$1,437,100.00
Eastern Region Improvements	
Upgrades to Existing Pump Station 3-6	To be completed in-house
Upgrades to Existing Pump Station 4-2	To be completed in-house
Miscellaneous Improvements	
RK&K Task 10 Jefferson Memorial Park forcemain	$200,000.00
Miscellaneous Improvements Sub-Total	$200,000.00
Construction Sub-Total	$1,637,100.00
Contingency (±10%)	$163,710.00
TOTAL CONSTRUCTION COST	$1,800,810.00
PROFESSIONAL FEES - Engineering, Accounting, Legal, etc.	$500,000.00
TOTAL COLLECTION PROJECT COST	$2,300,810.00

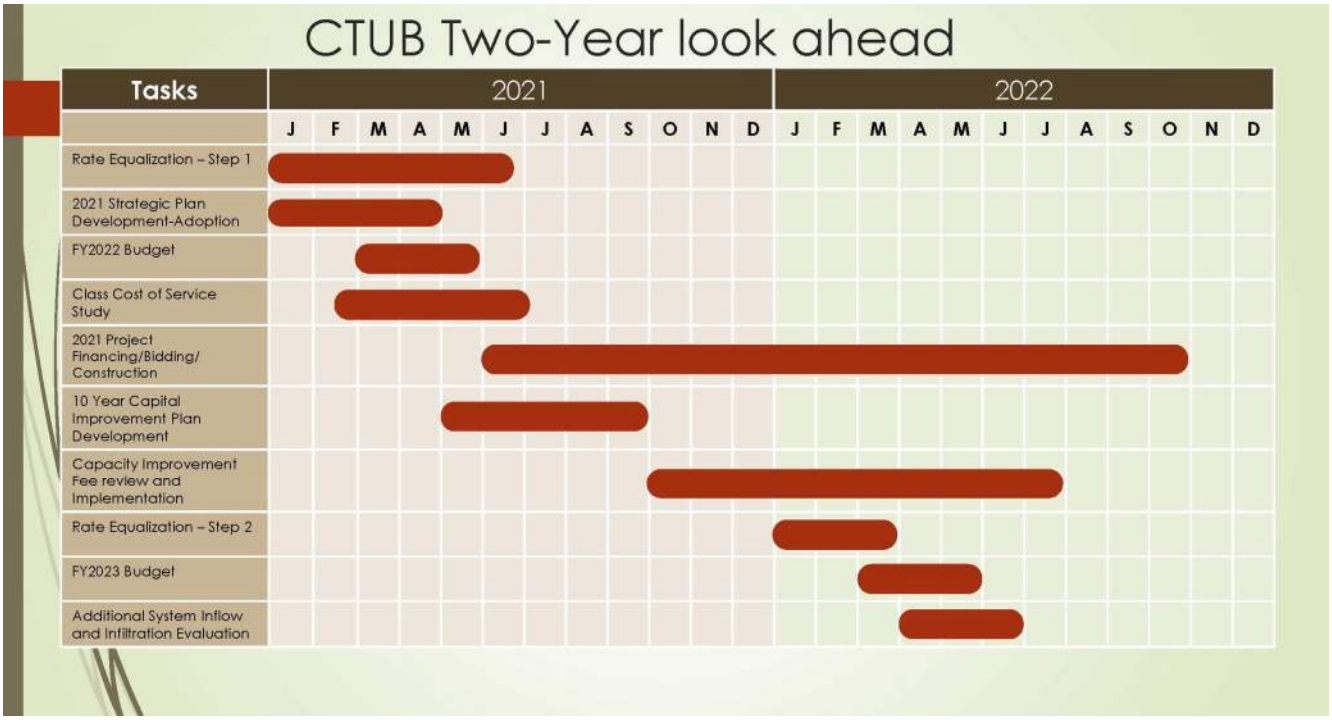
Ranson Projects	
DESCRIPTION	TOTAL COST
Fairfax Crossing parallel 10" gravity line	$650,000.00
Forrest Avenue Pump station relocation/Fairfax Crossing	$615,000.00
Construction Sub-Total	$1,265,000.00
Contingency and Professional Fees (30%)	$379,500.00
TOTAL RANSON PROJECT COST	$1,644,500.00

Renewal and Replacement Project	
DESCRIPTION	TOTAL COST
CTWWTP	$3,000,000.00
TWWTP	$1,063,820.00
TOTAL RENEWAL AND REPLACEMENT PROJECT COST	$4,063,820.00

TOTAL ALL PROJECTS	**$8,009,130.00**

Project Schedule

A forecast of anticipated timeframes for completion of projects noted in the SSP are detailed in the diagram below:



This look-ahead is a forecast of anticipated top level strategic efforts. There are many factors that could affect this timeline.

Future Projects

As part of the consolidation into a regional utility in 2019, CTUB has initiated various efforts that will likely result in future projects that have not been formally vetted to date. As discussed in this SSP, the recent completion of a hydraulic wastewater model may result in additional capital projects for the collection and transmission system. The development of a 10-year Capital Improvement Plan (CIP) Expenditure Plan in conjunction with the evaluation of capacity improvement fees will provide a structure for the completion of these projects. The CIP will prioritize planning projects that are needed as a result of the following factors:

- Regulatory Compliance
- Condition/Probability of Failure
- Consequences of Failure/Risk
- Capacity / System Operational Efficiencies
- Improved Operations and Maintenance costs
- Safety
- Design Life / Best Replacement Practices
- Redundancy / Reliability
- Opportunity Projects
- Development Extensions

The CTUB Asset Management Plan will be updated to assist with the development and maintenance of a CIP.

CTWWTP Plant Expansion

Expansion of the CTWWTP is expected within the next 10 years based on the historical flow data in Table 1.4 as well as the development projections detailed in Table 1.2. Design efforts should be initiated in 2024/2025. In advance of the plant expansion, Gwin, Dobson and Foreman may be engaged to provide recommendations that may provide optimization enhancements to extend the service life of the existing facility, enhance process operations, provide additional capacity and improve treatment efficiencies. These targeted, cost-effective improvements may result in a more robust and reliable process for meeting regulatory standards until such time that a larger and more centralized treatment plant is constructed to meet planning period demands.

There are various factors that need to be evaluated with an expansion of the CTWWTP including location, size, type of facility and environmental protection. An expansion from 1.75 MGD to 3.5/4.0 MGD is estimated to cost between $15 million and $20 million in today's dollars. Every effort will be made to provide the most cost effective design to minimize any burden to ratepayers.

RATE EQUALIZATION, FUNDING AND FINANCIAL OPTIONS

Rate Equalization

During the consolidation of utilities, the City of Charles Town agreed to exercise its best efforts to equalize the rates and charges for water service of all water and sewer customers within 10 years after the closing date. To fulfill this obligation, CTUB and the Charles Town City Council will be working on strategies to initiate a stepped approach to rate equalization within the 1st quarter of 2021.

Rate equalization has an impact on each and every CTUB sewer customer. An added complexity is the equalization of three different utility rates and one having a significantly different rate structure (JCPSD single tier). The Charles Town and City of Ranson rate structures follow the tiered rate approach consistent with the WVPSC Commodity-Demand method which most water and sewer utilities follow in West Virginia. The Commodity-Demand method makes significant use of peak demand factors by customer class and isolates costs that are purely volume related and customer driven. Demand factors are significantly different for customer classes (i.e., residential, commercial). Peaking factors generally significantly decline when comparing the residential class to the commercial and other classes. This approach is the WVPSC recommended, most conventional and fairest for systems with multiple and material customer classes. The importance of this discussion on tiering is that the most practical and needed approach to rate equalization will be to transition the JCPSD single tier structure in a stepped manner to the multiple tiered structures of the City of Charles Town and City of Ranson. In addition to the recommendations below, CTUB staff and its financial advisors recommend maintaining a minimum debt/service coverage ratio of 130%. The debt service coverage ratio required by bondholders for the combined utility is 115%.

As part of the rate equalization process CTUB has authorized the completion of a Class Cost of Service Study which will identify the most appropriate rate structure and rate equality between the customer classes. This should be completed shortly after adoption of this SSP.

Funding and Financial Planning

In addition to the rate equalization discussion, CTUB will be working with the Mayor and City Council on funding options for the projects discussed in this SSP:

- 2021 Renewal/Replacement Project
- 2021 Collection System Projects
- Forrest Avenue Pump Station relocation and Fairfax Crossing Parallel Gravity project

CTUB continues to pursue a strategy for funding upgrades and expansion in a manner that will minimize the burden to the current and future ratepayers. CTUB intends to fund the costs for the above projects through conventional rate impacts, payment of prior bonds and Capacity Improvement Fees. The development of a capital improvement plan will identify future capital purchases that are necessary for the operation of the sewer system. CTUB will be preparing a Capital Improvement Plan that will identify system needs and will aid in the evaluation of the Capacity Improvement fees. This plan and evaluation is anticipated to be underway in 2021.

Future CTWWTP expansion is expected to be necessary within the next 10 years. This will require a significant capital outlay and funding strategies in a future SSP and project discussion. It is anticipated that plant expansion could range from $15 to $20 million.

APPENDIX A – GROWTH PROJECTIONS

Appendix A - CTUB Sewer Strategic Plan 2021-2024 Development Forecast																											
Development	Total Design EDUs	Total Built as of 2021	20 year forecast to be built	Total Flow	Beyond 20 year forecast	Year 1 2021	Year 2 2022	Year 3 2023	Year 4 2024	Year 5 2025	Year 6 2026	Year 7 2027	Year 8 2028	Year 9 2029	Year 10 2030	Year 11 2031	Year 12 2032	Year 13 2033	Year 14 2034	Year 15 2035	Year 16 2036	Year 17 2037	Year 18 2038	Year 19 2039	Year 20 2040	Years 11-20 2031-2040	TOTAL @ Year 20	TOTAL REMAINING
American Heritage (Huntwell)	500	0	500	75,000	200	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0	0	160	300	200
Aspen Green	203	46	157	30,450	0	20	20	20	20	20	20	20	17	0	0	0	0	0	0	0	0	0	0	0	0	157	0
Beallair	372	112	260	55,800	0	20	20	20	20	20	20	20	20	20	20	20	20	20	0	0	0	0	0	0	60	260	0
Blackford Village	338	0	338	50,700	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	18	0	178	338	0
Breckenridge East	300	0	300	45,000	100	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20	20	20	20	20	200	200	100
Briar Run	131	122	9	19,650	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
Burr Industrial Park & Bardane	200	170	30	30,000	0	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	30	0
Cambridge	134	85	49	20,100	0	5	5	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	4	0	0	39	49	0
Charles Town Infill	250	0	250	37,500	150	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	50	100	150
Clayhill Farm	300	0	300	45,000	20	0	0	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	0	180	280	20
Daniels Forest	192	0	192	28,800	0	0	0	0	0	0	20	20	20	20	20	20	20	20	20	12	0	0	0	0	92	192	0
Fritts Property	370	0	370	55,500	50	0	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	320	50
Harvest Hills	392	6	386	58,800	166	0	0	0	0	0	0	0	0	0	20	20	20	20	20	20	20	20	20	20	200	220	166
Huntfield	3,200	421	2,779	480,000	2,459	0	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	320	2459
Jefferson Heights North	262	0	262	39,300	122	0	0	20	20	15	15	15	15	15	15	10	0	0	0	0	0	0	0	0	10	140	0
Tate Manor	80	0	80	12,000	0	20	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0
Lakeland Place / Lloyd's	600	0	600	90,000	220	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	380	220
Jefferson Orchards	888	0	888	133,200	688	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20	20	20	20	20	200	200	688
Langlet	1,000	0	1,000	150,000	800	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20	20	20	20	20	200	200	800
Lloyd Property	500	0	500	75,000	300	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20	20	20	20	20	200	200	300
Locust Knoll	359	0	359	53,850	59	0	0	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	300	59
Magnolia Springs	300	0	300	45,000	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0	0	0	0	100	300	0
Norborne Glebe	1,050	246	804	157,500	484	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0	180	320	484
Old Town Ranson - Infill	250	0	250	37,500	150	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	50	100	150
Potomac Marketplace	54	0	54	8,100	0	0	5	5	5	5	5	5	5	5	5	5	4	0	0	0	0	0	0	0	9	54	0
President's Pointe	1,100	77	1,023	165,000	0	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	73	523	1,023	0
Prospect Place	170	0	170	25,500	0	0	0	0	0	9	9	25	25	25	25	25	27	0	0	0	0	0	0	0	52	170	0
Ranson Gateway / Boulevard	1,175	0	1,175	176,250	835	0	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	340	835
Shenandoah Springs	705	259	446	105,750	46	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	400	46
Stolipher	324	0	324	48,600	124	0	0	0	0	0	0	0	0	0	0	20	20	20	20	20	20	20	20	20	200	200	124
Washington Landing	274	0	274	41,100	0	0	0	0	50	50	50	50	50	24	0	0	0	0	0	0	0	0	0	0	0	274	0
Winchester Cold Storage	675	0	675	101,250	125	0	0	0	0	0	0	0	0	0	50	50	50	50	50	50	50	50	50	50	500	550	125
Windmill Crossing	150	146	4	22,500	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
Total Projected Development	**7,086**	**728**	**6,358**	**1,062,900**	**2,123**	**96**	**101**	**101**	**191**	**199**	**219**	**235**	**235**	**209**	**235**	**275**	**276**	**245**	**245**	**245**	**225**	**225**	**225**	**225**	**228**	**0**	**4,235**	**2,123**

APPENDIX B – EXISTING SERVICE AREA

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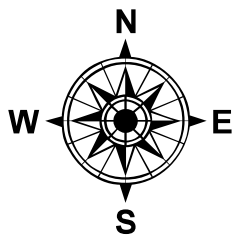
APPENDIX C – PROJECTED DEVELOPMENTS

Exhibit 1-2
Projected Developments

Refer to Appendix A for Project reference.



FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX C
ROUTE 9 DESIGN REPORT

City of Ranson, WV

Route 9 Sewer Project

Design Report

July 25, 2018



HATCH CHESTER
Member of the Hatch Group

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City of Ranson, WV

Route 9 Sewer Project
Design Report

July 25, 2018

Prepared by: Scott Yearley, P.E.

Approved by: Richard Travers, P.E.

Project No.: H355558

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ROUTE 9 SEWER PROJECT
DESIGN REPORT
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Appendix 1 - Route 9 Corridor Sewershed Study
Appendix 2 – Yeomans Pump Curves

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ROUTE 9 SEWER PROJECT
DESIGN REPORT

1.0 PURPOSE

This design report ("Report") presents hydraulic designs for the proposed public sewer infrastructure (gravity sewers, pump stations and force-mains) described in the accompanying drawing set ("Drawings") and project manual for the City of Ranson's Route 9 Sewer Project ("Project").

2.0 INTRODUCTION

The West Virginia Infrastructure and Jobs Development Council is seeking to establish a 1,000-acre industrial park in WV's eastern panhandle region. In support of this goal, Ranson and the Jefferson County Development Authority ("JCDA") negotiated an agreement to bring ROXUL, Inc., a manufacturer of cement-based insulation materials, to a 150-acre site on the 390-acre Jefferson Orchards property ("Orchard"). The Orchard was annexed into Ranson in 2004, and lies just north of Ranson's Urban Growth Boundary.

ROXUL's site plan was approved in August 2017, and construction began in November. ROXUL intends to begin operation in June 2019. Ranson has committed to construct supporting sewer, water and road infrastructure by the time the plant is placed in service. The Project provides the sewer extension necessary to support ROXUL, and includes sewer capacity to tie in existing and planned development sites along the WV Route 9/115 corridor ("Route 9 corridor"). State funding is in place for the Project. This Report addresses sewer aspects only; it does not address water service or road extension.

3.0 BACKGROUND

Ranson's early planning recognized that current public sewer service south of the Orchard in the Route 9 corridor (by Jefferson County Public Sewer District) is not adequate to serve ROXUL. Further, Ranson and JCDA envisioned that construction of sewer mains to the Orchard, which is considerably north of Ranson's existing sewer system, would provide service to undeveloped Ranson properties in between.

Ranson's concept for the Project was to locate a public pump station local to ROXUL, construct sewer piping along the western Route 9 corridor, and connect the piping to an existing Ranson sewer located several miles south of the Orchard. The topography in the Route 9 corridor does not allow ROXUL to be sewered by gravity to Ranson's sewer system.

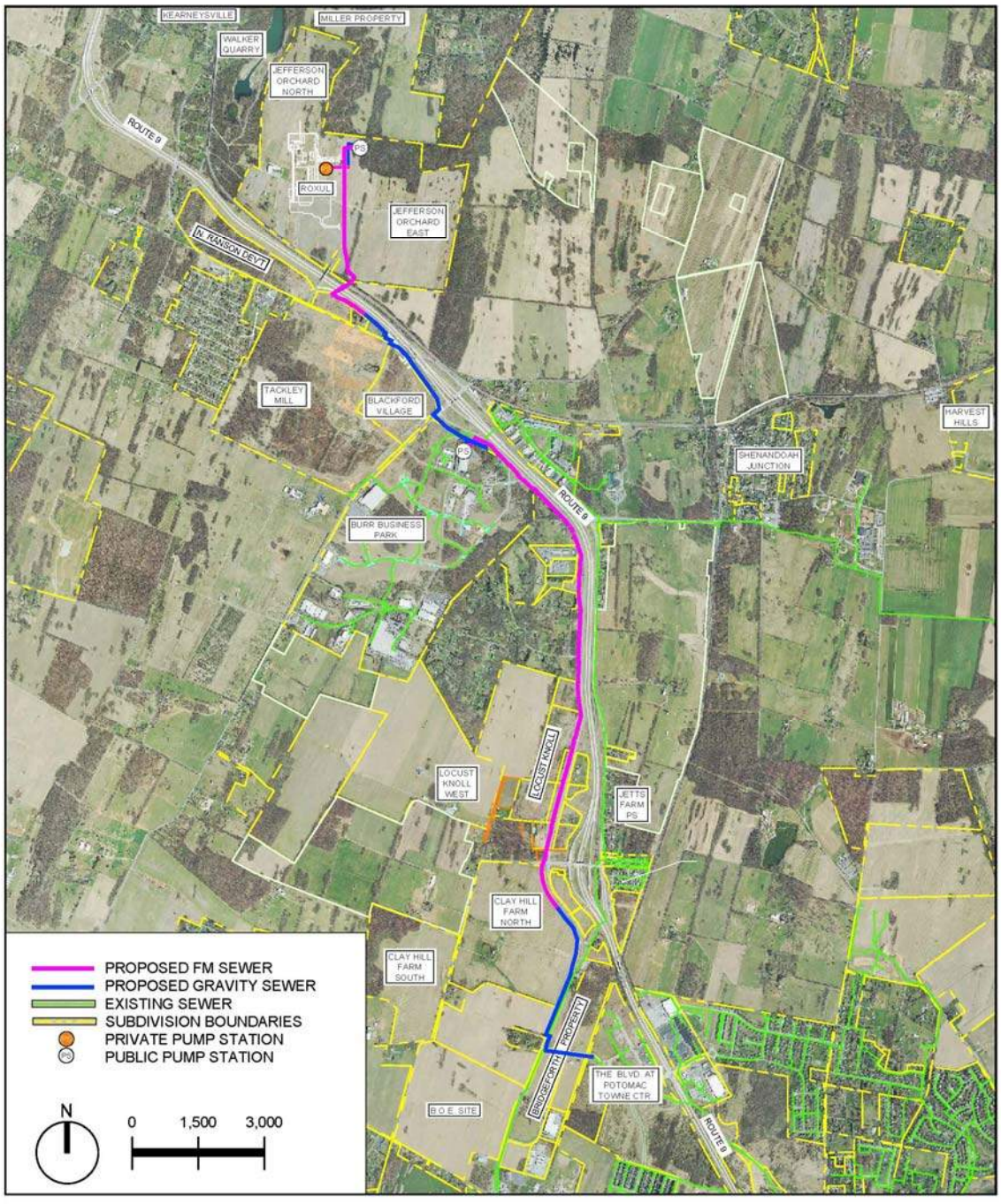
More specifically, ROXUL would discharge to a public gravity sewer and pump station across the road from ROXUL's site. Flow would then be routed by force-main under Route 9, then by combination of force-main and gravity sewer to an existing Ranson gravity sewer in the Potomac Towne Center commercial development. Downstream of the tie-in, flow would be routed by gravity to the Flowing Springs Pump Station, then by force-main to the Evitts Run Interceptor Sewer, then by gravity to the City of Charles Town Wastewater Treatment Plant. Ranson's "Route 9 Corridor Sewershed Study" shows this routing (Figure 9, Page 29, in Appendix 1).

The Route 9 Study considered six options for how to best provide long-term public sewer service for ROXUL and other Route 9 corridor properties. Ranson selected an option (a variant of Option #5) which entails two public pump stations – one on War Admiral Boulevard in addition to one at the Orchard. The Route 9 Study also verified that sewer capacity is available at least in the short-term for ROXUL and others in the existing downstream system between Potomac Towne Center and the Charles Town Wastewater Treatment Plant (Section 5.0, Page 27, in Appendix 1). Project specifics have been coordinated with the Charles Town Utility Board ("CTUB"), since CTUB will likely become owner/operator of the proposed facilities.

The Project proposes about 10,000 linear feet of gravity sewer (8-inch through 15-inch diameter), two pump stations ("Northport PS" and "War Admiral PS"), and about 17,000 linear feet of force-main trench containing triple force-mains. The proposed gravity sewer at the downstream end of the Project is sized to carry a peak flow of about 2,000 gallons per minute (GPM) from about 6,200 equivalent dwelling units (EDUs), and is equipped with a stub to simplify connection to a future relief sewer.

Figure 3-1 on the following page shows the Project alignment, and surrounding existing and potential developments comprising the "sewershed" or intended service area.

Figure 3-1
Route 9 Sewer Project
Alignment and Service Area



The sizing calculations in this Report account for a service area that essentially honors the corridor defined in the Route 9 Study, but contain minor deviations for purposes of sizing. For example, the calculations account for flow from the Miller property which is partly outside the defined corridor, and from the Harvest Hills development which is entirely outside the defined corridor, but do not account for flow from Kearneysville or the Walker Quarry area though they are at least partially within the defined corridor. Calculations aside, it is expected capacity will not be reserved for any particular development except ROXUL. ROXUL is expected to consume about 450 EDUs of the 6,200-EDU capacity provided (about 7%), so about 5,750 EDUs of capacity remains for others.

The flow projections in this Report are more aggressive than those in the Route 9 Study, simply for the purpose of adequately establishing capacities of the proposed facilities. The sizing calculations account for ultimate or "build-out" flows that may be carried by the proposed facilities without regard to downstream improvements that may be needed in, say, 2025. It is acknowledged that the proposed facilities have more capacity than the immediate downstream sewers (see Page 28), and that a relief sewer or other improvements may become necessary downstream depending on corridor development and master planning after 2019.

The remainder of this Report, Sections 4 through 8, addresses individual components of the proposed system beginning at the Orchard and progressing downstream as follows:

- Section 4: Orchard Gravity Sewer
- Section 5: Northport PS and Force-Mains
- Section 6: Blackford Village Gravity Sewer
- Section 7: War Admiral PS and Force-Mains
- Section 8: Clay Hill Farm Gravity Sewer

4.0 ORCHARD GRAVITY SEWER

The Orchard gravity sewer originates at Manhole (MH) JO-05 along Northport Avenue. The sewer receives flow from ROXUL's force-main at MH JO-04 (ROXUL's site design by others resulted in a private ROXUL pump station), then conveys ROXUL and ultimately other flow northward to Northport PS. The Orchard gravity sewer consists of about 600 linear feet of 8- and 10-inch diameter pipe. The Orchard gravity sewer is identified on the Drawings as "Gravity Line 3."

For sizing, the Orchard gravity sewer is separated into three sections as follows:

1. MH JO-05 to JO-04 (8-inch)
2. MH JO-04 to JO-02 (8-inch)
3. MH JO-02 to Northport PS wet well (10-inch)

Below, for each of the three sections, a pair of tables is presented. The first table, the "flow table," gives projected peak flows that may need to be conveyed in the next two decades (2019-2039). The flow totals represent ultimate or "build-out" values; the timeframe over which those flows may materialize may be longer or shorter than 20 years. The second table, the "capacity table," shows proposed pipe diameters and slopes that are adequate for the projected peak flow.

Tables JO-1a and JO-1b below are the flow and capacity tables for Section 1 of the Orchard gravity sewer (MH JO-05 to JO-04).

Table JO-1a
Flows in Orchard Gravity Sewer (MH JO-05 to JO-04)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU	GPD (Note 1)	AC
Dev't	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0	GPD (avg)	---	82,500	165
		0	29	57	86	115	143	143	143	143	143	143	GPM (peak) (Note 2)		82,500	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		0	92	183	275	367	458	458	458	458	458	458	EDU			

Note 1: GPD value derives from acreage as (AC) x (500 GPD/AC).
Note 2: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.

Table JO-1b
Capacity of Orchard Gravity Sewer (MH JO-05 to JO-04)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Seg't	JO-05	JO-04	8	576.02	575.54	28	1.71	708	(>143 GPM, OK)

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table JO-1a shows an ultimate peak flow of about 143 gallons per minute (GPM) assuming build-out of the listed development. Table JO-1b shows proposed 8-inch diameter piping at a slope sufficient to convey at least 143 GPM.

Tables JO-2a and JO-2b below are the flow and capacity tables for Section 2 of the Orchard gravity sewer (MH JO-04 to JO-02).

Table JO-2a
Flows in Orchard Gravity Sewer (MH JO-04 to JO-02)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU	GPD (Note 1)	AC
Dev't	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0	GPD	---	82,500	165
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0	(avg)	---	80,000	---
		69	98	127	225	253	282	282	282	282	282	282	GPM (peak) (Note 2)		162,500	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	314	406	719	811	903	903	903	903	903	903	EDU			

Note 1: GPD values derive from acreage as (AC) x (500 GPD/AC).
Note 2: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 3: Shading denotes flow carried forward from Table JO-1a.

Table JO-2b
Capacity of Orchard Gravity Sewer (MH JO-04 to JO-02)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Seg't	JO-04	JO-03	8	575.24	567.30	299	2.66	883	(>282 GPM, OK)
	JO-03	JO-02	8	566.10	565.30	160	0.50	383	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table JO-2a shows an ultimate peak flow of about 282 GPM assuming build-out of the listed developments. Table JO-2b shows proposed 8-inch diameter piping at slopes sufficient to convey at least 282 GPM.

Table JO-2a computes ROXUL (and all other) peak flow as 2.5 times average daily flow, although ROXUL expects that its flow will be essentially steady around-the-clock and will not have pronounced diurnal peaks like residential flow. ROXUL expects a peak factor of about 2.0, and expects peak flows to occur no more than five times per month during Phase 1 and ten times per month after expansion.

The Project includes construction of the public portion of ROXUL's service line (i.e., the portion off ROXUL's site, from ROXUL's property line to MH JO-04). The public portion will be a 6-inch gravity sewer with ample capacity for ROXUL's ultimate peak flow. The private portion will be a 4-inch force-main designed and constructed by others.

Tables JO-3a and JO-3b below are the flow and capacity tables for Section 3 of the Orchard gravity sewer (MH JO-02 to Northport PS wet well).

Table JO-3a
Flows in Orchard Gravity Sewer (MH JO-02 to Wet Well)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU	GPD (Note 1)	AC
Develop't	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0	GPD	---	37,500	75
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500	(avg)	---	117,500	235
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
		69	98	127	238	280	321	375	429	470	510	551	GPM (peak) (Note 2)		317,500	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	314	406	761	894	1,028	1,200	1,372	1,503	1,633	1,764	EDU			

Note 1: GPD values derive from acreage as (AC) x (500 GPD/AC).
Note 2: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 3: Stub at MH JO-02 (8") is sized for JO-North & Miller flow (269 GPM). 269 GPM = (37,500 GPD + 117,500 GPD) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: Shading denotes flow carried forward from Table JO-2a.

Table JO-3b
Capacity of Orchard Gravity Sewer (MH JO-02 to Wet Well)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Segt	JO-02	JO-01	10	565.00	564.72	77	0.36	589	(>551 GPM, OK)
	JO-01	Wet Well	10	564.42	564.38	12	0.33	564	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table JO-3a shows an ultimate peak flow of about 551 GPM assuming build-out of the listed developments. Table JO-3b shows proposed 10-inch diameter piping at a slope sufficient to convey at least 551 GPM.

5.0 NORTHPORT PUMP STATION AND FORCE-MAINS

Northport PS is situated on Northport Avenue opposite ROXUL, where flow is discharged by the Orchard gravity sewer. The Northport force-mains (three) convey ROXUL and ultimately other flow about 4,600

linear feet southward across Route 9. The Northport force-mains are identified on the Drawings as "Force-Main Line 2."

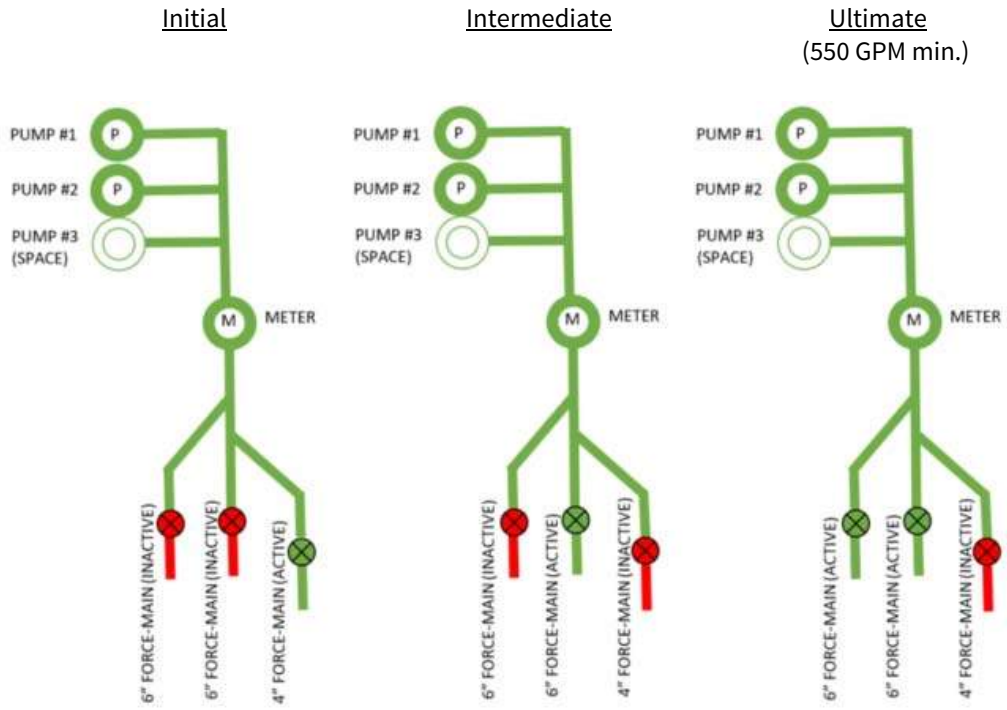
Table JO-3a above shows potential flows that may come to Northport PS in the next two decades (2019-2039). Again, the flow totals represent ultimate or "build-out" values; the timeframe over which those flows may materialize may be longer or shorter than 20 years.

Because initial flow will be delivered to Northport PS via ROXUL's private pump station, initial flow into Northport PS will be intermittent. Table JO-3a shows that Northport PS's initial influent flow is from ROXUL only, but that by 2021 influent is coming also from the eastern part of the Orchard and by 2025 from the northern part of the Orchard. Table JO-3a shows that ultimate peak flow that may come to Northport PS is about 550 GPM assuming build-out of all listed developments, so Northport PS must be able to pump at least 550 GPM in the ultimate condition. This flow equates to an ultimate customer base of about 1,800 equivalent dwelling units (EDUs).

Northport PS is designed as a submersible-type configuration consisting of a single wet well with constant-speed Yeomans (or Flygt) pumps. Because of the great difference between initial and ultimate flow, Northport PS is designed with three force-mains and a triplex (three-pump) arrangement although it seems unlikely a third pump will ever be needed to meet capacity requirements.

Figure 5-1 below shows Northport PS's general arrangement of triplex pump station with one 4-inch diameter force-main and two 6-inch diameter force-mains.

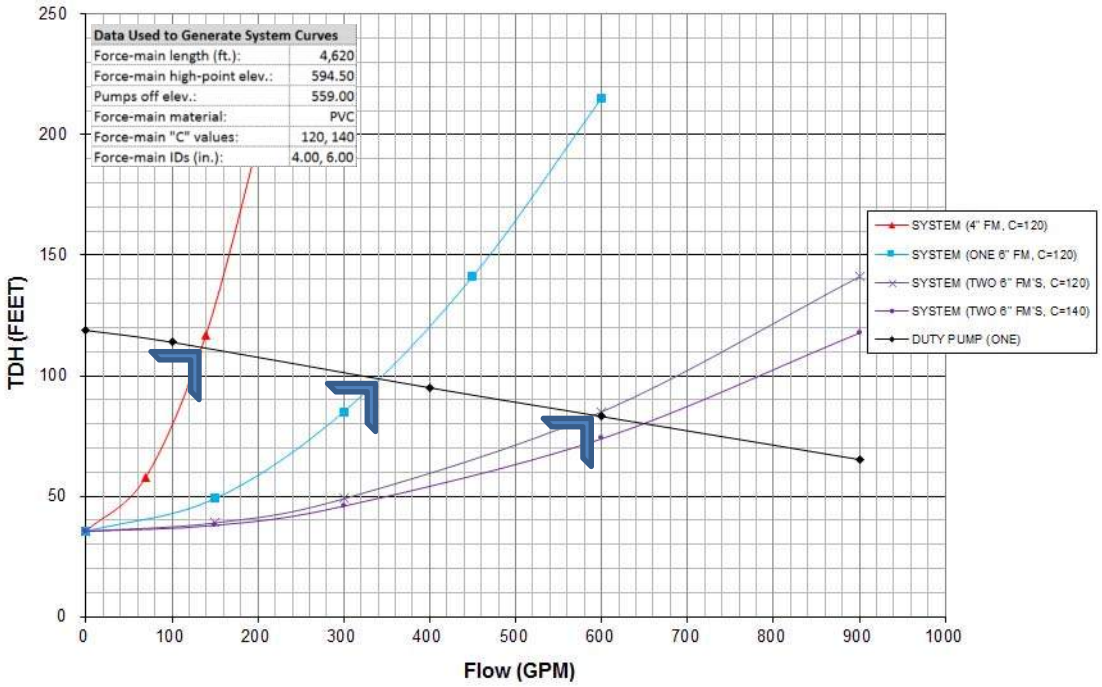
Figure 5-1
Northport Pump Station
General Arrangement and Force-Main Staging



In the initial stage, one duty pump will pump through the 4-inch force-main, and the 6-inch force-mains will be inactive. In the intermediate stage, one duty pump will pump through one 6-inch force-main; the 4-inch force-main and the other 6-inch force-main will be inactive. In the ultimate stage, one duty pump will pump at least 550 GPM through the 6-inch force-mains (275 GPM through each), and the 4-inch force-main will be inactive. At each stage, the pumps will switch duty and standby roles after each pumping cycle. This arrangement requires no future upgrade of Pumps #1 and#2. The Drawings call for three pumps to be in place for day-1 operation, but this is proposed for sake of redundancy, not capacity.

Figure 5-2 below shows system curves that represent Northport PS's force-main system in the initial stage (one active 4-inch force-main), intermediate stage (one active 6-inch force-main), and ultimate stage (two active 6-inch force-mains). The pump curve for the specified Yeomans pump is also shown.

Figure 5-2
Northport Pump Station
Pump and System Curves



Static head reflects that Northport PS will move water from an elevation of 559.00 ("pumps off" elevation in wet well) to an elevation of about 594.50 (crown elevation at pipeline high-point, which is higher than the discharge elevation of about 580.00). Friction head is computed using the Hazen-Williams formula assuming 4,620 feet of 4-inch and 6-inch diameter PVC force-main piping (beginning just after the meter vault), plus an allowance for ductile iron header/meter piping (6-inch diameter) and an allowance for fittings and valves throughout. To be conservative, friction head is based on nominal force-main diameters (4.00-inch and 6.00-inch inside diameters). The specified force-main piping has 4.39-inch and 6.31-inch inside diameters.

Figure 5-2 shows three operating points, corresponding to the three stages of operation. The operating point for the initial stage (one duty pump, 4-inch force-main) is indicated as about 135 GPM at 112 feet total dynamic head (TDH). Velocity in the 4-inch force-main at 135 GPM is about 3.5 feet per second (FPS), which is adequate. The operating point for the intermediate stage (one duty pump, one 6-inch force-main) is indicated as about 340 GPM at 98' TDH. Velocity in either 6-inch force-main at 340 GPM is about 3.9 FPS. The operating point for the ultimate stage (one duty pump, two 6-inch force-mains) is indicated as about 590 GPM at 84' TDH (with C=120). Appendix 2 contains data for the specified Yeomans pumps (Model 412.53SV), such as pump speed, impeller diameter, efficiency and horsepower for this application.

Given the flow progression of Table JO-3a, the initial stage will be from 2019-2024, the intermediate stage will be from 2024-2030, and the ultimate stage will be from 2030 on. If a pump output higher than 590 GPM is ever necessary, an evaluation can be done at that time as to appropriate pump station modifications.

Table 5-1 below shows wet well calculations for Northport PS, using influent flow rates from Table JO-3a and day-1 pump rate from Figure 5-2. For both day-1 and ultimate conditions, the calculations establish by two methods the minimum water volume that must be accommodated between the "pump on" and "pump off" levels in the wet well. The minimum drawdown volume is taken to be the greater result of the two methods.

The calculations then establish the time over which the drawdown volume will accumulate under average influent conditions (detention time). Lastly, the calculations establish the elevation difference between "pump on" and "pump off" levels.

Table 5-1
Northport Pump Station
Wet Well Calculations

Flows:		GPD	GPM
Day-1 min.	Q_{min1} =	40,000	28
Day-1 average	Q_{ave1} =	40,000	28
Day-1 peak	Q_{peak1} =	100,000	69
Day-1 pump rate (1 pump op.)	Q_{pump1} =	---	135
Ultimate average	Q_{ave2} =	317,500	220
Ultimate peak	Q_{peak2} =	793,750	550
Ult. pump rate (1 pump op.)	Q_{pump2} =	---	550 (min.)

Day 1:				Ultimate:			
Min. drawdown volume based on 15-minute pump cycle time:				**Min. drawdown volume based on 15-minute pump cycle time:**			
	V_{15} =	($T \times Q_{pump1}$) / 4			V_{15} =	($T \times Q_{pump2}$) / 4	
Min. pumping cycle	T =	15	mins	Min. pumping cycle	T =	15	mins
Pumping rate	Q_{pump1} =	135	gpm	Pumping rate	Q_{pump2} =	550	gpm
Min. volume	V_{15} =	506	gal	Min. volume	V_{15} =	2,063	gal
		68	ft^3			276	ft^3
Min. drawdown volume based on 2-minute pump run time:				**Min. drawdown volume based on 2-minute pump run time:**			
	V_2 =	(Q_{pump1}) x 2 mins			V_2 =	(Q_{pump2}) x 2 mins	
Min. volume	V_2 =	270	gal	Min. volume	V_2 =	1,100	gal
		36	ft^3			147	ft^3
Detention time at average flow:				**Detention time at average flow:**			
	$T_{detention}$ =	V_{15} / Q_{ave1}			$T_{detention}$ =	V_{15} / Q_{ave2}	
	$T_{detention}$ =	18	mins		$T_{detention}$ =	9	mins
Drawdown height:				**Drawdown height:**			
	V =	(PI x (d^2 / 4)) x h			V =	(PI x (d^2 / 4)) x h	
Diameter of wet well	d =	10	ft	Diameter of wet well	d =	10	ft
Drawdown volume	V_{15} =	68	ft^3	Drawdown volume	V_{15} =	276	ft^3
Drawdown height	h =	0.86	ft	Drawdown height	h =	3.51	ft
	use	1.00	ft		use	3.50	ft

Table 5-1 shows, for day-1 conditions, that the minimum drawdown volume is 506 gallons, and detention time based on this volume and average influent flow is 18 minutes. This detention time is acceptable since it is well under 30 minutes. The drawdown volume results from an assumption of a 15-minute minimum pump cycle time (i.e., at least 15 minutes between successive pump starts), which equates to a maximum of four starts per hour. With a wet-well diameter of 10 feet, drawdown height is about one foot.

For ultimate conditions, Table 5-1 shows that the minimum drawdown volume is 2,063 gallons, and detention time based on this volume and average influent flow is 9 minutes. The drawdown volume results again from an assumption of a 15-minute minimum pump cycle time. Drawdown height is about 3.5 feet.

Minimum drawdown volumes in Table 5-1 computed based on a two-minute pump run time are smaller than those based on pump cycle time, and therefore do not "set" the minimum drawdown volume in either the day-1 or ultimate case.

Table 5-2 shows wet-well elevations for both day-1 and ultimate conditions at Northport PS, including "pump on" and "pump off" elevations separated by the drawdown heights derived in Table 5-1.

Table 5-2
Northport Pump Station
Wet Well Elevations

Day 1:	
Top:	574.00
Ground:	573.50
Incoming invert:	564.38
High water alarm:	561.00
Pump on (lag):	560.50
Pump on (duty):	560.00
Pumps off:	559.00
Low water alarm:	558.50
Wet well floor:	556.50
Bottom of excavation:	554.50

Ultimate:	
High water alarm:	563.50
Pump on (lag):	563.00
Pump on (duty):	562.50

Since drawdown heights differ for day-1 and ultimate conditions, it will be necessary to periodically adjust the "duty pump on" elevation (and "lag pump on" and "high water alarm" elevations) to control the number of starts per hour as influent flows increase.

Figure 5-3 below shows the profile of the Northport force-mains, along with approximate hydraulic profiles for the three stages of operation.

Figure 5-3
Northport Pump Station
Force-Main Profile

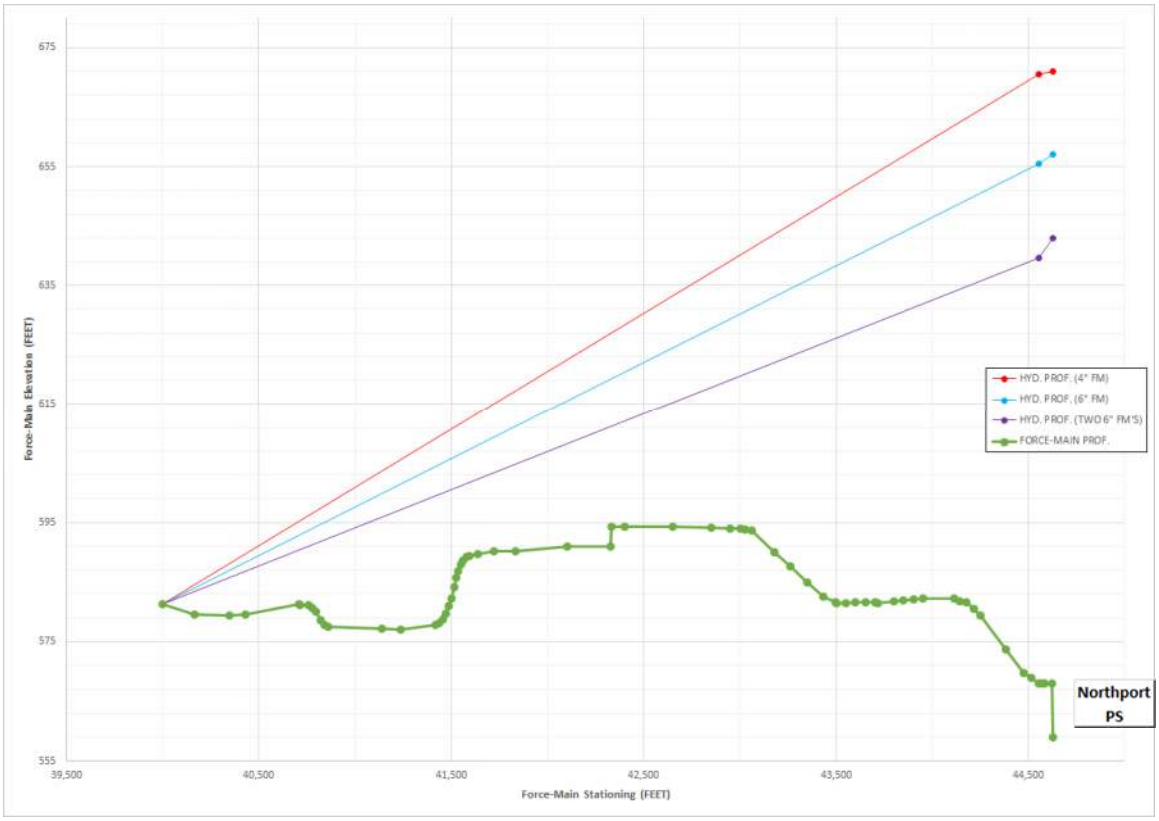


Figure 5-3 shows that the discharge elevation of the force-mains is not the highest elevation on the pipe profile. The discharge elevation is about 15' lower than the highest pipe elevation, so some draining will occur after pump shut-off unless it is decided to use a backpressure-sustaining valve to prevent draining. Force-main pressure near Northport PS ranges from roughly 30-45 PSI, depending on stage of operation. Force-main pressure at the high point (about Sta. 424+00) ranges from roughly 7-14 PSI.

Table 5-3 below shows the approximate amount of time that flow will reside in Northport PS's 4-inch force-main during the initial stage of operation when average daily flows are lowest (2019-2024). The table also shows the approximate time flow will reside in Northport PS's 6-inch force-main during the intermediate stage when peak influent flows require use of the larger force-main (2024-2030).

Table 5-3
Northport Force-Mains
Detention Time

	initial stage			intermediate stage		
	2019	2021	2023	2025	2027	2029
FM length (LF)	4,620	4,620	4,620	4,620	4,620	4,620
FM dia. (IN)	4	4	4	6	6	6
average daily flow (GPD)	40,000	56,500	73,000	137,000	161,000	185,000
FM vol. (GAL)	3,014	3,014	3,014	6,782	6,782	6,782
turnover in FM (TIMES PER DAY)	13.3	18.7	24.2	20.2	23.7	27.3
detention time in FM (HRS)	1.8	1.3	1.0	1.2	1.0	0.9

Table 5-3 shows that detention time at the start of the initial stage of operation will be less than 2 HRS (1.8 HRS in 2019), declining to 1.0 HR by 2023. Detention time at the start of the intermediate stage will be just over 1 HR (1.2 HRS in 2025), declining to less than 1 HR (0.9 HR) by 2029.

6.0 BLACKFORD VILLAGE GRAVITY SEWER

The Blackford Village (BV) gravity sewer originates at MH BV-22 along the Route 9 bike path, where flow is discharged by the Northport force-mains, then conveys Northport and ultimately other flow southward to War Admiral PS. The BV gravity sewer consists of about 4,500 linear feet of 10- and 12-inch diameter pipe, with an 8-inch diameter spur near the downstream end. The BV gravity sewer is identified on the Drawings as "Gravity Line 2."

For sizing, the BV gravity sewer is separated into five main sections, plus the spur section, as follows:

1. MH BV-22 to BV-16 (10-inch)
2. MH BV-16 to BV-06 (12-inch)
3. MH BV-06 to BV-03 (12-inch)
4. MH BV-03 to BV-02 (12-inch)
5. MH BV-02 to War Admiral PS wet well (12-inch)
6. MH DC-02 to BV-02 (8-inch spur for day-care center and others)

Tables BV-1a and BV-1b below are the flow and capacity tables for Section 1 of the BV gravity sewer (MH BV-22 to BV-16).

Table BV-1a
Flows in Blackford Village Gravity Sewer (MH BV-22 to BV-16)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU	GPD (Note 1)	AC
Development	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0	GPD	---	37,500	75
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500	(avg)	---	117,500	235
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
		69	98	127	238	280	321	375	429	470	510	551	GPM (peak) (Note 2)		317,500	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	314	406	761	894	1,028	1,200	1,372	1,503	1,633	1,764	EDU			

Note 1: GPD values derive from acreage as (AC) x (500 GPD/AC).
Note 2: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 3: Shading denotes flow carried forward from Table JO-3a.

Table BV-1b
Capacity of Blackford Village Gravity Sewer (MH BV-22 to BV-16)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Segment	BV-22	BV-21	10	588.50	584.93	298	1.20	1,076	
	BV-21	BV-20	10	584.63	581.08	296	1.20	1,076	
	BV-20	BV-19	10	574.71	569.60	51	10.02	3,110	
	BV-19	BV-18	10	569.30	566.70	110	2.36	1,509	(>551 GPM, OK)
	BV-18	BV-17	10	566.40	562.50	68	5.74	2,354	
	BV-17	BV-16	10	562.20	561.77	70	0.61	767	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table BV-1a shows an ultimate peak flow of about 551 GPM assuming build-out of the listed developments. Table BV-1b shows proposed 10-inch diameter piping at slopes sufficient to convey at least 551 GPM.

Tables BV-2a and BV-2b below are the flow and capacity tables for Section 2 of the BV gravity sewer (MH BV-16 to BV-06).

Table BV-2a
Flows in Blackford Village Gravity Sewer (MH BV-16 to BV-06)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Development	Blackford Village	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280		730	131,400	---
	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0	GPD	---	37,500	75
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500	(avg)	---	117,500	235
	North Ranson Development	0	0	0	0	0	0	6,300	6,300	6,300	6,300	6,300		---	31,500	63
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
		69	98	127	238	280	321	432	542	639	737	834	GPM (peak) (Note 3)		480,400	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	314	406	761	894	1,028	1,381	1,734	2,046	2,357	2,669	EDU			

Note 1: EDU value is derived in the Route 9 Corridor Sewershed Study.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU), and derive from acreage as (AC) x (500 GPD/AC).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: N stub at MH BV-14 (8") is sized for N. Ranson Development flow (55 GPM). 55 GPM = (31,500 GPD) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 5: W stub at MH BV-14 (8") is sized for Blackford Village flow (228 GPM). 228 GPM = (131,400 GPD) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 6: Shading denotes flow carried forward from Table BV-1a.

Table BV-2b
Capacity of Blackford Village Gravity Sewer (MH BV-16 to BV-06)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Segment	BV-16	BV-15	12	561.47	560.57	93	0.97	1,574	
	BV-15	BV-14	12	560.27	558.78	299	0.50	1,130	
	BV-14	BV-13	12	558.48	557.26	246	0.50	1,130	
	BV-13	BV-12	12	556.96	555.74	246	0.50	1,130	
	BV-12	BV-11	12	555.44	554.45	236	0.42	1,036	(>834 GPM, OK)
	BV-11	BV-10	12	554.15	553.86	70	0.41	1,023	
	BV-10	BV-09	12	553.56	552.53	246	0.42	1,036	
	BV-09	BV-08	12	552.23	551.38	202	0.42	1,036	
	BV-08	BV-07	12	551.08	550.44	229	0.28	846	
	BV-07	BV-06	12	550.14	549.65	176	0.28	846	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table BV-2a shows an ultimate peak flow of about 834 GPM assuming build-out of the listed developments. Table BV-2b shows proposed 12-inch diameter piping at slopes sufficient to convey at least 834 GPM.

Tables BV-3a and BV-3b below are the flow and capacity tables for Section 3 of the BV gravity sewer (MH BV-06 to BV-03).

Table BV-3a
Flows in Blackford Village Gravity Sewer (MH BV-06 to BV-03)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Development	Blackford Village	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280		730	131,400	---
	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0	GPD (avg)	---	37,500	75
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500		---	117,500	235
	North Ranson Development	0	0	0	0	0	0	6,300	6,300	6,300	6,300	6,300		---	31,500	63
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
	Tackley Mill	0	0	0	0	21,600	21,600	21,600	21,600	21,600	0	0		600	108,000	---
		69	98	127	238	317	396	544	692	827	924	1,022	GPM (peak) (Note 3)		588,400	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	314	406	761	1,014	1,268	1,741	2,214	2,646	2,957	3,269	EDU			

Note 1: EDU values are derived in the Route 9 Corridor Sewershed Study.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU), and derive from acreage as (AC) x (500 GPD/AC).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: Stub at MH BV-06 (10") is sized for Blackford Village & Tackley Mill flow (416 GPM). 416 GPM = (131,400 GPD + 108,000 GPD) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 5: Shading denotes flow carried forward from Table BV-2a.

Table BV-3b
Capacity of Blackford Village Gravity Sewer (MH BV-06 to BV-03)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Seg't	BV-06	BV-05	12	542.70	542.19	98	0.52	1,153	
	BV-05	BV-04	12	541.89	540.00	308	0.61	1,248	(>1,022 GPM, OK)
	BV-04	BV-03	12	539.70	536.60	341	0.91	1,525	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table BV-3a shows an ultimate peak flow of about 1,022 GPM assuming build-out of the listed developments. Table BV-3b shows proposed 12-inch diameter piping at slopes sufficient to convey at least 1,022 GPM.

Tables BV-4a and BV-4b below are the flow and capacity tables for Section 4 of the BV gravity sewer (MH BV-03 to BV-02).

Table BV-4a
Flows in Blackford Village Gravity Sewer (MH BV-03 to BV-02)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Development	Blackford Village	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280		730	131,400	---
	Burr Business Park	0	27,000	6,264	6,264	6,264	6,264	6,264	0	0	0	0		324	58,320	---
	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0	GPD	---	37,500	75
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500	(avg)	---	117,500	235
	North Ranson Development	0	0	0	0	0	0	6,300	6,300	6,300	6,300	6,300		---	31,500	63
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
	Tackley Mill	0	0	0	0	21,600	21,600	21,600	21,600	21,600	0	0		600	108,000	---
		69	145	184	306	397	487	645	793	928	1,025	1,123	GPM (peak) (Note 3)		646,720	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	464	590	981	1,269	1,557	2,065	2,538	2,970	3,281	3,593	EDU			

Note 1: EDU values are derived in the Route 9 Corridor Sewershed Study.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU), and derive from acreage as (AC) x (500 GPD/AC).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: Shading denotes flow carried forward from Table BV-3a.

Table BV-4b
Capacity of Blackford Village Gravity Sewer (MH BV-03 to BV-02)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Seg't	BV-03	BV-02	12	536.30	533.80	207	1.21	1,758	(>1,123 GPM, OK)

Note 1: Capacity is computed using a Manning "N" factor of 0.013.

Table BV-4a shows an ultimate peak flow of about 1,123 GPM assuming build-out of the listed developments. Table BV-4b shows proposed 12-inch diameter piping at a slope sufficient to convey at least 1,123 GPM.

Tables BV-5a and BV-5b below are the flow and capacity tables for Section 5 of the BV gravity sewer (MH BV-02 to War Admiral PS wet well).

Table BV-5a
Flows in Blackford Village Gravity Sewer (MH BV-02 to Wet Well)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Development	Blackford Village	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280		730	131,400	---
	Burr Business Park	0	27,000	6,264	6,264	6,264	6,264	6,264	0	0	0	0		324	58,320	---
	Day-Care Center (Note 4)	0	833	0	0	0	0	0	0	0	0	0		---	833	---
	Harvest Hills	0	0	0	0	0	0	14,112	14,112	14,112	14,112	14,112		392	70,560	---
	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0	GPD	---	37,500	75
	Jetts Farm flow (less W. Burr)	0	0	45,000	0	0	0	0	0	0	0	0	(avg)	---	45,000	---
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500		---	117,500	235
	North Ranson Development	0	0	0	0	0	0	6,300	6,300	6,300	6,300	6,300		---	31,500	63
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
	Shenandoah Junction	0	0	28,800	0	0	0	0	0	0	0	0		160	28,800	---
	Tackley Mill	0	0	0	0	21,600	21,600	21,600	21,600	21,600	0	0		600	108,000	---
		69	146	314	436	526	616	799	972	1,131	1,253	1,375	GPM (peak) (Note 3)		791,913	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	469	1,005	1,395	1,683	1,972	2,558	3,110	3,620	4,010	4,400	EDU			

Note 1: EDUs (except Shenandoah Junction) are derived in the Route 9 Corridor Sewershed Study. EDUs for Shenandoah Junction are per Shenandoah Junction Public Sewer, Inc.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU), and derive from acreage as (AC) x (500 GPD/AC).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: 833 GPD = (25,000 GAL/MO) / (30 DAY/MO). Per Jefferson Utilities, Inc., DCC flow ranges from 14,000-25,000 GAL/MO depending on year.
Note 5: Shading denotes flow carried forward from Table BV-4a.

Table BV-5b
Capacity of Blackford Village Gravity Sewer (MH BV-02 to Wet Well)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Segt	BV-02	BV-01	12	533.50	532.97	69	0.77	1,403	(>1,375 GPM, OK)
	BV-01	Wet Well	12	532.67	532.58	12	0.75	1,384	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table BV-5a shows an ultimate peak flow of about 1,375 GPM assuming build-out of the listed developments. The unshaded flows, except for the day-care center, represent potential customers from east of Route 9. The existing Jetts Farm PS currently handles much of the flow generated in Route 9's upper eastern corridor; Table BV-5a presumes that much of the Jetts Farm flow will be intercepted and redirected to War Admiral PS to relieve overloading east of Route 9.

Table BV-5b shows proposed 12-inch diameter piping at slopes sufficient to convey at least 1,375 GPM.

The day-care center (DCC) gravity sewer is proposed as a spur to the BV gravity sewer. It originates at MH DC-02 in the road right-of-way near War Admiral PS, where flow from the DCC will be intercepted, then conveys DCC (and ultimately other) flow to MH BV-02 in front of War Admiral PS.

Tables DC-1a and DC-1b below are the flow and capacity tables for the DCC gravity sewer (MH DC-02 to BV-02).

Table DC-1a
Flows in Day-Care Center Gravity Sewer (MH DC-02 to BV-02)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Dev't	Day-Care Center	0	833	0	0	0	0	0	0	0	0	0		---	833	---
	Harvest Hills	0	0	0	0	0	0	14,112	14,112	14,112	14,112	14,112	GPD	392	70,560	---
	Jetts Farm flow (less W. Burr)	0	0	45,000	0	0	0	0	0	0	0	0	(avg)	---	45,000	---
	Shenandoah Junction	0	0	28,800	0	0	0	0	0	0	0	0		160	28,800	---
		0	1	130	130	130	130	154	179	203	228	252	GPM (peak) (Note 3)		145,193	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		0	5	415	415	415	415	493	571	650	728	807	EDU			

Note 1: EDUs (except Shenandoah Junction) are derived in the Route 9 Corridor Sewershed Study. EDUs for Shenandoah Junction are per Shenandoah Junction Public Sewer, Inc.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: Shading denotes flow previously appearing in Table BV-5a.

Table DC-1b
Capacity of Day-Care Center Gravity Sewer (MH DC-02 to BV-02)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Seg't	DC-02	DC-01	8	543.75	543.00	183	0.41	347	(>252 GPM, OK)
	DC-01	BV-02	8	542.70	539.74	296	1.00	541	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table DC-1a shows an ultimate peak flow of about 252 GPM assuming build-out of the listed developments. Table DC-1b shows proposed 8-inch diameter piping at a slope sufficient to convey at least 252 GPM. The Project proposes to construct the DCC gravity sewer, but not to divert DCC flow. It is expected DCC flow will be diverted by others subsequent to Project completion.

7.0 WAR ADMIRAL PUMP STATION AND FORCE-MAINS

War Admiral PS is situated on War Admiral Boulevard adjacent to Burr Business Park, where flow is discharged by the BV gravity sewer. The War Admiral force-mains (three) convey Northport and ultimately other flow about 12,000 linear feet southward to the Clay Hill Farm property. The War Admiral force-mains are identified on the Drawings as "Force-Main Line 1."

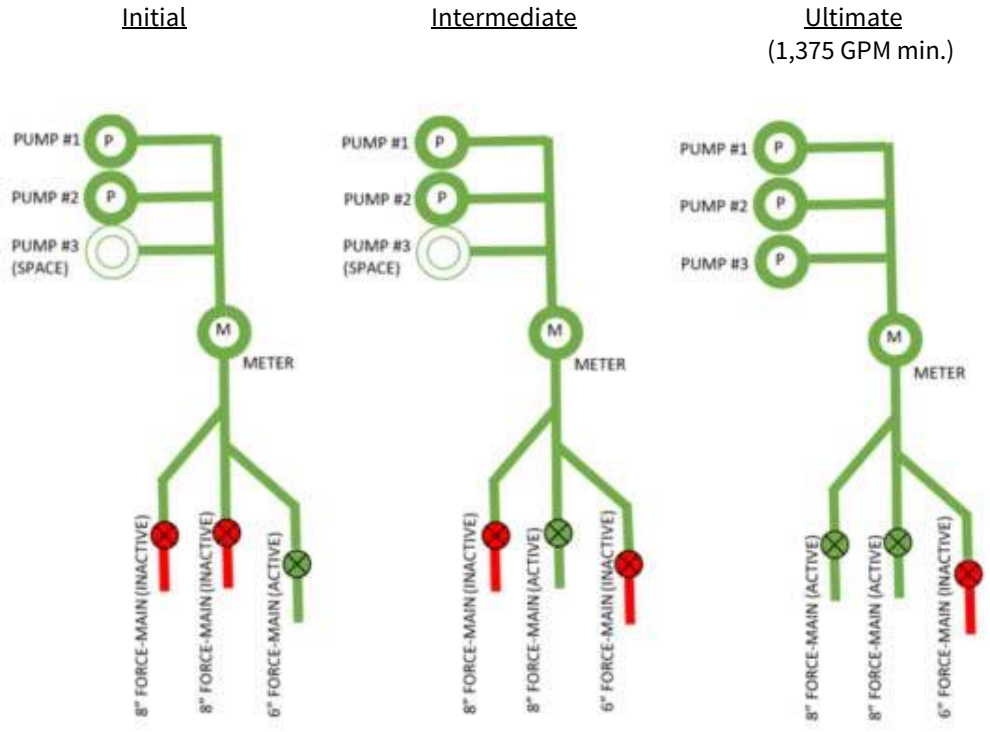
Table BV-5a above shows potential ultimate or "build-out" flows that may come to War Admiral PS. Because initial flow will be delivered to War Admiral PS via the Northport PS, initial flow into War Admiral PS will be intermittent unless Burr Business Park's existing tenants west of Route 9 are connected at MH BV-03 upon Project completion.

Table BV-5a shows that War Admiral PS's initial influent flow is from ROXUL only, but that by 2021 influent is coming also from western Burr Business Park and the eastern part of the Orchard and by 2023 from areas in the eastern corridor. Table BV-5a shows that ultimate peak flow that may come to War Admiral PS is about 1,375 GPM assuming build-out of all listed developments, so War Admiral PS must be able to pump 1,375 GPM in the ultimate condition. This flow equates to an ultimate customer base of about 4,400 EDUs.

War Admiral PS is proposed as a submersible-type configuration consisting of a single wet well with constant-speed Yeomans (or Flygt) pumps. Because of the great difference between initial and ultimate flow, War Admiral PS is proposed with three force-mains and a triplex (three-pump) arrangement.

Figure 7-1 below shows the proposed general arrangement of triplex pump station with one 6-inch diameter force-main and two 8-inch diameter force-mains that will allow War Admiral PS in the ultimate condition to pump at least 1,375 GPM using two duty pumps and two force-mains (with a third identical pump as standby pump). Initially, only two pumps need to be present.

Figure 7-1
War Admiral Pump Station
General Arrangement and Force-Main Staging

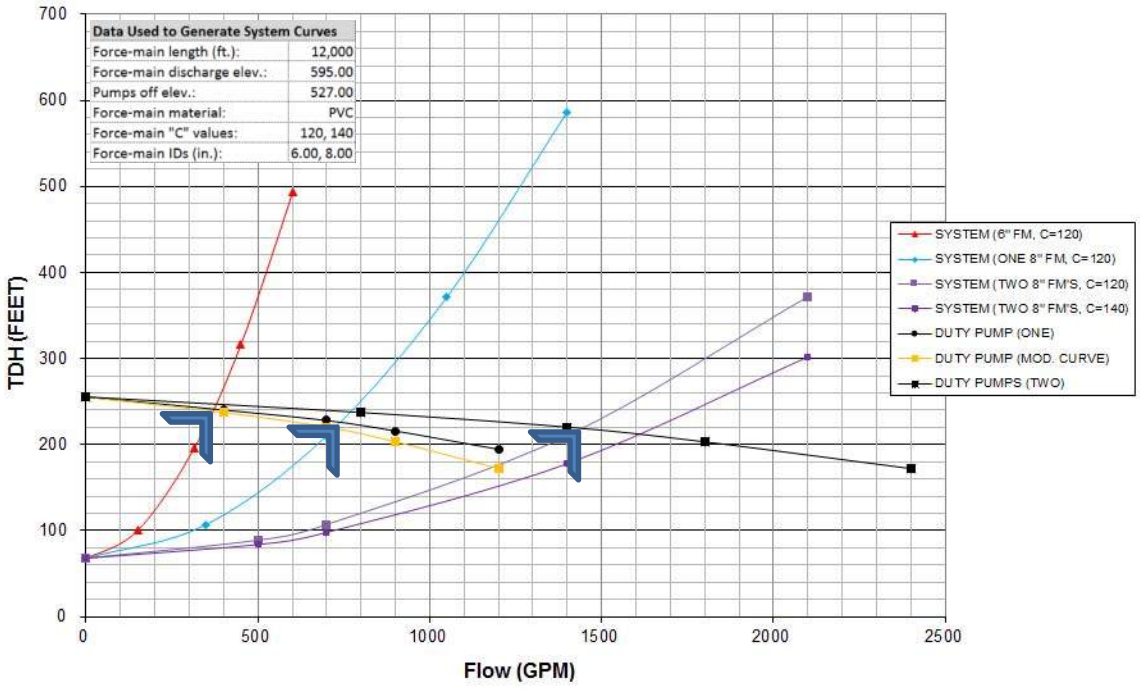


In the initial stage, one duty pump will pump through the 6-inch force-main, and the 8-inch force-mains will be inactive. The pumps will switch duty and standby roles after each pumping cycle. In the

intermediate stage, one duty pump will pump through one 8-inch force-main; the 6-inch force-main and the other 8-inch force-main will be inactive. In the ultimate stage, two duty pumps will pump at least 1,375 GPM through the 8-inch force-mains (at least 688 GPM through each), and the 6-inch force-main will remain inactive. This arrangement requires no future upgrade of Pumps #1 and#2. It simply requires the future addition of a third pump that is identical to Pumps #1 and #2. The Drawings call for three pumps to be in place for day-1 operation, but this is proposed for sake of redundancy, not capacity.

Figure 7-2 below shows system curves that represent War Admiral PS's force-main system in the initial stage (one active 6-inch force-main), intermediate stage (one active 8-inch force-main), and ultimate stage (two active 8-inch force-mains). The pump curve for the specified Yeomans pump is shown, along with a curve representing two pumps operating in parallel.

Figure 7-2
War Admiral Pump Station
Pump and System Curves



Static head reflects that War Admiral PS will move water from an elevation of 527.00 ("pumps off" elevation in wet well) to an elevation of about 595.00 (crown elevation at discharge within Clay Hill Farm). Friction head is computed using the Hazen-Williams formula assuming about 12,000 feet of 6-inch and 8-inch diameter PVC force-main piping (beginning just after the meter vault), plus an allowance for ductile iron header/meter piping (8-inch diameter) and an allowance for fittings and valves throughout. To be conservative, friction head is based on nominal force-main diameters (6.00-

inch and 8.00-inch inside diameters). The specified force-main piping has 6.31-inch and 8.28-inch inside diameters.

Figure 7-2 shows three operating points, corresponding to the three stages of operation. The operating point for the initial stage (one duty pump, 6-inch force-main) is indicated as about 370 GPM at 240 feet TDH. Velocity in the 6-inch force-main at 370 GPM is about 4.2 FPS, which is adequate. The operating point for the intermediate stage (one duty pump, one 8-inch force-main) is indicated as about 730 GPM at 225' TDH. Velocity in either 8-inch force-main at 730 GPM is about 4.7 FPS. The operating point for the ultimate stage (two duty pumps, two 8-inch force-mains) is indicated as about 1,440 GPM at 220' TDH (C=120). Appendix 2 contains data for the specified Yeomans pumps (Model 4153), such as pump speed, impeller diameter, efficiency and horsepower for this application.

Given the flow progression of Table BV-5a, the initial stage will be from 2019-2024, the intermediate stage will be from 2024-2030, and the ultimate stage will be from 2030 on.

Figure 7-2 also shows that, unlike Northport PS, War Admiral PS should not operate one duty pump into both 8-inch force-mains. This type of operation could cause the pump to "run off its curve."

Table 7-1 below shows wet well calculations for War Admiral PS, using influent flow rates from Table BV-5a and day-1 pump rate from Figure 7-2.

Table 7-1
War Admiral Pump Station
Wet Well Calculations

Flows:		GPD	GPM				
Day-1 min.	Q_{min1} =	40,000	28				
Day-1 average	Q_{ave1} =	40,000	28				
Day-1 peak	Q_{peak1} =	100,000	69				
Day-1 pump rate (1 pump op.)	Q_{pump1} =	---	370				
Ultimate average	Q_{ave2} =	791,913	550				
Ultimate peak	Q_{peak2} =	1,979,783	1,375				
Ult. pump rate (2 pumps op.)	Q_{pump2} =	---	1,375 (min.)				
Day 1:				**Ultimate:**			
Min. drawdown volume based on 10-minute pump cycle time:				**Min. drawdown volume based on 10-minute pump cycle time:**			
	V_{10} =	$(T \times Q_{pump1}) / 4$			V_{10} =	$(T \times Q_{pump2}) / 4$	
Min. pumping cycle	T =	10	mins	Min. pumping cycle	T =	10	mins
Pumping rate	Q_{pump1} =	370	gpm	Pumping rate	Q_{pump2} =	1,375	gpm
Min. volume	V_{10} =	925	gal	Min. volume	V_{10} =	3,438	gal
		124	ft^3			460	ft^3
Min. drawdown volume based on 2-minute pump run time:				**Min. drawdown volume based on 2-minute pump run time:**			
	V_2 =	$(Q_{pump1}) \times 2$ mins			V_2 =	$(Q_{pump2}) \times 2$ mins	
Min. volume	V_2 =	740	gal	Min. volume	V_2 =	2,750	gal
		99	ft^3			368	ft^3
Detention time at average flow:				**Detention time at average flow:**			
	$T_{detention}$ =	V_{10} / Q_{ave1}			$T_{detention}$ =	V_{10} / Q_{ave2}	
	$T_{detention}$ =	33	mins		$T_{detention}$ =	6	mins
Drawdown height:				**Drawdown height:**			
	V =	$(PI \times (d^2 / 4)) \times h$			V =	$(PI \times (d^2 / 4)) \times h$	
Diameter of wet well	d =	12	ft	Diameter of wet well	d =	12	ft
Drawdown volume	V_{10} =	124	ft^3	Drawdown volume	V_{10} =	460	ft^3
Drawdown height	h =	1.09	ft	Drawdown height	h =	4.06	ft
	use	1.00	ft		use	4.00	ft

Table 7-1 shows, for day-1 conditions, that the minimum drawdown volume is 925 gallons, and detention time based on this volume and average influent flow is 33 minutes. The drawdown volume results from an assumption of a 10-minute minimum pump cycle time, which equates to a maximum of six starts per hour. Although a starting rate of fewer than six per hour is desirable, the specified pumps tolerate more so this rate is used here to keep day-1 volume and detention time as small as possible.

With a wet-well diameter of 12 feet, drawdown height is about 1.0 foot. If War Admiral PS additionally receives flow from western Burr Business Park when PS operation commences, day-1 detention time will be about 20 minutes instead of 33 minutes.

For ultimate conditions, Table 7-1 shows that the minimum drawdown volume is 3,438 gallons, and detention time based on this volume and average influent flow is 6 minutes. The drawdown volume results again from an assumption of a 10-minute minimum pump cycle time. Drawdown height is about 4.0 feet.

Minimum drawdown volumes in Table 7-1 computed based on a two-minute pump run time are smaller than those based on pump cycle time, and therefore do not "set" the minimum drawdown volume in either the day-1 or ultimate case.

Table 7-2 shows wet-well elevations for both day-1 and ultimate conditions at War Admiral PS, including "pump on" and "pump off" elevations separated by the drawdown heights derived in Table 7-1.

Table 7-2
War Admiral Pump Station
Wet Well Elevations

Day 1:			Ultimate:	
Top:	552.00			
Ground:	551.50			
Incoming invert:	532.58			
High water alarm:	529.00		High water alarm:	532.00
Pump on (lag):	528.50		Pump on (lag):	531.50
Pump on (duty):	528.00		Pumps on (duty):	531.00
Pumps off:	527.00			
Low water alarm:	526.50			
Wet well floor:	524.50			
Bottom of excavation:	522.50			

Since drawdown heights differ greatly for day-1 and ultimate conditions, it will be necessary to periodically adjust the "duty pump on" elevation (and "lag pump on" and "high water alarm" elevations) to control the number of starts per hour as influent flows increase.

Figure 7-3 below shows the profile of the War Admiral force-mains, along with approximate hydraulic profiles for the three stages of operation.

Figure 7-3
War Admiral Pump Station
Force-Main Profile

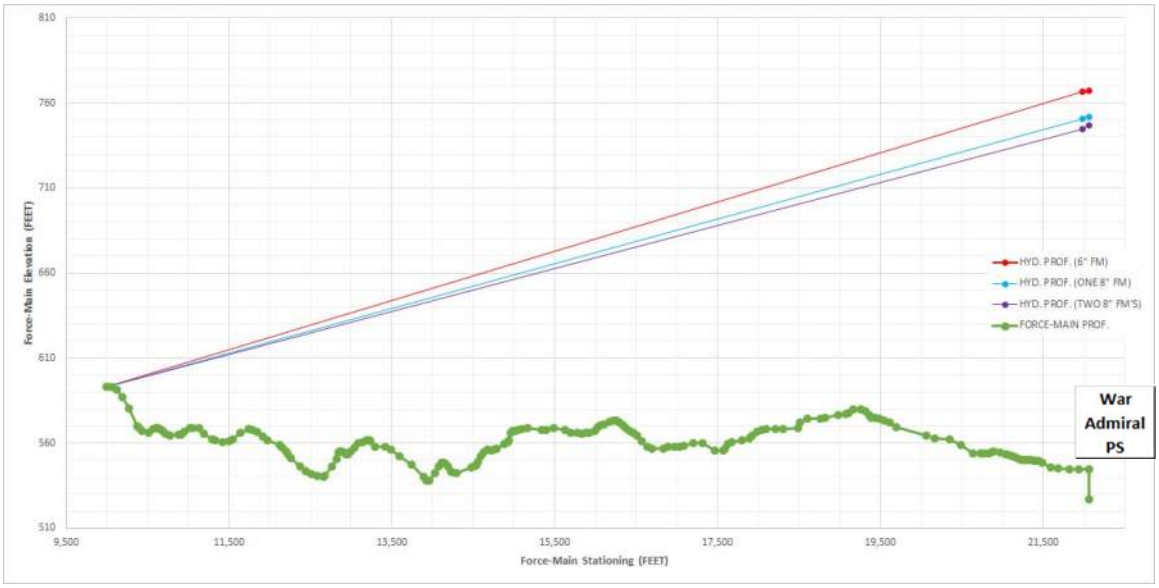


Figure 7-3 shows that the discharge elevation of the force-mains is the highest elevation on the pipe profile, so no draining will occur after pump shut-off. Force-main pressure near War Admiral PS ranges from roughly 85-95 PSI, depending on stage of operation.

Table 7-3 below shows the approximate amount of time that flow will reside in War Admiral PS's 6-inch force-main during the initial stage of operation when average daily flows are lowest (2019-2024). The table also shows the approximate time flow will reside in War Admiral PS's 8-inch force-main during the intermediate stage when peak influent flows require use of the larger force-main (2024-2030).

Table 7-3
War Admiral Force-Mains
Detention Time

	initial stage			intermediate stage		
	2019	2021	2023	2025	2027	2029
FM length (LF)	12,000	12,000	12,000	12,000	12,000	12,000
FM dia. (IN)	6	6	6	8	8	8
average daily flow (GPD)	40,000	83,500	180,064	250,328	302,192	354,056
FM vol. (GAL)	17,615	17,615	17,615	31,316	31,316	31,316
turnover in FM (TIMES PER DAY)	2.3	4.7	10.2	8.0	9.6	11.3
detention time in FM (HRS)	10.6	5.1	2.3	3.0	2.5	2.1
average daily flow (GPD) (Note 1)	67,000					
turnover in FM (TIMES PER DAY)	3.8					
detention time in FM (HRS)	6.3					

Note 1: 67,000 GPD = 40,000 GPD + 27,000 GPD. 27,000 GPD is estimated add'l day-1 flow if Burr Business Park's existing tenants west of Route 9 are connected upon Project completion.

Table 7-3 shows that detention time at the start of the initial stage of operation will be about 10 HRS (10.6 HRS in 2019) assuming ROXUL flow only, declining to about half that value (5.1 HRS) by 2021 and to just over 2 HRS near the end of the initial stage (2.3 HRS in 2023). A much shorter detention time, 6.3 HRS, can be realized in 2019 as shown if Burr Business Park's existing tenants west of Route 9 are connected at MH BV-03 upon Project completion. Detention time at the start of the intermediate stage will be 3 HRS (2025), declining to about 2 HRS near the end of the intermediate stage (2.1 HRS in 2029).

8.0 CLAY HILL FARM GRAVITY SEWER

The Clay Hill Farm (CHF) gravity sewer originates at MH CH-20 on the Clay Hill Farm property, where flow is discharged by the War Admiral force-mains, then conveys War Admiral and ultimately other flow southward to the existing gravity system at Potomac Towne Center. The CHF gravity sewer consists of about 4,600 linear feet of 12- and 15-inch diameter pipe, with a 10-inch diameter transition pipe at the downstream end. The CHF gravity sewer is identified on the Drawings as "Gravity Line 1."

For sizing, the CHF gravity sewer is separated into five sections as follows:

1. MH CH-20 to CH-18 (12-inch)
2. MH CH-18 to CH-09 (15-inch)
3. MH CH-09 to CH-06 (15-inch)
4. MH CH-06 to CH-02 (15-inch)
5. MH CH-02 to existing MH 11V (10-inch transition)

Tables CH-1a and CH-1b below are the flow and capacity tables for Section 1 of the CHF gravity sewer (MH CH-20 to CH-18).

Table CH-1a
Flows in Clay Hill Farm Gravity Sewer (MH CH-20 to CH-18)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Development	Blackford Village	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280		730	131,400	---
	Burr Business Park	0	27,000	6,264	6,264	6,264	6,264	6,264	0	0	0	0		324	58,320	---
	Day-Care Center	0	833	0	0	0	0	0	0	0	0	0		---	833	---
	Harvest Hills	0	0	0	0	0	0	14,112	14,112	14,112	14,112	14,112		392	70,560	---
	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0		---	37,500	75
	Jetts Farm flow (less W. Burr)	0	0	45,000	0	0	0	0	0	0	0	0	GPD	---	45,000	---
	Locust Knoll (Note 4)	0	0	12,924	12,924	12,924	12,924	12,924	0	0	0	0	(avg)	359	64,620	---
	Locust Knoll - West (Note 4)	0	0	0	0	0	0	16,200	16,200	16,200	16,200	16,200		450	81,000	---
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500		---	117,500	235
	North Ranson Development	0	0	0	0	0	0	6,300	6,300	6,300	6,300	6,300		---	31,500	63
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
	Shenandoah Junction	0	0	28,800	0	0	0	0	0	0	0	0		160	28,800	---
	Tackley Mill	0	0	0	0	21,600	21,600	21,600	21,600	21,600	0	0		600	108,000	---
		69	146	336	481	593	706	940	1,140	1,328	1,478	1,628	GPM (peak) (Note 3)		937,533	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	469	1,077	1,539	1,899	2,259	3,007	3,649	4,249	4,729	5,209	EDU			

Note 1: EDUs (except Shenandoah Junction) are derived in the Route 9 Corridor Sewershed Study. EDUs for Shenandoah Junction are per Shenandoah Junction Public Sewer, Inc.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU), and derive from acreage as (AC) x (500 GPD/AC).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: LK and LK-West are presumed to connect to the Burr 6" force-main between Sta. 121+00 and 146+00.
Note 5: Shading denotes flow carried forward from Table BV-5a.

Table CH-1b
Capacity of Clay Hill Farm Gravity Sewer (MH CH-20 to CH-18)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Segt	CH-20	CH-19	12	593.69	584.50	296	3.10	2,814	(>1,628 GPM, OK)
	CH-19	CH-18	12	579.61	561.40	299	6.09	3,945	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table CH-1a shows an ultimate peak flow of about 1,628 GPM assuming build-out of the listed developments. Table CH-1b shows proposed 12-inch diameter piping at slopes sufficient to convey at least 1,628 GPM.

Tables CH-2a and CH-2b below are the flow and capacity tables for Section 2 of the CHF gravity sewer (MH CH-18 to CH-09).

Table CH-2a
Flows in Clay Hill Farm Gravity Sewer (MH CH-18 to CH-09)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Development	Blackford Village	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280		730	131,400	---
	Burr Business Park	0	27,000	6,264	6,264	6,264	6,264	6,264	0	0	0	0		324	58,320	---
	Clay Hill Farm - North (Note 4)	0	0	0	0	0	0	6,696	6,696	6,696	6,696	6,696		186	33,480	---
	Day-Care Center	0	833	0	0	0	0	0	0	0	0	0		---	833	---
	Harvest Hills	0	0	0	0	0	0	14,112	14,112	14,112	14,112	14,112		392	70,560	---
	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0		---	37,500	75
	Jetts Farm flow (less W. Burr)	0	0	45,000	0	0	0	0	0	0	0	0	GPD (avg)	---	45,000	---
	Locust Knoll	0	0	12,924	12,924	12,924	12,924	12,924	0	0	0	0		359	64,620	---
	Locust Knoll - West	0	0	0	0	0	0	16,200	16,200	16,200	16,200	16,200		450	81,000	---
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500		---	117,500	235
	North Ranson Development	0	0	0	0	0	0	6,300	6,300	6,300	6,300	6,300		---	31,500	63
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
	Shenandoah Junction	0	0	28,800	0	0	0	0	0	0	0	0		160	28,800	---
	Tackley Mill	0	0	0	0	21,600	21,600	21,600	21,600	21,600	0	0		600	108,000	---
		69	146	336	481	593	706	951	1,163	1,363	1,524	1,686	GPM (peak) (Note 3)		971,013	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	469	1,077	1,539	1,899	2,259	3,044	3,723	4,360	4,877	5,395	EDU			

Note 1: EDUs (except Shenandoah Junction) are derived in the Route 9 Corridor Sewershed Study. EDUs for Shenandoah Junction are per Shenandoah Junction Public Sewer, Inc.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU), and derive from acreage as (AC) x (500 GPD/AC).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: CHF totals are 300 EDU & 54,000 GPD. CHF-North is 62% (169 AC) of total AC (274 AC) per CHF LDPP dated 3/12/2012. 33,480 GPD = 54,000 GPD x 0.62.
Note 5: W stub at MH CH-18 (8") is sized for 58% of CHF flow (54 GPM from 158 AC). 54 GPM = (54,000 GPD x 0.58) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 6: E stub at MH CH-18 (8") is sized for 4% of CHF flow (4 GPM from 11 AC). 4 GPM = (54,000 GPD x 0.04) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 7: Shading denotes flow carried forward from Table CH-1a.

Table CH-2b
Capacity of Clay Hill Farm Gravity Sewer (MH CH-18 to CH-09)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Segment	CH-18	CH-17	15	552.00	548.95	272	1.12	3,069	
	CH-17	CH-16	15	548.65	545.29	300	1.12	3,069	
	CH-16	CH-15	15	544.99	541.63	300	1.12	3,069	
	CH-15	CH-14	15	541.33	538.99	209	1.12	3,069	
	CH-14	CH-13	15	538.69	535.37	296	1.12	3,069	(>1,686 GPM, OK)
	CH-13	CH-12	15	535.07	528.71	296	2.15	4,253	
	CH-12	CH-11	15	520.12	517.16	296	1.00	2,900	
	CH-11	CH-10	15	516.86	513.60	296	1.10	3,042	
	CH-10	CH-09	15	513.30	510.30	272	1.10	3,042	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table CH-2a shows an ultimate peak flow of about 1,686 GPM assuming build-out of the listed developments. Table CH-2b shows proposed 15-inch diameter piping at slopes sufficient to convey at least 1,686 GPM.

Tables CH-3a and CH-3b below are the flow and capacity tables for Section 3 of the CHF gravity sewer (MH CH-09 to CH-06).

Table CH-3a
Flows in Clay Hill Farm Gravity Sewer (MH CH-09 to CH-06)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Development	Blackford Village	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280		730	131,400	---
	Burr Business Park	0	27,000	6,264	6,264	6,264	6,264	6,264	0	0	0	0		324	58,320	---
	Clay Hill Farm - North	0	0	0	0	0	0	6,696	6,696	6,696	6,696	6,696		186	33,480	---
	Clay Hill Farm - South (Note 4)	0	0	0	0	0	0	4,104	4,104	4,104	4,104	4,104		114	20,520	---
	Day-Care Center	0	833	0	0	0	0	0	0	0	0	0		---	833	---
	Harvest Hills	0	0	0	0	0	0	14,112	14,112	14,112	14,112	14,112		392	70,560	---
	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0		---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0	GPD	---	37,500	75
	Jetts Farm flow (less W. Burr)	0	0	45,000	0	0	0	0	0	0	0	0	(avg)	---	45,000	---
	Locust Knoll	0	0	12,924	12,924	12,924	12,924	12,924	0	0	0	0		359	64,620	---
	Locust Knoll - West	0	0	0	0	0	0	16,200	16,200	16,200	16,200	16,200		450	81,000	---
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500		---	117,500	235
	North Ranson Development	0	0	0	0	0	0	6,300	6,300	6,300	6,300	6,300		---	31,500	63
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
	Shenandoah Junction	0	0	28,800	0	0	0	0	0	0	0	0		160	28,800	---
	Tackley Mill	0	0	0	0	21,600	21,600	21,600	21,600	21,600	0	0		600	108,000	---
		69	146	336	481	593	706	958	1,178	1,384	1,553	1,721	GPM (peak) (Note 3)		991,533	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	469	1,077	1,539	1,899	2,259	3,067	3,769	4,429	4,969	5,509	EDU			

Note 1: EDUs (except Shenandoah Junction) are derived in the Route 9 Corridor Sewershed Study. EDUs for Shenandoah Junction are per Shenandoah Junction Public Sewer, Inc.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU), and derive from acreage as (AC) x (500 GPD/AC).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: CHF totals are 300 EDU & 54,000 GPD. CHF-South is 38% (105 AC) of total AC (274 AC) per CHF LDPP dated 3/12/2012. 20,520 GPD = 54,000 GPD x 0.38.
Note 5: Stub at MH CH-09 (8") is sized for 38% of CHF flow (36 GPM from 105 AC). 36 GPM = (54,000 GPD x 0.38) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 6: Shading denotes flow carried forward from Table CH-2a.

Table CH-3b
Capacity of Clay Hill Farm Gravity Sewer (MH CH-09 to CH-06)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Segment	CH-09	CH-08	15	509.80	509.37	96	0.45	1,946	
	CH-08	CH-07	15	509.07	508.24	185	0.45	1,946	(>1,721 GPM, OK)
	CH-07	CH-06	15	506.24	505.25	145	0.68	2,392	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table CH-3a shows an ultimate peak flow of about 1,721 GPM assuming build-out of the listed developments. Table CH-3b shows proposed 15-inch diameter piping at a slope sufficient to convey at least 1,721 GPM.

Tables CH-4a and CH-4b below are the flow and capacity tables for Section 4 of the CHF gravity sewer (MH CH-06 to CH-02).

Table CH-4a
Flows in Clay Hill Farm Gravity Sewer (MH CH-06 to CH-02)

		2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039		EDU (Note 1)	GPD (Note 2)	AC
Development	Blackford Village	0	0	0	0	0	0	26,280	26,280	26,280	26,280	26,280		730	131,400	---
	BOE Site (fmr. Lloyd Property)	0	0	0	0	0	0	18,000	18,000	18,000	18,000	18,000		500	90,000	---
	Bridgeforth Property	0	0	0	0	0	0	6,500	6,500	6,500	6,500	6,500		---	32,500	65
	Burr Business Park	0	27,000	6,264	6,264	6,264	6,264	6,264	0	0	0	0		324	58,320	---
	Clay Hill Farm - North	0	0	0	0	0	0	6,696	6,696	6,696	6,696	6,696		186	33,480	---
	Clay Hill Farm - South	0	0	0	0	0	0	4,104	4,104	4,104	4,104	4,104		114	20,520	---
	Day-Care Center	0	833	0	0	0	0	0	0	0	0	0		---	833	---
	Harvest Hills	0	0	0	0	0	0	14,112	14,112	14,112	14,112	14,112		392	70,560	---
	Jefferson Orchard - East	0	16,500	16,500	16,500	16,500	16,500	0	0	0	0	0	GPD	---	82,500	165
	Jefferson Orchard - North	0	0	0	7,500	7,500	7,500	7,500	7,500	0	0	0	(avg)	---	37,500	75
	Jetts Farm flow (less W. Burr)	0	0	45,000	0	0	0	0	0	0	0	0		---	45,000	---
	Locust Knoll	0	0	12,924	12,924	12,924	12,924	12,924	0	0	0	0		359	64,620	---
	Locust Knoll - West	0	0	0	0	0	0	16,200	16,200	16,200	16,200	16,200		450	81,000	---
	Miller Property	0	0	0	0	0	0	23,500	23,500	23,500	23,500	23,500		---	117,500	235
	North Ranson Development	0	0	0	0	0	0	6,300	6,300	6,300	6,300	6,300		---	31,500	63
	ROXUL	40,000	0	0	40,000	0	0	0	0	0	0	0		---	80,000	---
	Shenandoah Junction	0	0	28,800	0	0	0	0	0	0	0	0		160	28,800	---
	Tackley Mill	0	0	0	0	21,600	21,600	21,600	21,600	21,600	0	0		600	108,000	---
		69	146	336	481	593	706	1,001	1,263	1,512	1,723	1,934	GPM (peak) (Note 3)		1,114,033	
		2019 only	cum. 2019-2021	cum. 2019-2023	cum. 2019-2025	cum. 2019-2027	cum. 2019-2029	cum. 2019-2031	cum. 2019-2033	cum. 2019-2035	cum. 2019-2037	cum. 2019-2039				
		222	469	1,077	1,539	1,899	2,259	3,203	4,041	4,837	5,513	6,189	EDU			

Note 1: EDUs (except Shenandoah Junction) are derived in the Route 9 Corridor Sewershed Study. EDUs for Shenandoah Junction are per Shenandoah Junction Public Sewer, Inc.
Note 2: GPD values derive from EDUs as (EDUs) x (180 GPD/EDU), and derive from acreage as (AC) x (500 GPD/AC).
Note 3: GPM peak is computed as (GPD avg) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 4: Stub at MH CH-06 (8") is sized for BOE Site flow (156 GPM). 156 GPM = (90,000 GPD) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 5: Stubs at MH CH-03 (8") are each sized for Bridgeforth Property flow (56 GPM). 56 GPM = (32,500 GPD) / (1,440 MIN/DAY) x 2.5 peak factor.
Note 6: Shading denotes flow carried forward from Table CH-3a.

Table CH-4b
Capacity of Clay Hill Farm Gravity Sewer (MH CH-06 to CH-02)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Segment	CH-06	CH-05	15	504.95	503.65	289	0.45	1,946	
	CH-05	CH-04	15	503.35	502.02	296	0.45	1,946	(>1,934 GPM, OK)
	CH-04	CH-03	15	501.72	500.42	289	0.45	1,946	
	CH-03	CH-02	15	500.12	499.68	98	0.45	1,946	

Note 1: Capacities are computed using a Manning "N" factor of 0.013.

Table CH-4a shows an ultimate peak flow of about 1,934 GPM assuming build-out of the listed developments. Table CH-4b shows proposed 15-inch diameter piping at a slope sufficient to convey at least 1,934 GPM.

Section 5 of the CHF gravity sewer (MH CH-02 to existing MH 11V) is a proposed 10-inch diameter "transition" sewer, to allow transition from the proposed 15-inch sewer at MH CH-02 to the 10-inch inlet penetration at existing MH 11V in Potomac Towne Center. It is intended for use in the near-term only (5-10 years), until such time that a relief sewer is constructed downstream or flow is diverted elsewhere. MH CH-02 includes a 15-inch diameter stub for the relief sewer. Timing of the relief sewer will depend on corridor development and master planning after 2019.

Table CH-5 below is the capacity table for the transition sewer (MH CH-02 to existing MH 11V).

Table CH-5
Capacity of Clay Hill Farm Gravity Sewer (MH CH-02 to existing MH 11V)

	u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 1)	
Seg't	CH-02	11V	10	499.38	496.36	99	3.05	1,716	(>442 GPM, OK)
	Note 1: Capacity is computed using a Manning "N" factor of 0.013.								

It is acknowledged that Section 4 of the CHF gravity sewer (15-inch diameter) has more capacity than the existing sewers immediately downstream in Potomac Towne Center (10-inch diameter). The proposed 15-inch sewer has a capacity of about 1,946 GPM per Table CH-4b, versus the 10-inch sewer's capacity of about 442 GPM per the downstream capacity analysis in the Route 9 Study (Table 5.2A, Page 32, in Appendix 1). It is noted that the Route 9 Study's appendix contains computations of gravity sewer capacities, and identifies that the 442-GPM value is probably closer to 550+ GPM.

For the transition, Table CH-5 shows the proposed 10-inch sewer at a slope sufficient to convey about 1,700 GPM, which is ample for the transition sewer's intended use.

Route 9 Sewer Project
Design Report

Appendix 1
Route 9 Corridor Sewershed Study

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City of Ranson, WV

Route 9 Corridor Sewershed Study

January 22, 2018

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City of Ranson, WV

Route 9 Corridor Sewershed Study

January 22, 2018

Prepared by: Scott Yearley, P.E.

Approved by: Richard Travers, P.E.

Project No.: H355558

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704 Quince Orchard Road, Suite 310, Gaithersburg, MD 20878

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ROUTE 9 CORRIDOR SEWERSHED STUDY

EXECUTIVE SUMMARY

This study considers options for how the City of Ranson ("Ranson") may best provide long-term public sewer service for the ROXUL manufacturing facility, the associated Jefferson Orchard property (the "Orchard"), and Route 9 corridor properties within and north of Ranson's Urban Growth Boundary via the proposed Route 9 Infrastructure Project (the "Project"). The study also verifies that sewer capacity is available at least in the short-term for ROXUL, and other corridor development, in the existing downstream system between the proposed connection at Potomac Towne Center and the Charles Town Wastewater Treatment Plant.

Section 4.0 considers six pump station location options for the Project. Despite their distinctions, the options have commonalities consistent with the Project's goals to serve the new ROXUL manufacturing facility for an operational start of June 2019, and to serve other properties within the Route 9 corridor. Using the EDU/Project Cost ratios developed in Section 4.0 as a basis, ranking of the options is as follows:

- Option #6 ratio: 325
- Option #3 ratio: 289
- Option #5 ratio: 287
- Option #4 ratio: 195
- Option #2 ratio: 153
- Option #1 ratio: 108

The ranking shows that Options #3, #5 and #6 have much higher EDU/Project Cost ratios than Options #1, #2 and #4, indicating greater "bang-for-the-buck" with respect to serving non-ROXUL properties in the Route 9 corridor. The ratios of Options #1, #2 and #4 "fall short" because these options fail to provide gravity service as follows:

- Option #4: With its sole pump station at Locust Knoll, Option #4 fails to provide gravity service to any areas north of Locust Knoll.
- Option #2: With its sole pump station in Orchard East, Option #2 fails to provide gravity service to any areas in Route 9's western corridor.
- Option #1: With its sole pump station in Orchard East, Option #1 fails to provide gravity service to any areas in Route 9's western corridor. Further, with its pump station positioned at a relatively high elevation near Northport Avenue, Option #1 fails to provide gravity service to Orchard East.

Among the top three options, it is concluded that either Option #3 or #5 would be a more appropriate choice than Option #6. Options #3 and #5 both meet the goals to serve ROXUL and provide gravity service to under- or un-developed properties in Ranson, and they do so at lower cost than Option #6. Option #6 serves many more EDUs by gravity than any other option, and has the highest ratio of all options, but is considerably costlier. Option #6 entails over 25% more initial cost than the funding request, plus more long-term cost associated with operation/maintenance of three pump stations. Option #3's cost is generally consistent with the funding request, and Option #5's cost is about 14% more than the funding request. Options #3 and #5 are depicted on pages 16 and 20, respectively.

Options #3 and #5 both include a public pump station located at Burr Business Park on the west side of Route 9, which serves ROXUL and also does the following:

- Serves over 1,600 non-ROXUL EDUs by gravity (Burr, Blackford Village and Tackley Mill).
- Removes the flow equivalent of about 150 EDUs from Old Town Ranson and the eastern Route 9 corridor.
- Decreases likelihood of septicity issues in the Project pipeline.

Option #5 provides a near-identical EDU/Project Cost ratio to that of Option #3, but is costlier primarily due to its distinguishing feature – a public pump station and associated piping located in Orchard East which will only serve ROXUL until another user(s) occupies Orchard East. But the Orchard East pump station minimizes ROXUL's pumping requirements, and could be regarded as an enticement to potential users of Orchard East. Option #3 increases ROXUL's pumping requirements and, although it opens Burr Business Park to further development, does nothing to enhance the future of the Orchard as a large industrial park in Jefferson County.

Overall, it is concluded that Options #3 and #5 both meet the Project goals. But Option #5, despite higher cost to build and operate, may satisfy more stakeholders and may attract other industrial clients to Jefferson County. It is recommended that Ranson consider pros and cons of both Options #3 and #5 to judge which option is actually the more cost-effective Project.

The downstream capacity analysis in Section 5.0 indicates that all five elements of the downstream system, including Flowing Springs pump station (FSPS), are adequate as of 2019 after addition of ROXUL Phase 1 flow, and other new-development flow, to current flow.

FSPS will be operating at about 65% of current firm pumping capacity during 2019 peak flow conditions, if all the projections used to derive that figure come to fruition. Much of FSPS' current excess capacity is projected to be consumed by 2019 because FSPS is projected to receive <u>new</u> flow from:

- ROXUL
- Burr Business Park existing development (via Pump Station Option #3 or #5)
- Potomac Towne Center 2018-19 development
- Breckenridge Pump Station tributary area 2018-19 development
- Shenandoah Springs 2018-19 development

At this time, it is recommended that <u>no</u> upgrade of FSPS be included in the Project. It is, however, recommended that the above-mentioned 2018-19 development be monitored closely over the next several years, as this could alter the 65% figure. Based on the ROXUL and new development projections, an FSPS upgrade will be necessary perhaps as soon as 2025 and no later than 2027 based on the projections in Section 5.0.

It is also recommended that <u>no</u> interception of flow at Lloyd's Flats pump station be included in the Project. Although this interception would remove additional flow from Old Town Ranson, Section 5.0 indicates that 50% interception causes FSPS to be at about 70% of current capacity in 2019, and that full interception causes FSPS to be at about 76% of current capacity in 2019. If full interception were

included in the Project, it would hasten FSPS upgrade by about two years based on the progression of Table 5.3B.

The analysis in Section 5.0 indicates that most elements of the downstream system are adequate for projected flows during the period of 2020-2029. But the analysis shows that FSPS will be operating at about 86% of current simplex pumping capacity during 2025 peak flow conditions, and about 95% of current simplex pumping capacity during 2027 peak flow conditions, if all the development projections come about. It is recommended that Ranson re-examine flow conditions at FSPS in the 2019-2023 timeframe to determine if 2025 looks like an appropriate time to start planning for upgrade.

1.0 INTRODUCTION

The West Virginia Infrastructure and Jobs Development Council (IJDC) is seeking to bring a 1,000-acre industrial park to the Eastern Panhandle region. In support of this goal, the City of Ranson ("Ranson") and the Jefferson County Development Authority (JCDA) have successfully negotiated an agreement to bring ROXUL, Inc., a manufacturer of cement-based insulation materials, to a 150-acre site on the west side of the 390-acre Jefferson Orchards property (the "Orchard"), annexed into Ranson in 2004. The Orchard lies within City limits just north of Ranson's Urban Growth Boundary.

ROXUL's site plan was approved in August 2017, and construction began in November. ROXUL intends to begin operation in June 2019, and Ranson has committed to construct supporting sewer, water, and transportation infrastructure by the time the plant is placed in service. The Route 9 Infrastructure Project (the "Project") will include sewer, water and road (Northport Avenue) extension necessary to support the ROXUL plant, and will also include sewer capacity to tie in existing and planned development sites along the WV Route 9/115 corridor ("Route 9 corridor"). This study addresses the Project's sewer aspects only; it does not address water service or the road extension.

2.0 BACKGROUND

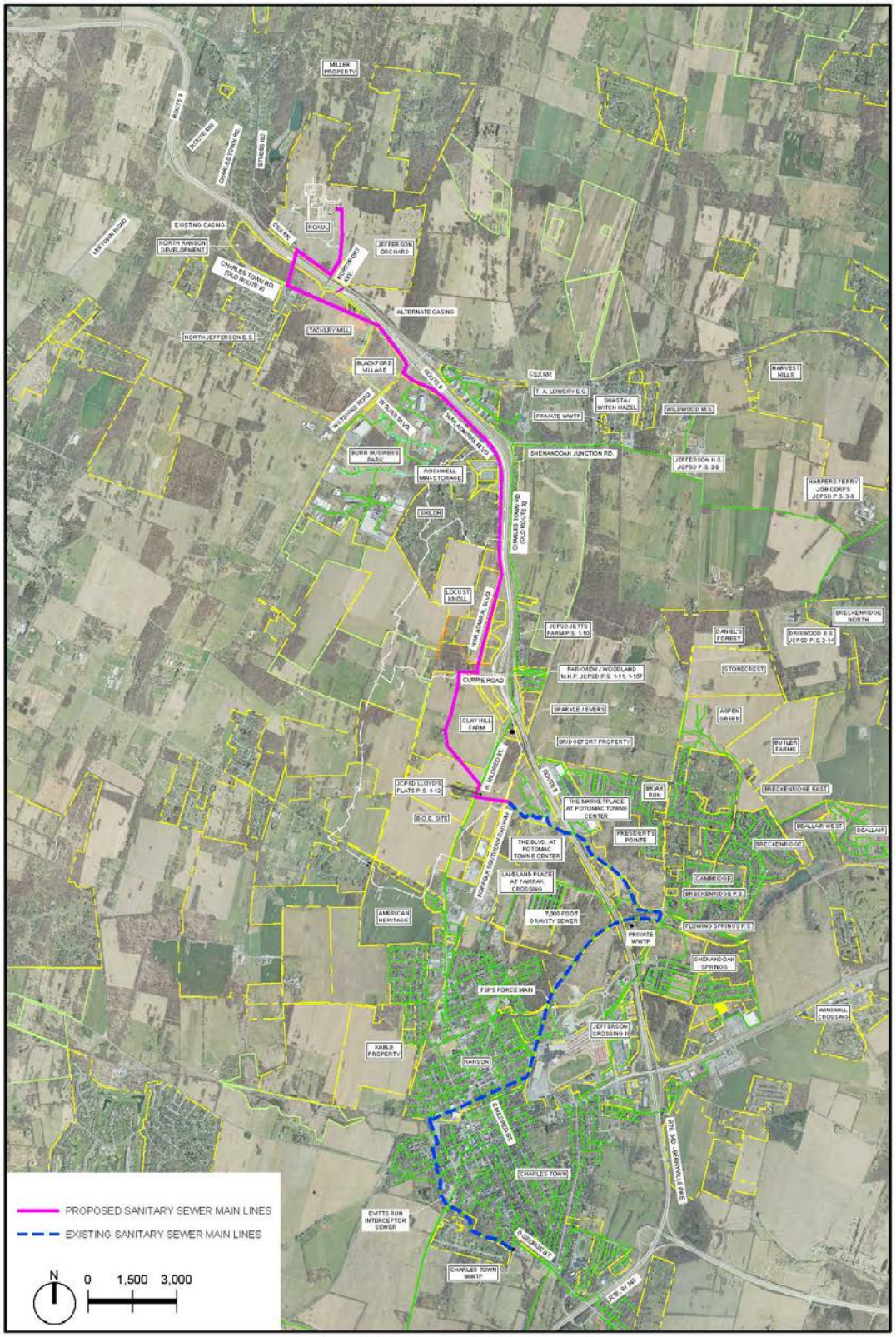
Ranson's early planning recognized that the current public sewer service south of the Orchard and east of Route 9 available through Jefferson County Public Sewer District (JCPSD) is not adequate to serve ROXUL. Further, the desire of Ranson and JCDA was that construction of sewer mains to the Orchard, which is considerably north of Ranson's existing sewer system, with placement of the mains west of Route 9 would provide future service to existing properties already within City limits.

Originally, Ranson's concept for the Project was to locate a public sewer pump station "local" to ROXUL, construct sewer piping west of, but generally near Route 9, and connect to an existing Ranson sewer in Potomac Towne Center. The "local" public pump station was necessary due to existing topography along Route 9 (i.e., the Orchard cannot be sewered by gravity to Potomac Towne Center).

Generally, Ranson's plan was that ROXUL sewage flow would discharge to a Ranson gravity sewer and pump station in the eastern part of the Orchard ("Orchard East"). Flow would then be routed by force-main along Northport Avenue and through an existing casing (under the CSX railroad and Route 9) to Route 115 (Charles Town Road), then by combination of force-main and gravity sewer west of Route 9 to the tie-in location, which is an existing Ranson gravity sewer in a commercial development ("The Boulevard at Potomac Towne Center") located several miles south of the Orchard. Downstream of the tie-in, sewage flow will be routed by gravity to Ranson's Flowing Springs Pump Station (FSPS), then by

force-main to the Ranson/Charles Town Evitts Run Interceptor Sewer, then by gravity to Charles Town's Wastewater Treatment Plant (WWTP). Refer to Figure 1 on the following page.

The design development of the ROXUL site since Ranson's original concept has resulted in a private pump station on ROXUL's site with a private force-main routed to the proposed Ranson facilities in Orchard East.



ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 1
FLOW ROUTING

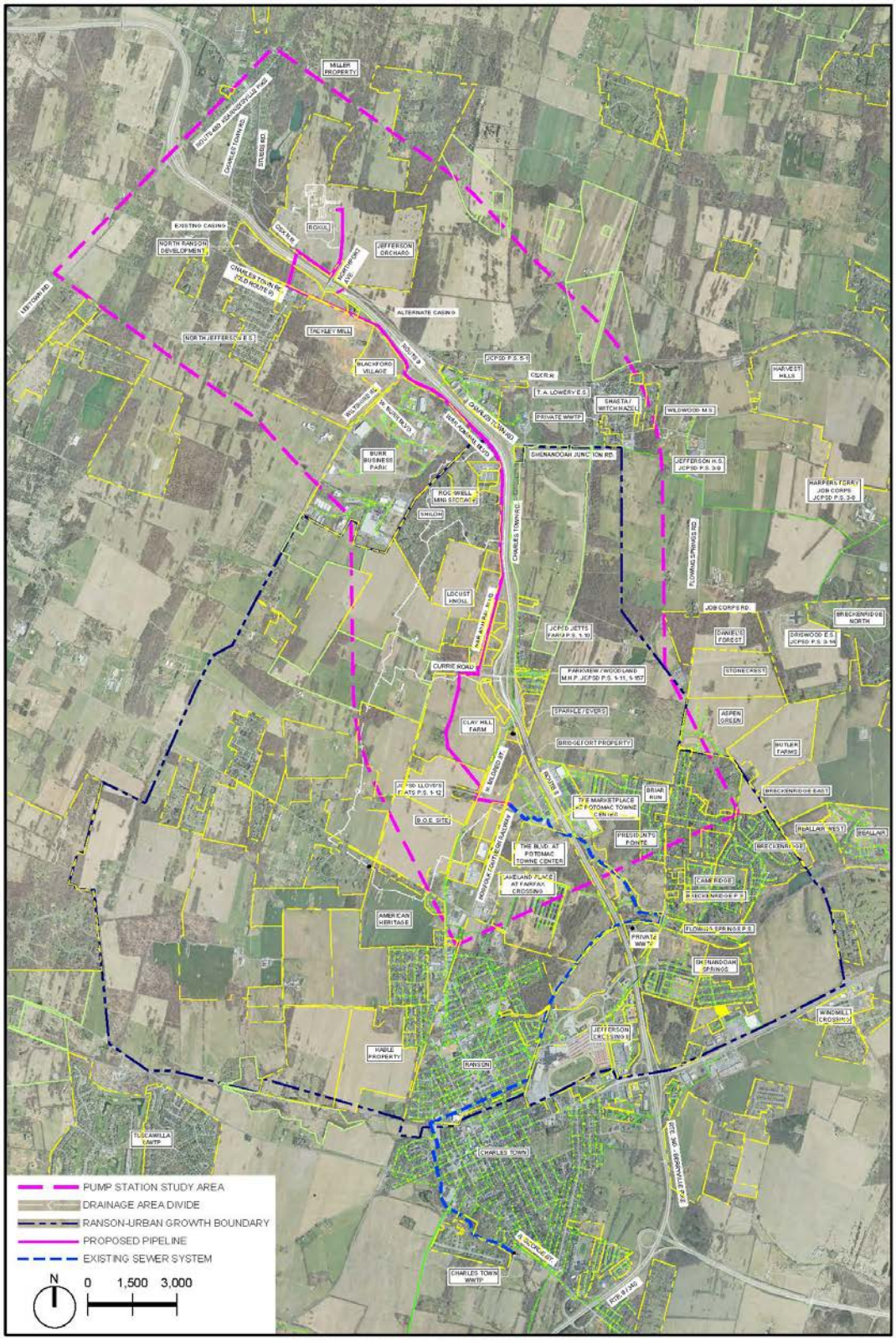
The generalized pipeline routing described above and shown on Figure 1, beginning along Northport Avenue then running west of Route 9, is common to all six pump station options described in this study. This document does not focus on pipeline routing specifics (pipe on west side of road versus east side of road, etc.); that is a matter for detailed design. Further, this document does not address pump station specifics (flow, head, horsepower, etc.) nor force-main specifics (pipe diameter, use of dual force-mains, etc.), since these are also matters for detailed design.

The pipeline routing for all six pump station options presumes use of one of two existing 30-inch diameter casing pipes that were installed a number of years ago under Route 9 and the adjacent CSX railroad specifically for utility extensions to the Orchard. As such, all figures and cost opinions in this document reflect use of one of these casing pipes.

About one-quarter mile south of the 30-inch diameter casings, two other casing pipes (24-inch and 30-inch) also exist under Route 9 near the Orchard (see Figure 1); one of these two southern casings could potentially be used instead to install the sewer pipeline under Route 9. The southern casings do not, however, extend under the CSX railroad, so using one of these casings requires permitting and construction of a railroad bore, but eliminates the circuitous routing necessitated by the northern casings (the circuitous routing requires design and construction of about 3,000 linear feet of net additional pipeline). Using one of the southern casings also eliminates the need to route the pipeline in the area of a potential ROXUL rail spur along ROXUL's southern boundary. It is expected that use of one of the southern casing pipes will be considered in advance of detailed design since it could possibly reduce Project cost and construction time.

3.0 ROUTE 9 CORRIDOR

The Route 9 corridor is regarded as a swath of land roughly two miles in width, and roughly centered on Route 9, whose southern limit is in the area of the Potomac Towne Center commercial development and whose northern limit is in the area of Route 480 (Leetown Road/Kearneysville Pike) just north of the Orchard. The western limit, roughly one mile west of Route 9, is an approximate delineator between land that drains east toward Route 9 and land that drains elsewhere away from Route 9. Drainage in the corridor is generally from west to east. Refer to Figure 2 on the following page.



ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 2
ROUTE 9 CORRIDOR

Ranson has a defined Urban Growth Boundary (UGB), which is also shown on Figure 2. Like the corridor defined above, the northern portion of the UGB is roughly centered on Route 9 but is wider to the west and does not extend as far north. Ranson has annexed several areas in the past 10-15 years, including the Orchard, that are situated outside (north of) the UGB; though outside the UGB, the annexed areas lie within the Route 9 corridor and therefore, are a part of this study.

Existing and proposed development in the Route 9 corridor is of central importance in this study, since this study is considering pumping options for, and the provision of gravity service to, certain developed and undeveloped areas. Such development will also be important in the Project design (i.e., pump station sizing and pipe sizing).

Development projections for regions served by Charles Town's WWTP, including the Route 9 corridor, are addressed in the Charles Town Utility Board's (CTUB) "2015 Wastewater Strategic Plan & Ten Year Wastewater Capital Plan" (WWSP). The WWSP identifies 30 developments in the "northern region" alone (Ranson's UGB and beyond), and 42 developments in total across four service regions; this study uses the WWSP's projections as a basis for the analyses in Sections 4.0 and 5.0. The 2015 WWSP is the latest version of this triennial plan; it is expected CTUB will produce the next version in Spring 2018.

The pump station analysis in Section 4.0 considers the number of potential sewer users from applicable northern region WWSP developments, expressed as "equivalent dwelling units" (EDUs). EDU counts for the various pump station options are derived on the last page of Appendix 1 using raw EDU data from the WWSP, and are used in Section 4.0 to aid comparison of pump station location options. EDU counts are in some cases taken from another (non-WWSP) source and so credited, and in other cases are computed from scratch. The downstream analysis in Section 5.0 considers all 42 WWSP developments, and considers incremental (year-by-year) projections of average daily flows associated with these users. The full WWSP is available on CTUB's website, http://www.ctubwv.com.

3.1 Route 9 Eastern Corridor

The Route 9 eastern corridor is served by the JCPSD as far north as Route 9's Wiltshire Road exit, and includes numerous sewer-user classifications (i.e., commercial, government, industrial, public safety, residential, utility). Although this study limits the corridor's southern boundary as Potomac Towne Center, JCPSD's system also extends further east and south of the eastern corridor with some flows conveyed to Ranson's FSPS – these flows are further addressed in the downstream analysis in Section 5.0.

The eastern corridor's government flow component is generated by federal, state and county facilities/offices, and five schools. The public safety flow component is generated by state and county offices in Burr Business Park. The residential flow component is generated by residences along Charles Town Road, between Shenandoah Junction Road and Currie Road. These entities appear on Figure 2 above, but only the schools are labeled since they have pump stations associated with them.

The five schools are located along the Shenandoah Junction Road corridor and the Job Corps Road corridor. The Shenandoah Junction Road corridor has three schools (Jefferson High, Wildwood Middle, T.A. Lowery Elementary); the Job Corps Road corridor has two schools (Harpers Ferry Job Corps, Driswood Elementary). The Shenandoah Junction Road corridor also has two mobile-home

parks (Shasta and Witch Hazel), but they are not connected to JCPSD's force-main; instead they are connected to a private WWTP.

Several JCPSD pump stations work in tandem to move eastern-corridor flows toward, then southward along, Route 9, then further southward along North Mildred Street toward Old Town Ranson. Small clusters of gravity sewer exist, but most of the piping is force-main. Pump stations are as follows, listed as situated from north to south:

- PS #5-1, Burr Office Park
- PS #3-9, Jefferson High School / Wildwood Middle School
- PS #3-8, Harpers Ferry Job Corps
- PS #3-14, Driswood Elementary School
- PS #1-10, Jetts Farm
- PS #1-157, Parkview Mobile Home Park
- PS #1-11, Woodland Mobile Home Park
- PS #1-12, Lloyd's Flats

North of Harpers Ferry Job Corps, JCPSD proposes a pump station in the future Harvest Hills development. It is expected this station will pump westerly to the existing facilities at Jefferson High School and Wildwood Middle School.

Two other pump stations, #5-2 and #5-3 (Burr Business Park), contribute flow to the eastern corridor though situated in the western corridor. They are not listed above, and are not a part of this discussion, because options for intercepting their flows and keeping the flows in the western corridor are covered in Section 4.0.

All eastern-corridor flows are in a single force-main (Jetts Farm force-main) as of Currie Road, and from there proceed to Lloyd's Flats pump station (#1-12) on North Mildred Street. Details concerning flow routing south of Lloyd's Flats pump station are beyond the scope of this study, because Project facilities do not extend south of that location.

3.2 Route 9 Western Corridor

The Route 9 western corridor as defined by this study consists of properties within Ranson located west of Route 9 down to the southern corridor limit of Potomac Towne Center. In a sense, the western corridor also includes ROXUL and the balance of the Orchard because the intent is to sewer them into the western corridor. Among the 30 "northern region" developments/properties identified in the WWSP, Section 4.0 of this study is mainly concerned with those situated in the western Route 9 corridor as follows:

- The Orchard (not situated in the western corridor, but will be sewered into the western corridor
- North Ranson Development (not listed in WWSP)

- Tackley Mill
- Blackford Village (not listed in WWSP)
- Burr Business Park
- Locust Knoll
- Clay Hill Farm
- Board of Education (BOE) site (identified as “Lloyd Property” in WWSP)
- Bridgefort property (not listed in WWSP)

There are two existing developments in the Route 9 western corridor that are of no significant interest to this study: (1) Shiloh subdivision, consisting of single-family houses on large lots, and (2) Rockwell Mini-Storage, a “self-storage” commercial facility. The subdivision and storage facility use private, on-site wastewater disposal methods; therefore, these sites do not enter into this study’s consideration of public-sewer options nor into its consideration of downstream sewer impact. Rockwell Mini-Storage reportedly has expansion or conversion-of-use interest, but its territory is limited; if public sewer service is ultimately required, it is expected that flow would be pumped to the nearest public sewer.

4.0 PUMP STATION LOCATION OPTIONS

There are six basic options for locating pump stations along the route of the ROXUL pipeline - four options involving one public pump station (Options #1-#4), and two options involving multiple public pump stations (Options #5 and #6). Collectively, Options #1-#6 consider the Orchard and the Route 9 western corridor for pump station locations.

All six options presume the following:

- A private pump station located on ROXUL property;
- A force-main, and perhaps some gravity sewer, routed southward from ROXUL/Orchard to the Locust Knoll area;
- Force-main ending at or just south of Currie Road;
- Gravity sewer beginning at or just south of Currie Road, and routed southward along or adjacent to North Mildred Street then eastward to “The Boulevard at Potomac Towne Center” commercial development (a force-main along this routing is not being considered because it would be oriented “downhill” and drain like a gravity sewer at pump shutoff but would preclude gravity tie-in; the gravity sewer, in contrast, provides gravity service to vacant acreage on the Clay Hill Farm site, the BOE site, and the Bridgefort site); and
- Project piping having a total length of about 30,000 linear feet (about 75% force-main and about 25% gravity sewer), and having a capacity based on ultimate (build-out) peak flow.

Characteristics associated with each Project option have been developed for comparison purposes as part of this study. These characteristics include project cost opinions (construction, property acquisition and soft costs), potential EDUs served by gravity, and associated pros and cons.

After the discussion of each option is a comparison matrix (Table 4.0) showing these characteristics. The matrix also shows the ratio of potential EDUs served by gravity per million dollars of total cost to simplify option comparison; a higher ratio is indicative of more potential EDUs served by the Project per dollar spent.

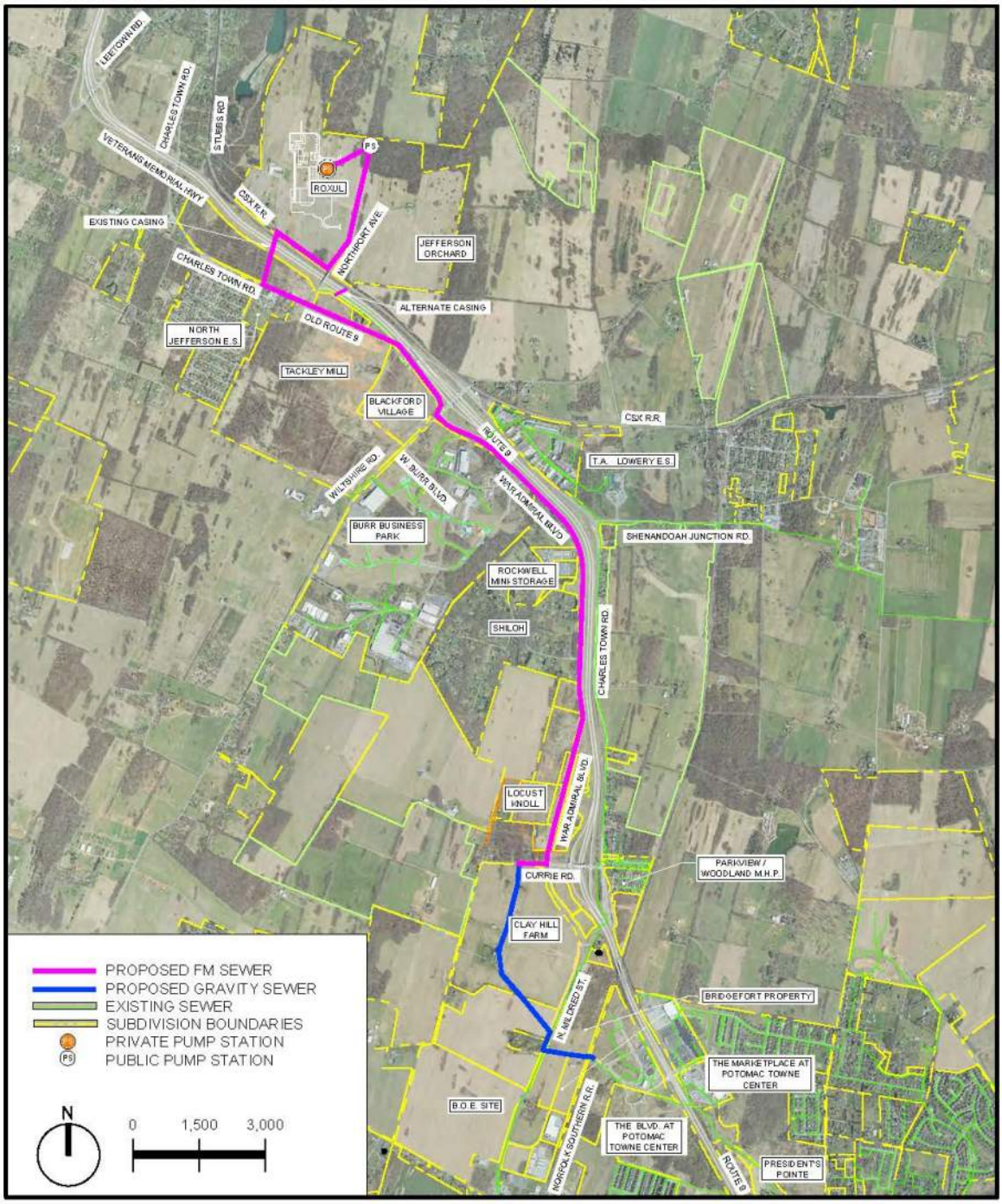
Options #1-#6 are summarized as follows:

- Option #1: One public pump station, located immediately adjacent to ROXUL property and designed for ROXUL use only (i.e., having no provision for any other future users).
- Option #2: One public pump station, located in Orchard East and designed to accommodate ROXUL and other users within the Orchard.
- Option #3: One public pump station, located at Burr Business Park adjacent to War Admiral Boulevard.
- Option #4: One public pump station, located at the proposed Locust Knoll development.
- Option #5: Two public pump stations – one located per Option #2 in Orchard East, and one located per Option #3 at Burr Business Park.
- Option #6: Three public pump stations – one located per Option #2 in Orchard East, one located per Option #3 at Burr Business Park, and one located per Option #4 at Locust Knoll.

4.1 Option #1

Option #1 proposes one public pump station, located immediately adjacent to ROXUL property and the Northport Avenue extension, and designed for ROXUL use only. This station would have no capacity for any future non-ROXUL development (refer to Figure 3 on the following page). Pros and cons are as follows:

Pros	Cons
• Is consistent with original concept of locating a public pump station "local" to ROXUL, which relieves ROXUL from having to build a robust pump station.	• Is short-sighted with respect to the Orchard and points north, because it does not provide gravity service to vacant acreage in Orchard East nor capacity for vacant acreage north of ROXUL and the Orchard. • Is short-sighted with respect to the western Route 9 corridor, because it does not provide gravity service to vacant acreage north of Currie Road. Future connection to this sewer force-main will necessitate individual pump stations for each development. • Increases the likelihood of septicity problems, because it likely will cause ROXUL's wastewater to have a longer residence time in the downstream sewer force main. • Offers a lower "EDU/$M" ratio (108) than all other options, because it serves relatively few (less than 1,000) non-ROXUL EDUs.



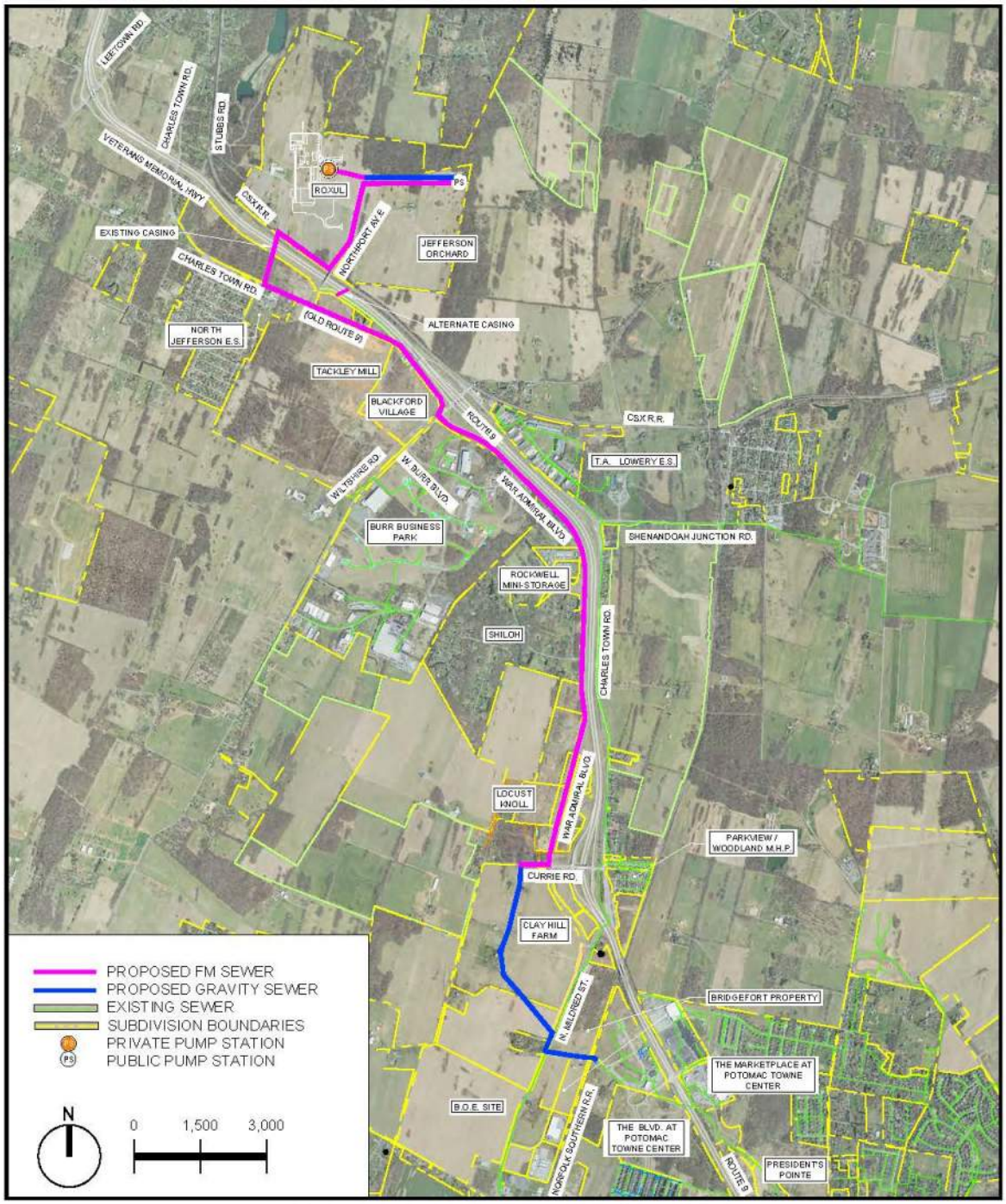
ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 3
PUMP STATION OPTION 1

4.2 Option #2

Option #2 proposes one public pump station, located in Orchard East and designed to accommodate ROXUL and other users (refer to Figure 4 on the following page). Pros and cons are as follows:

Pros	Cons
• Is consistent with original concept of locating a public pump station "local" to ROXUL, which relieves ROXUL from having to build a robust pump station. • Provides gravity service to vacant acreage in Orchard East allowing some development with limited infrastructure installation.	• Is short-sighted, because it does not provide gravity service to vacant acreage in the western Route 9 corridor. Future connection to this sewer force-main will necessitate individual pump stations for each development. • Increases the likelihood of septicity problems, because it likely will cause ROXUL's wastewater to have a longer residence time in the downstream sewer force-main. • Locates pump station in a relatively remote location. The station will be more expensive to build, operate and maintain, will require installation and maintenance of an access road, and will be more vulnerable to vandalism. • Offers a lower "EDU/$M" ratio (153) than most other options, because it doesn't readily serve EDUs in the western corridor.



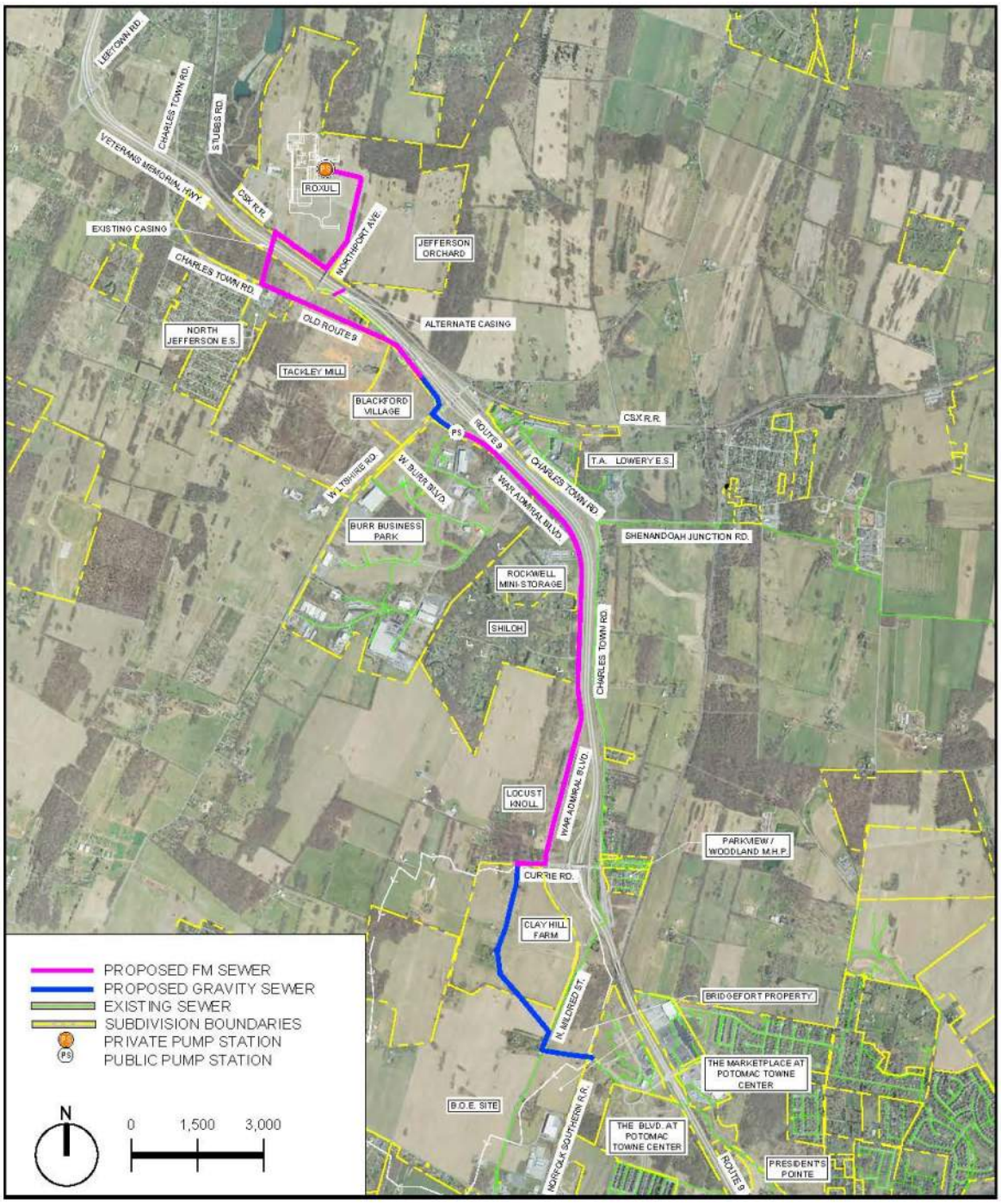
ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 4
PUMP STATION OPTION 2

4.3 Option #3

Option #3 proposes one public pump station, located at Burr Business Park adjacent to War Admiral Boulevard (refer to Figure 5 on the following page). Pros and cons are as follows:

Pros	Cons
• Better serves the western Route 9 corridor, because it provides gravity service to vacant acreage in Burr Business Park and potentially Tackley Mill and Blackford Village. • Returns some capacity to Old Town Ranson and the eastern Route 9 corridor, because it intercepts existing flow generated by Burr Business Park tenants west of Route 9. • Decreases the likelihood of septicity problems, because it helps ROXUL's wastewater to have a shorter residence time in the western Route 9 corridor by allowing connection of other users when the system is operational. • Offers a better "EDU/$M" ratio (289) than Options #1, #2 and #4, and serves over 2,600 EDUs in addition to ROXUL.	• Is not consistent with original concept of locating a public pump station "local" to ROXUL, and therefore requires ROXUL's private pump station to be more robust, i.e., more costly to build and operate due to larger motors (approximately twice as much horsepower) compared to Options #1 and #2. • Does not provide gravity service to vacant acreage in Orchard East. • Involves existing and future JCPSD customers rather than just Ranson customers, so an agreement is likely necessary to establish fees, shared costs and future considerations. It may be necessary for the State Public Service Commission to "sign-off" on this change to the customer base of JCPSD.



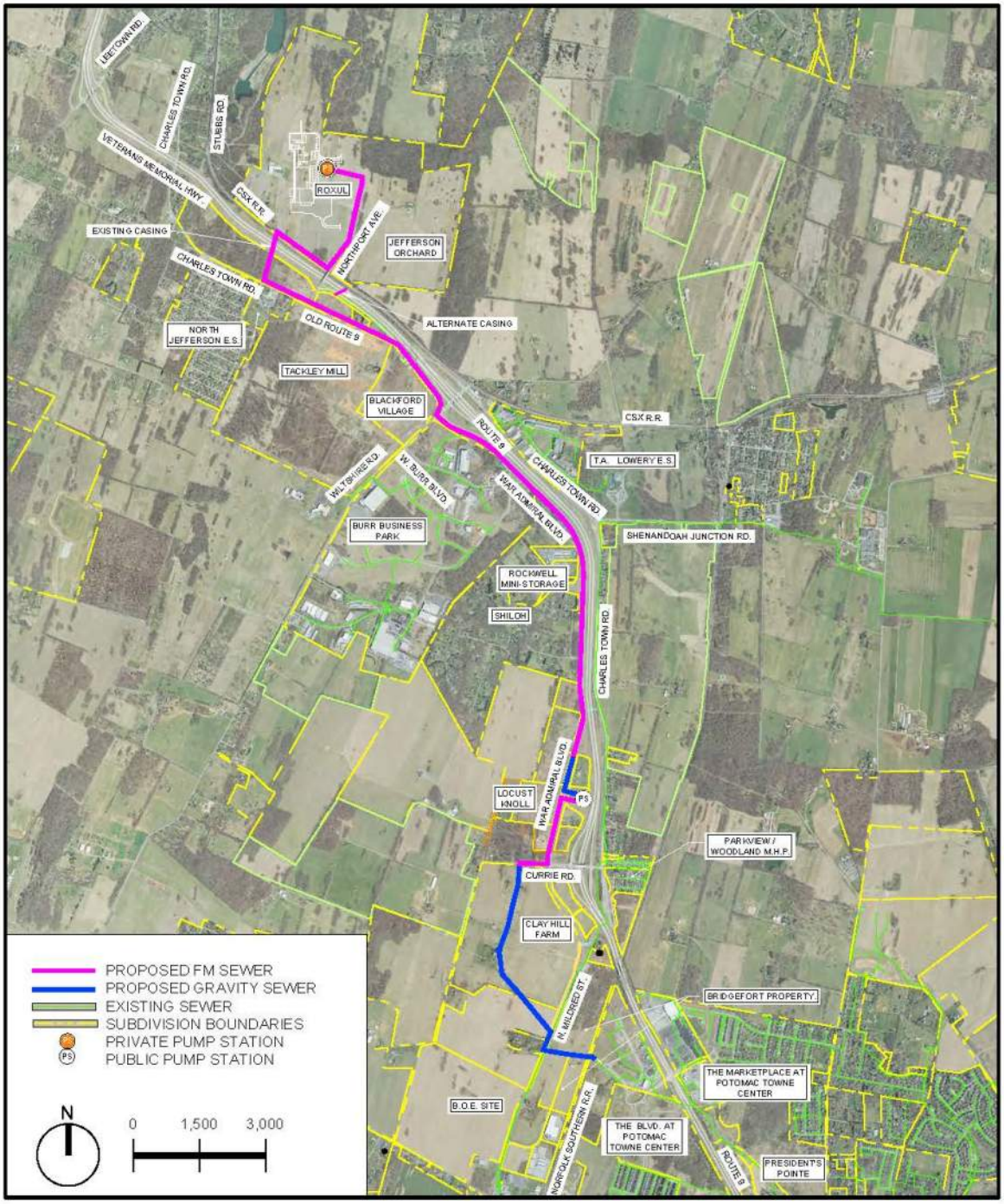
ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 5
PUMP STATION OPTION 3

4.4 Option #4

Option #4 proposes one public pump station, located at the proposed Locust Knoll development (refer to Figure 6 on the following page). Pros and cons are as follows:

Pros	Cons
• Provides gravity service to some vacant acreage west of Route 9 (i.e., Locust Knoll and the additional adjacent vacant acreage to the west).	• Is not consistent with original concept of locating a public pump station "local" to ROXUL, and therefore requires ROXUL's private pump station to be more robust, i.e., more costly to build and operate due to larger motors (approximately four times as much horsepower) compared to Options #1 and #2). • Does not provide gravity service to any vacant acreage north of Locust Knoll (i.e., Orchard East, Tackley Mill, Blackford Village, and portions of Burr Business Park). Thus, future connection to the Project force-main will necessitate individual pump stations for each development. • Increases the likelihood of septicity problems, because it likely will cause ROXUL's wastewater to have a longer residence time in the downstream sewer force-main. • Offers a lower "EDU/$M" ratio (195) than Options #3, #5 and #6.



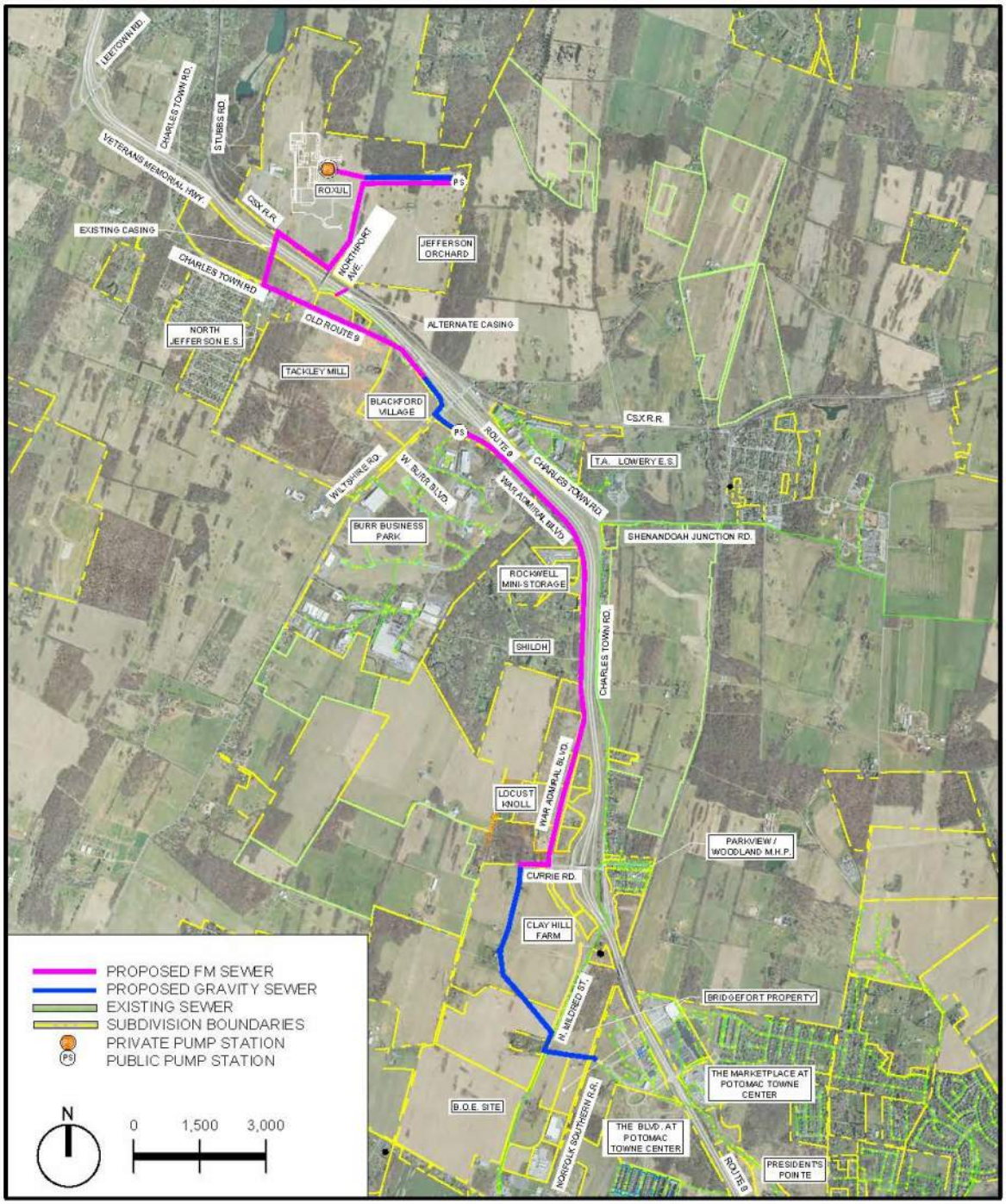
ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 6
PUMP STATION OPTION 4

4.5 Option #5

Option #5 proposes two public pump stations – one located per Option #2 in Orchard East, and one located per Option #3 at Burr Business Park (refer to Figure 7 on the following page). Pros and cons are as follows:

Pros	Cons
• Is consistent with original concept of locating a public pump station "local" to ROXUL, which relieves ROXUL from having to build a robust pump station. • Provides gravity service to vacant acreage in Orchard East. • Better serves the western Route 9 corridor, because it provides gravity service to vacant acreage in Burr Business Park and potentially Tackley Mill and Blackford Village. • Returns some capacity to Old Town Ranson and the eastern Route 9 corridor, because it intercepts existing flow generated by Burr Business Park tenants west of Route 9. • Decreases the likelihood of septicity problems, because it helps ROXUL's wastewater to have a shorter residence time in the western Route 9 corridor by allowing for day-1 connection of other users besides ROXUL. • Offers a better "EDU/$M" ratio (287) than most options involving one pump station, and serves over 3,000 EDUs in addition to ROXUL.	• Increases construction duration due to two pump stations, which may negatively impact the Project's deadline (Ranson could miss the ROXUL June 2019 operational start). • Is costlier to build, operate and maintain compared to options involving one pump station, since there are two pump stations. • Is about 14% higher in cost than the Project's $9M+ funding request. • Involves existing and future JCPSD customers rather than just Ranson customers, so an agreement is likely necessary to establish fees, shared costs and future considerations. It may be necessary for the State Public Service Commission to "sign-off" on this change to the customer base of JCPSD.



ROUTE 9 INFRASTRUCTURE PROJECT
FIGURE 7
PUMP STATION OPTION 5

4.6 Option #6

Option #6 proposes three public pump stations - one located per Option #2 in Orchard East, one located per Option #3 at Burr Business Park, and one located per Option #4 at Locust Knoll (refer to Figure 8 on the following page). Pros and cons are as follows:

Pros	Cons
• Is consistent with original concept of locating a public pump station "local" to ROXUL, which relieves ROXUL from having to build a robust pump station. • Provides gravity service to vacant acreage in Orchard East. • Better serves the western Route 9 corridor than all other options, because it provides gravity service to essentially all vacant acreage north of Currie Road (i.e., Burr Business Park, Tackley Mill, Blackford Village, Locust Knoll, etc.). • Returns some capacity to Old Town Ranson and the eastern Route 9 corridor, because it intercepts existing flow generated by Burr Business Park tenants west of Route 9. • Decreases the likelihood of septicity problems, because it helps ROXUL's wastewater to have a shorter residence time in the western Route 9 corridor by allowing for day-1 connection of other users besides ROXUL. • Offers a better "EDU/$M" ratio (325) than all other options as it serves about 4,000 EDUs in addition to ROXUL, and about 800 more EDUs than Option #5.	• Increases construction duration due to three pump stations, which may negatively impact the Project's deadline. • Is costlier to build, operate and maintain than all other options, since there are three pump stations. • Is about 27% higher in cost than the Project's $9M+ funding request. • Involves existing and future JCPSD customers rather than just Ranson customers, so an agreement is likely necessary to establish fees, shared costs and future considerations. It may be necessary for the State Public Service Commission to "sign-off" on this change to the customer base of JCPSD.

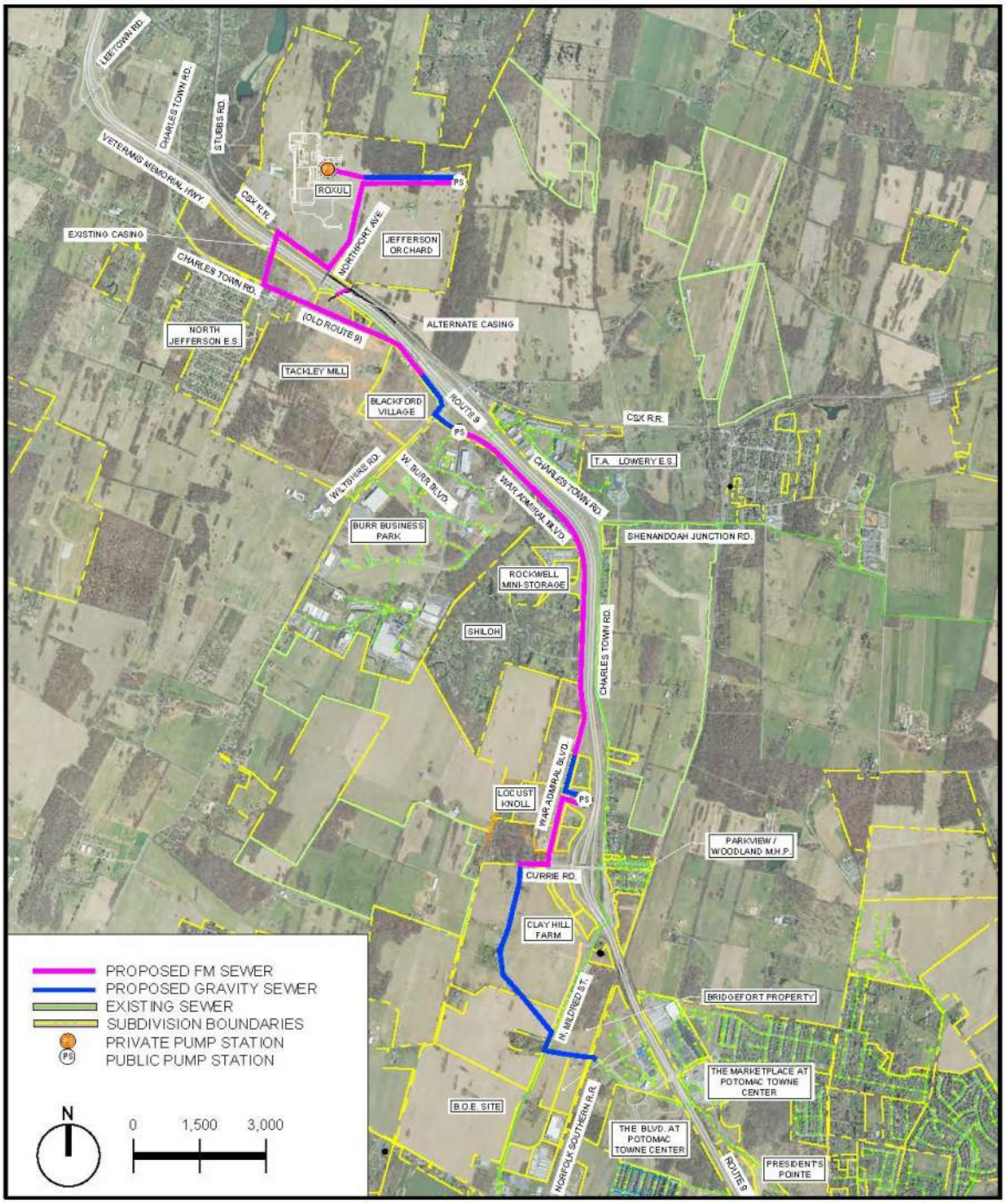


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FIGURE 8
PUMP STATION OPTION 6

A comparison matrix (Table 4.0) is presented on the following page showing characteristics associated with each Project option, including cost opinions, potential EDUs served by gravity, and pros and cons. The matrix also shows the ratio of potential EDUs served by gravity per million dollars of total cost to simplify option comparison; a higher ratio is indicative of more potential EDUs served by the Project per dollar spent.

Appendix 1 contains derivations for the cost opinions and EDU counts shown in the matrix. The cost opinion for Option #2 is generally consistent with that submitted with the Project funding application; the other five cost opinions are variations on the cost of Option #2. Moreover, all cost opinions should be considered "planning level" cost opinions, since they have been developed in advance of detailed design. It is expected that competitive bidding will yield lower construction costs than the construction-cost opinions.

4.7 Pump Station Location Conclusions/Recommendations

Sections 4.1-4.6 consider six pump station location options for the Project. Despite their distinctions, the options have commonalities consistent with the Project's goals to serve the new ROXUL manufacturing facility for an operational start of June 2019, and to serve other properties within the Route 9 corridor.

Using the EDU/Project Cost ratios from the matrix as a basis, ranking of the options is as follows:

- Option #6 ratio: 325
- Option #3 ratio: 289
- Option #5 ratio: 287
- Option #4 ratio: 195
- Option #2 ratio: 153
- Option #1 ratio: 108

The ranking shows that Options #3, #5 and #6 have much higher EDU/Project Cost ratios than Options #1, #2 and #4, indicating greater "bang-for-the-buck" with respect to serving non-ROXUL properties in the Route 9 corridor. The ratios of Options #1, #2 and #4 "fall short" because these options fail to provide gravity service as follows:

- Option #4: With its sole pump station at Locust Knoll, Option #4 fails to provide gravity service to any areas north of Locust Knoll.
- Option #2: With its sole pump station in Orchard East, Option #2 fails to provide gravity service to any areas in Route 9's western corridor.
- Option #1: With its sole pump station in Orchard East, Option #1 fails to provide gravity service to any areas in Route 9's western corridor. Further, with its pump station positioned at a relatively high elevation near Northport Avenue, Option #1 fails to provide gravity service to Orchard East.

Table 4.0

Comparison Matrix - Pump Station Location Options

		Cost Opinions							
	Option Summary	Const. ($M)	Property ($M)	Soft ($M)	Total ($M)	EDU	Ratio (EDU/$M)	Pros	Cons
Option #1	One public PS (located adjacent to ROXUL, for ROXUL use only)	$ 6.908	$ 0.179	$ 1.961	$ 9.048	981	108	Is consistent w/ orig. concept of local PS.	Does not provide grav. svc. to Orchard East. Does not provide grav. svc. to W corridor. Increases likelihood of septicity problems. Offers lowest ratio of all options.
Option #2	One public PS (located in Orchard East, for ROXUL and other users)	$ 7.710	$ 0.196	$ 2.092	$ 9.998	1,534	153	Is consistent w/ orig. concept of local PS. Provides grav. svc. to Orchard East.	Does not provide grav. svc. to W corridor. Increases likelihood of septicity problems. Locates PS in remote location. Offers lower ratio than most other options.
Option #3	One public PS (located at Burr Business Park, near War Admiral Blvd.)	$ 6.962	$ 0.176	$ 1.970	$ 9.108	2,635	289	Better serves W corridor. Returns capacity to OTR & E corridor. Decreases likelihood of septicity problems. Offers higher ratio than Opt. #1, #2 & #4.	Requires ROXUL PS to be more robust. Does not provide grav. svc. to Orchard East. Impacts JCPSD customer base.
Option #4	One public PS (located at Locust Knoll)	$ 7.013	$ 0.179	$ 1.978	$ 9.170	1,790	195	Provides grav. svc. to Locust Knoll, etc.	Requires ROXUL PS to be more robust. Does not provide grav. svc. N of Locust Knoll. Increases likelihood of septicity problems. Offers lower ratio than 3 other options.
Option #5	Two public PSs (one per Opt. #2, one per Opt. #3)	$ 8.651	$ 0.223	$ 2.244	$11.118	3,188	287	Is consistent w/ orig. concept of local PS. Provides grav. svc. to Orchard East. Better serves W corridor. Returns capacity to OTR & E corridor. Decreases likelihood of septicity problems. Offers higher ratio than most one-PS options.	Increases construction duration. Is costlier than one-PS options (initial and O&M). Is 14% higher cost than funding request. Impacts JCPSD customer base.
Option #6	Three public PSs (one per Opt. #2, one per Opt. #3, one per Opt. #4)	$ 9.657	$ 0.252	$ 2.408	$12.317	3,997	325	Is consistent w/ orig. concept of local PS. Provides grav. svc. to Orchard East. Better serves W corridor than other options. Returns capacity to OTR & E corridor. Decreases likelihood of septicity problems. Offers higher ratio than all other options.	Increases construction duration. Is most costly of all options (initial and O&M). Is 27% higher cost than funding request. Impacts JCPSD customer base.

Among the top three options, it is concluded that either Option #3 or #5 would be a more appropriate choice than Option #6. Options #3 and #5 both meet the goals to serve ROXUL and provide gravity service to under- or un-developed properties in Ranson, and they do so at lower cost than Option #6. Option #6 serves many more EDUs by gravity than any other option, and has the highest ratio of all options, but is considerably costlier. Option #6 entails over 25% more initial cost than the funding request, plus more long-term cost associated with operation/maintenance of three pump stations. Option #3's cost is generally consistent with the funding request, and Option #5's cost is about 14% more than the funding request.

Options #3 and #5 both include a public pump station located at Burr Business Park on the west side of Route 9, which serves ROXUL and also does the following:

- Serves over 1,600 non-ROXUL EDUs by gravity (Burr, Blackford Village and Tackley Mill).
- Removes the flow equivalent of about 150 EDUs from Old Town Ranson and the eastern Route 9 corridor.
- Decreases likelihood of septicity issues in the Project pipeline.

Option #5 provides a near-identical EDU/Project Cost ratio to that of Option #3, but is costlier primarily due to its distinguishing feature – a public pump station and associated piping located in Orchard East which will only serve ROXUL until another user(s) occupies Orchard East. But the Orchard East pump station minimizes ROXUL's pumping requirements, and could be regarded as an enticement to potential users of Orchard East. Option #3 increases ROXUL's pumping requirements and, although it opens Burr Business Park to further development, does nothing to enhance the future of the Orchard as a large industrial park in Jefferson County.

Overall, it is concluded that Options #3 and #5 both meet the Project goals. But Option #5, despite higher cost to build and operate, may satisfy more stakeholders and may attract other industrial clients to Jefferson County. It is recommended that Ranson consider pros and cons of both Options #3 and #5 to judge which option is actually the more cost-effective Project.

4.8 Eastern Corridor Potential Improvements

Pump Station Options #3, #5 and #6 discussed above offer benefits to Old Town Ranson and the eastern corridor, by removing flows at Burr Business Park. Other potential improvements in the eastern corridor are addressed in this subsection.

Flows that originate in, or are conveyed into, Route 9's eastern corridor currently go through Old Town Ranson, which is an area of limited remaining capacity. Prior to preparation of this study, JCPSD was proposing a $7M project that, if constructed, would among other things intercept eastern-corridor flows and redirect them easterly such that those flows are removed from Old Town. But if JCPSD's $7M project does not move forward (the latest indication is that it will not), the Project could be configured to improve handling of flows traveling through Route 9's eastern corridor.

The easiest way for the Project to further serve the Route 9 eastern corridor is to intercept all flows at Lloyd's Flats pump station, although this interception diverts a lot of flow to FSPS. Intercepting

at Lloyd's Flats pump station does allow elimination of that station, and does remove all eastern-corridor flows from Old Town Ranson. However, the analysis in Section 5.2.2 below indicates that full interception at Lloyd's Flats consumes much of the remaining pumping capacity at FSPS under 2019 or "Day 1" conditions. Thus, if full removal of eastern-corridor flow from Old Town Ranson is desired, an FSPS upgrade will be necessary years sooner than would otherwise be the case.

There are other potential improvements to serve the Route 9 eastern corridor (disregarding JCPSD's project) that may be merited, but they involve re-engineering the eastern system to some degree. This study was not intended to review JCPSD's system in detail, so only one additional project is discussed herein.

One potential project involves redirecting Pump Station #5-1's discharge westerly across (under) Route 9 to a new pump station at Burr Business Park if Option #3, #5 or #6 is implemented with the Project. This redirection could be included in a follow-up project performed sometime after ROXUL starts operation. JCPSD would need to decide to explore this project as it only impacts their facilities and not Ranson facilities. Pros and cons of this potential project are as follows:

Pros	Cons
• May free-up capacity in the eastern corridor to accommodate Shasta/Witch Hazel flows, allowing elimination of their private WWTP. • May free-up capacity in the eastern corridor to accommodate initial customers in the future Harvest Hills development. • Would further reduce detention times in western-corridor piping, since all flow from Burr Business Park would flow into the new pump station.	• Involves designing and constructing a new force-main for Pump Station #5-1 to direct flow westward under Route 9. • Could involve removal of the existing gravity sewer (that now carries flow eastward) under Route 9 toward Pump Station #5-1. • May not remove sufficient flow from the eastern corridor to justify the design and construction expense. • May also entail the greater expense of rehabilitating Pump Station #5-1, because the station is reportedly about 30 years old and in need of rehabilitation. • Could negatively affect hydraulic conditions (i.e., change the system curve) at Pump Station #5-1, causing the existing pumps to operate at a lower efficiency. • Would necessitate analysis of Pump Station #5-1's current downstream force-main system.

5.0 DOWNSTREAM CAPACITY ANALYSIS

Analyzing downstream sewer capacity is required to verify that capacity is available at least in the short-term for ROXUL, and perhaps other corridor development, in the existing downstream system that is comprised of Ranson and Charles Town facilities. This analysis is basic in nature and is not based on computer modeling of the downstream system. The downstream analysis assumes that Option #3 or #5 is implemented for the Project.

The downstream analysis considers all 42 WWSP developments, and considers incremental (year-by-year) projections of average daily flows associated with these developments in terms of gallons per day (GPD) as shown in the WWSP. Due to the lower development activity over the last number of years, most development projections herein "shift" the WWSP's 2016 EDUs/Flows to 2018. The "shift" results in a conservative analysis because some of the EDUs/Flows shifted from 2016 to 2018 may already be accounted for in the 2017 Flows shown in this downstream analysis' spreadsheets in Appendix 2. Therefore, if some of the development has already taken place, future-year flows will be less than shown resulting in less flow in the downstream elements. Other developments were "shifted" further into out-years to account for their current approval status and anticipated development activity based on input from Ranson and other stakeholders. Hopefully, this shift is somewhat reflective of their actual commencement.

The WWSP presents two different versions of incremental future flows: the first version represents incremental projected flows for each development generated by the applicable developer; the second version represents discounted developer flows generated by CTUB based on recent data for new EDUs per year within CTUB's service regions. This analysis estimates peak flows using the WWSP's discounted average daily flow values as a basis. The WWSP Tables showing the Development Projections and the Flow Projections (discounted average daily flow values) are included as Appendix 3.

5.1 Long-Term Downstream Solution

The Project's routing of ROXUL flow and other corridor flow to The Boulevard at Potomac Towne Center and Flowing Springs Pump Station may be allowed to continue for a number of years after 2019 without any changes to FSPS or other downstream facilities, as Sections 5.2 and 5.3 show. FSPS was originally planned to serve specific developments, but now serves a combination of planned and unplanned developments. This will continue with the connection of Route 9 corridor flows, which will initially include the ROXUL facility as a major contributor. Upgradability of FSPS was accounted for in the original design, but that upgrade is currently not necessary. It is important that the pace of development be closely tracked with the FSPS flows so that adequate time is available for review of Ranson and JCPSD facilities, their needed upgrades, and their long-term improvements, and for design and construction of whatever improvements are needed to serve the Route 9 corridor.

One possible long-term solution would be a "Master Route 9 Pump Station" in the area where the Lloyd's Flats pump station is currently situated. Timing of this future project will depend on how quickly demand grows for capacity at FSPS, due to new EDUs coming on-line within and outside the Route 9 (eastern and western) corridor, and the decision of if, and when, to upgrade FSPS. Estimating what time-frame the system in its current configuration can adequately serve the corridor is discussed below.

It is expected the Master Route 9 Pump Station's discharge would be routed southerly around Ranson's Orchard Hills subdivision, to the Ranson/Charles Town Evitts Run interceptor. With this routing, the Route 9 corridor flows will be permanently removed from The Boulevard at Potomac Towne Center and FSPS. If this solution is implemented, the Master Route 9 Pump Station will "give back" capacity to FSPS, so FSPS can serve the area originally intended. It will also "give back" capacity to gravity sewers between The Boulevard at Potomac Towne Center and FSPS so those adjacent developments can fully develop.

5.2 Downstream Capacity vs. ROXUL Phase 1 Flow

As of December 2017, ROXUL's expectation is that its facility will generate an average daily flow (ADF) of about 40,000 gallons per day (GPD) for several years beginning in 2019, and about 80,000 GPD total after Phase 2 expansion is fully operational in 2025. Earlier ROXUL estimates indicated about 100,000 GPD total after Phase 2 expansion so, to be conservative, this analysis assumes 80,000 GPD total as of 2025 and 100,000 GPD total as of 2027. Existing facilities downstream must at least accommodate ROXUL's Phase 1 ADF times a peak factor for their facility to be operational, unless downstream upgrades are constructed.

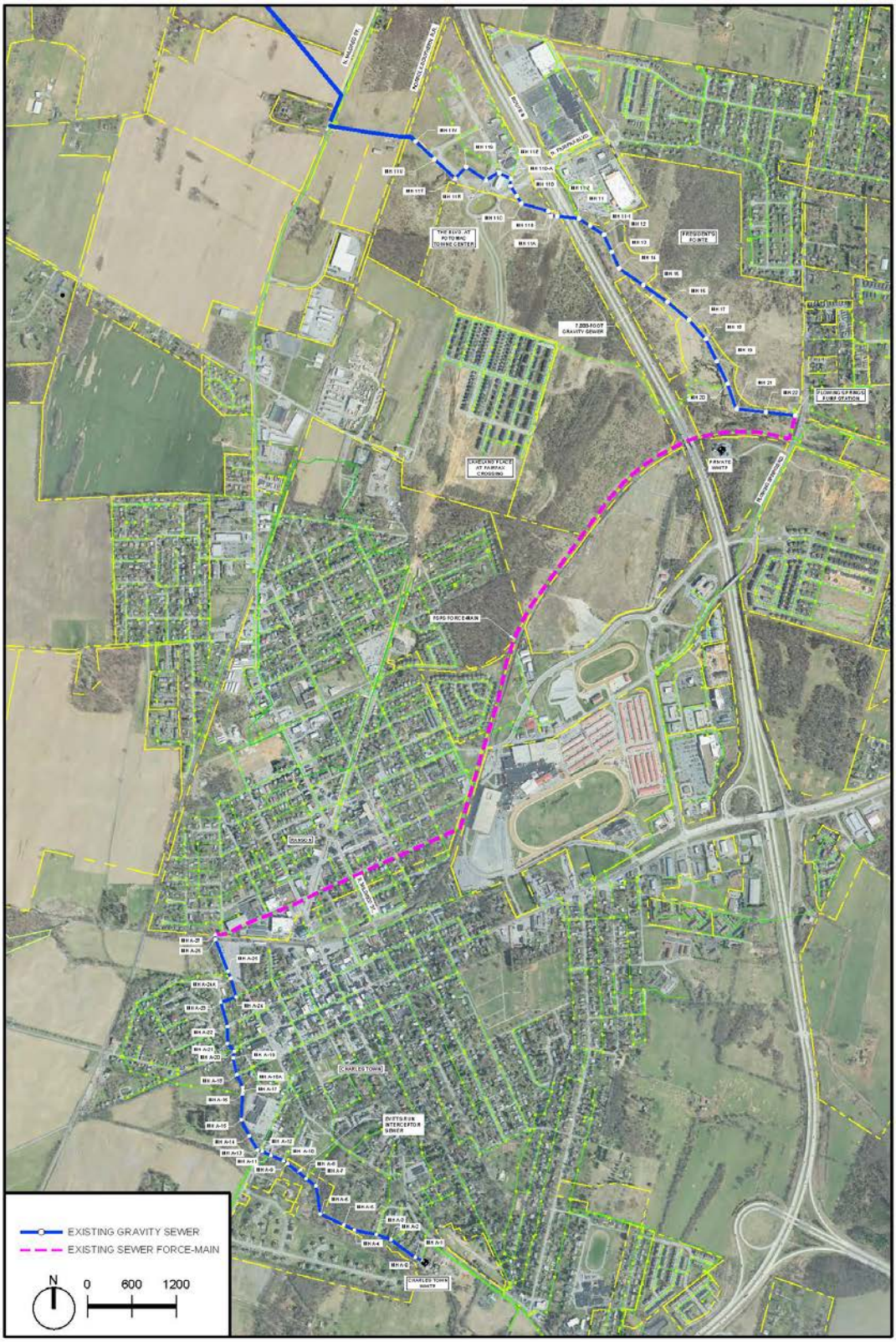
Peak flow is estimated herein as 2.5 times ADF, although ROXUL expects that its flow will be essentially steady around-the-clock and will not have pronounced diurnal peaks like residential flow. ROXUL expects a peak factor of about 2.0, and expects peak flows to occur no more than five times per month during Phase 1 and 10 times per month after expansion. Because ROXUL flow will be delivered to the downstream system via constant-speed pumps that cycle on and off throughout the day, ROXUL flow in the downstream system will be intermittent.

It is expected that much of ROXUL's wastewater will consist of discharge from its purification process that is applied to the incoming potable water. Thus, much of the discharge is expected to contain the same constituents as the incoming potable water, except in stronger concentrations. This study, however, is not concerned with the constituents of ROXUL's wastewater – it is only concerned with the volume of ROXUL's flow and the volumetric capacity of facilities downstream including Charles Town's WWTP.

The downstream system is comprised of the following five elements, beginning at the Project's tie-in location on Baker Boulevard within The Boulevard at Potomac Towne Center commercial development (refer to Figure 9 on the following page):

- Ranson gravity sewer (about 7,000 linear feet)
- Ranson FSPS
- Ranson FSPS force-main (about 11,600 linear feet)
- Ranson/Charles Town Evitts Run interceptor sewer (about 6,100 linear feet)
- Charles Town WWTP

Each downstream element is discussed individually in this section (5.2) with respect to gross capacity versus capacity expected to be consumed as of 2019 after addition of ROXUL Phase 1 peak flow (and other new-development peak flow) to current peak flow.



ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 9
EXISTING DOWNSTREAM SYSTEM

Projected flows shown in this section are derived in four spreadsheets which appear as the first four pages of Appendix 2, using the WWSP's discounted average daily flow values as a basis. The annual EDUs added to the Ranson Gravity Sewer are also shown on the first spreadsheet to show the projected growth anticipated from all Route 9 corridor properties, including ROXUL. The next three spreadsheets show annual EDUs associated with other area growth contributing to the other downstream elements. Gravity sewer capacities shown in this section are derived in a spreadsheet which appears as the fifth and last page of Appendix 2. The WWSP's projected average daily flow values (developer-generated values and CTUB-discounted values) appear in Appendix 3.

5.2.1 Ranson Gravity Sewer

The gravity sewer that extends from the Project's tie-in location to the FSPS is a Ranson sewer that consists of about 7,000 linear feet of 10-inch, 12-inch and 15-inch diameter piping. All this piping was constructed and put into service just over 10 years ago (i.e., in about 2005).

Each section of this piping is discussed by size as follows. After this discussion, Table 5.2A summarizes peak flow versus capacity for each section for projected 2019 conditions.

- The 10-inch sewer will carry Route 9 corridor flow (ROXUL, Burr, etc.), from the tie-in manhole (MH 11V) on Baker Boulevard, within The Boulevard at Potomac Towne Center development, to about the west right-of-way line of Route 9 (MH 11A). It will also carry flow from two feeder sewers, both from The Boulevard at Potomac Towne Center. It consists of 10 segments of 10-inch sewer, totaling about 2,400 linear feet in length. This sewer's capacity was evaluated using design information shown on utility drawings for The Boulevard at Potomac Towne Center since as-built drawings are not available. It is noted that three segments (MH 11D to MH 11A) are shown on the design drawings as 8-inch sewer to be upsized to 10-inch sewer, and this change in size to 10-inch was confirmed by Ranson staff during recent CCTV effort in September 2017.
- The 12-inch sewer will carry the 10-inch sewer's flow from about the west right-of-way line of Route 9 (MH 11A) to about the east right-of-way line of Route 9 (MH 11). It consists of two segments of 12-inch sewer, totaling about 400 linear feet in length. This sewer's capacity was evaluated using as-built information shown in Ranson's GIS database.
- The 15-inch sewer will carry the 12-inch sewer's flow from about the east right-of-way line of Route 9 (MH 11), through Flowing Springs Park, to the FSPS. It will also carry flow from two feeder sewers - one from The Marketplace at Potomac Towne Center, and one from Lakeland Place at Fairfax Crossing. It consists of 13 segments of 15-inch sewer, totaling about 4,200 linear feet in length. This sewer's capacity was evaluated using as-built information shown in Ranson's GIS database.

Refer to Figure 10 on the following page.



ROUTE 9 INFRASTRUCTURE PROJECT
FIGURE 10
RANSON 7,000-FOOT GRAVITY SEWER

Table 5.2A							
2019 - Day 1 Peak Flow in Ranson 7,000' Gravity Sewer							
A	B	C	D	E	F	G	H
total length (ft.)	section length (ft.)	pipe dia.	peak flow f/ Rt. 9 corridor (GPM)	peak flow f/ feeders (GPM)	total peak flow (GPM)	gross capacity (GPM)	% full during peak
7,000	2,400	10"	116	34	150	442	34%
	400	12"	116	34	150	1,357	11%
	4,200	15"	116	160	276	1,036	27%

Table 5.2A shows the following:

- The 10-inch section of sewer has a minimum or limiting capacity of about 442 GPM. This capacity is that of about 10% of the footage, which is at 0.27% grade; the other 90% of the footage is at steeper grade. This capacity is adequate to carry the combination of peak flow from the Route 9 corridor (ROXUL, Burr, etc.), and peak flow from the two feeders to the 10-inch sewer (150 GPM total peak); the flattest segment of 10-inch sewer will be about 34% full during 2019 peak flow conditions.
- The 12-inch section of sewer has a minimum or limiting capacity of about 1,357 GPM. This capacity is that of the flatter of the two segments (75% of the footage), which is still well above minimum grade (0.96% vs. 0.22%); the other 25% of the footage is at steeper grade. This capacity is plenty adequate to carry the peak flow coming from the 10-inch piping described above (150 GPM); the flatter segment of 12-inch sewer will be about 11% full during 2019 peak flow conditions.
- The 15-inch section of sewer has a minimum or limiting capacity of about 1,036 GPM. This capacity is that of the flattest segment (5% of the footage), which is just above minimum grade (0.17% vs. 0.15%); the other 95% of the footage is at steeper grade. This capacity is adequate to carry the combination of peak flow from the 12-inch piping described above, and peak flow from the two feeders to the 15-inch sewer (276 GPM total peak); the flattest segment of 15-inch sewer will be about 27% full during 2019 peak flow conditions.

5.2.2 Ranson Flowing Springs Pump Station

The facility that receives flow from the 7,000-foot gravity sewer is a Ranson-owned pump station known as the Flowing Springs Pump Station, located on Flowing Springs Road just north of Flowing Springs Run. FSPS receives flow from the west from the 15-inch gravity sewer described above. It also receives flow from the east from an 8-inch force-main that originates at the Breckenridge Pump Station, and from the south from an 8-inch gravity sewer serving Shenandoah Springs subdivision. FSPS was constructed and put into service just over 10 years ago (i.e., in about 2005).

FSPS serves an area that includes the following developments. These developments are at least partially built-out unless otherwise noted.

- Aspen Greens
- Beallair
- Breckenridge
- Briar Run
- Cambridge
- Fairfax Crossing
- Potomac Towne Center ("The Boulevard" and "The Marketplace")
- President's Pointe (future)
- Security Hills
- Shenandoah Springs
- Walnut Dell, Walnut Grove, Walnut Hills

Three of these developments contribute or will contribute flow to the 15-inch sewer that feeds FSPS from the west (Fairfax Crossing and Potomac Towne Center, and the future President's Pointe), and one contributes flow to the gravity sewer that feeds FSPS from the south (Shenandoah Springs). The other seven of these developments contribute flow to the Breckenridge Pump Station that feeds FSPS from the east.

FSPS is a submersible-type configuration. The FSPS site consists of a wet well, valve pit and three meter pit structures within a fenced area. The site also accommodates a building which houses a generator, variable-frequency drives and other electrical equipment for the pumps. The wet well has provision for three rail-mounted submersible pumps; two pumps are currently in place. The two pumps alternate as duty pump, while the second pump acts as a standby.

FSPS reportedly can accommodate higher-horsepower pumps than are currently in place. In other words, FSPS can be equipped with three pumps each of higher horsepower than the two existing pumps to meet ultimate influent conditions. After installation of a third pump, two pumps can act in tandem as duty pumps while the third acts as a standby.

One of the meter pits contains a totalizing meter used to measure FSPS influent flow from the 8-inch force-main that originates at the Breckenridge Pump Station to the east. The other two meter pits contain totalizing meters for FSPS' discharge, and are addressed in the next subsection.

Average daily flow conveyed by FSPS was about 227,000 GPD based on Ranson metering data for the 12-month period ending 10/31/2017. With two pumps currently in place, FSPS' firm capacity is therefore based on simplex or one-pump operation; current simplex pumping capacity is about 900 GPM based on analysis of output flow versus pump runtime for the 12-month period ending 10/31/2017. Table 5.2B summarizes peak influent flow at FSPS versus current simplex capacity for projected 2019 conditions.

Table 5.2B						
2019 - Day 1 Peak Flow (GPM) in Ranson FSPS						
A	B	C	D	E	F	G
	peak flow f/ 15" (GPM)	peak flow f/ Breck. (GPM)	peak flow f/ Shen. Spgs. (GPM)	total peak flow (GPM)	FSPS capacity (1 pump) (GPM)	% capacity during peak
FSPS	276	271	34	581	900	65%

Table 5.2B shows the following:

- FSPS' 900-GPM capacity is adequate to handle the combination of peak flow from the 15-inch gravity sewer described above, peak flow from the Breckenridge area, and peak flow from Shenandoah Springs subdivision (581 GPM total peak); FSPS will be operating at about 65% of current simplex pumping capacity during 2019 peak flow conditions.

Note that Table 5.2B accounts for interception of flow from Burr Business Park as per Options #3 and #5, but does not account for any interception of flow at Lloyd's Flats pump station. Under this scenario, about 1/3 of the flow that currently goes to Old Town Ranson from Lloyd's Flats is intercepted at Burr and conveyed to FSPS as of 2019.

When peak flow from the 15-inch sewer (Column B) is adjusted to account for full interception of Lloyd's Flats flow, total peak flow (Column E) increases to 687 GPM which represents a 76% consumption of FSPS' current simplex pumping capacity as of 2019. Thus, as stated in Section 4.8, if full removal of eastern-corridor flow from Old Town Ranson is desired, an FSPS upgrade will be necessary years sooner than is shown in Section 5.3 below.

When peak flow from the 15-inch sewer (Column B) is adjusted to account for 50% interception of Lloyd's Flats flow, total peak flow (Column E) increases to 634 GPM which represents a 70% consumption of FSPS' current simplex pumping capacity as of 2019. A 50% interception requires modifications at Lloyd's Flats pump station as part of the Project, but does not allow elimination of the station.

5.2.3 Ranson Force-Main from FSPS

The force-main that carries flow away from Ranson's FSPS is a Ranson-owned pipeline that was constructed and put into service concurrent with FSPS just over 10 years ago. More specifically, the force-main carries flow southwesterly through Ranson to the west end of Second Avenue where it discharges to the Evitts Run receiving sewer that is the subject of the next subsection. Off the FSPS site, the force-main consists of about 11,600 linear feet of 12-inch diameter HDPE piping.

The force-main begins as 8-inch diameter on the FSPS site, where it combines flow from the three 6-inch pump discharge lines and carries the combined flow through a totalizing meter. Just after the meter, a 4-inch branch off of the 8-inch piping allows diversion of some of FSPS' discharge to a location other than the Evitts Run receiving sewer (further discussed in next paragraph). The 8-inch

piping increases to 12-inch downstream of the 4-inch branch. In total, there is about 36 linear feet of 8-inch piping upstream of the 11,600 linear feet of 12-inch piping.

The 4-inch branch off of the 8-inch piping is metered and valved, and allows diversion of some of FSPS' discharge southward to JCPSD Pump Station #3-6, located on Pacesetter Way adjacent to Applebee's restaurant. Years ago, PS #3-6 suffered from inactivity, so the diversion was constructed to drive some flow to the station.

The diversion is reportedly still active and as such is accounted for in this analysis, but establishing whether or not the diversion is still warranted is outside the scope of this analysis. The diversion amount is typically about 20% of total FSPS discharge, based on flow data for the first nine months of 2017.

It appears, based on a cursory hydraulic analysis, the 12-inch force-main piping was sized to carry flow from FSPS in the ultimate condition; that is, it appears the piping was sized to carry the discharge of two future pumps operating in tandem at 100% speed providing an output much greater than current FSPS output. It is estimated that the force-main carries FSPS' current simplex pump output (720 GPM, which is 900 GPM less the 20% diversion) at a velocity of about 2 feet per second, which is marginally sufficient velocity to keep the force-main clean and is indicative that the force-main is under-utilized. Since the force-main "wants" higher flow rates and velocities than it is experiencing currently, the force-main's capacity is deemed much more than adequate for projected 2019 conditions.

5.2.4 Ranson/Charles Town Evitts Run Interceptor Sewer

The gravity sewer that extends from FSPS' force-main termination to Charles Town's WWTP is known as the Evitts Run interceptor sewer, and consists of 18-inch diameter piping (Ranson-owned) and 24-inch diameter piping (Charles Town-owned) totaling about 6,100 linear feet. All this piping is about 30 years old.

Each section of this piping is detailed by size as follows. After this discussion, Table 5.2C summarizes peak flow vs. gross carrying capacity for each section for projected 2019 conditions.

- The 18-inch sewer will carry Old Town Ranson flow, and FSPS force-main flow, from the west end of Second Avenue (MH A-27) southerly to Augustine Avenue (MH A-13). It will also carry flow from feeder sewers along, and within several blocks of, West Washington Street. It consists of 17 segments of 18-inch sewer, totaling approximately 3,300 feet in length. This sewer's capacity was evaluated using design information from City of Charles Town drawings titled "Wastewater System Improvements - Contract 2" (1986), since as-built information was unavailable.
- The 24-inch sewer will carry the 18-inch sewer's flow from Augustine Avenue (MH A-13) southeasterly to the Charles Town WWTP. It will also carry flow from multiple feeder sewers, coming from the Augustine Avenue and Mordington Avenue areas. It consists of 14 segments of 24-inch sewer, totaling approximately 2,800 feet in length. This sewer's capacity was evaluated using design information from City of Charles Town drawings titled "Wastewater System Improvements - Contract 2" (1986), since as-built information was unavailable.

Refer to Figure 11 on the following page.



ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 11
EVITTS RUN INTERCEPTOR SEWER

Table 5.2C								
2019 - Day 1 Peak Flow in Evitts Run Gravity Interceptor Sewer								
A	B	C	D	E	F	G	H	I
total length (ft.)	section length (ft.)	pipe dia.	peak flow f/ FSPS (GPM)	peak flow f/ OTR (GPM)	peak flow f/ feeders (GPM)	total peak flow (GPM)	gross capacity (GPM)	% full during peak
6,100	3,300	18"	720	556	57	1,333	1,417	94%
	2,800	24"	720	556	673	1,949	2,788	70%

Table 5.2C shows the following:

- The 18-inch section of sewer has a minimum or limiting capacity of about 1,417 GPM. This capacity is that of about 30% of the footage, which is at or just above minimum grade (0.12%) for 18-inch piping; the other 70% of the footage is at steeper grade. This capacity is adequate to carry the combination of peak flow from FSPS, peak flow from Old Town Ranson, and peak flow from feeders (1,333 GPM total peak); the flattest segments of the 18-inch sewer will be about 94% full during 2019 peak flow conditions. It is noted that about half of the 1,333 GPM is intermittent flow, coming from FSPS' force-main only when FSPS is pumping.
- The 24-inch section of sewer has a minimum or limiting capacity of about 2,788 GPM. This capacity is that of almost all footage, which is at minimum grade (0.01%) for 24-inch piping. This capacity is adequate to carry the combination of peak flow from the 18-inch sewer and peak flow from feeders (1,949 GPM total peak); most of the 24-inch sewer will be about 70% full during 2019 peak flow conditions.

5.2.5 Charles Town WWTP

The facility that receives and treats flow from the Evitts Run sewer is a Charles Town-owned facility known as the Charles Town Wastewater Treatment Plant, located on WV Route 115 (South George Street) adjacent to Evitts Run. The CT WWTP receives flow from the west from the 24-inch Evitts Run gravity sewer described above, and from the east from a 10-inch force-main that originates at Charles Town's Samuel Street Pump Station.

The CT WWTP serves Charles Town and Ranson, and much of the surrounding region. The WWTP's service area is sewered by Charles Town sewers, Ranson sewers, and JCPSD sewers. All three jurisdictions also operate pump stations, and all three contribute toward Charles Town's cost to operate the WWTP. The CT WWTP is flanked by a smaller WWTP about 2.5 miles to the west also operated by Charles Town known as the Tuscawilla WWTP.

As stated in Section 3.0, development projections for regions served by the CT WWTP are addressed in the Charles Town Utility Board's "2015 Wastewater Strategic Plan & Ten Year Wastewater Capital Plan" (WWSP). Specifically, CTUB's WWSP identifies 42 developments in the WWTP's four service regions (northern, southern, eastern, western) that have not started or are partially built-out.

Some of these developments contribute or will contribute flow to the 24-inch Evitts Run sewer that feeds CT WWTP from the west, and others contribute or will contribute flow to the Samuel Street

pump station that feeds CT WWTP from the east. Almost all the 42 developments factor into this analysis, except for several western-region developments served exclusively by the Tuscawilla WWTP.

Charles Town operates a "diversion" or "scalping" pump station near the 24-inch Evitts Run sewer that allows them to divert some of CT WWTP's influent westward to the Tuscawilla WWTP under certain circumstances. But according to recent discussion with CTUB, the scalping pump station has not been in use lately due to odor issues at the Tuscawilla WWTP. This analysis assumes the scalping pump station is not operated and that all Evitts Run sewer flow is directed to the CT WWTP.

According to the CTUB's 2015 WWSP, average daily influent flow at CT WWTP was about 0.97 MGD as of 2014, and volumetric treatment capacity was about 1.75 MGD. According to recent discussion with CTUB, average daily influent flow is about 1.25 MGD as of 2017. Table 5.2D summarizes average daily influent flow at CT WWTP versus volumetric capacity for projected 2019 conditions.

Table 5.2D

2019 - Day 1 Average Daily Flow (ADF) in CT WWTP

A	B	C	D	E	F
	ADF f/ 24" (MGD)	ADF f/ 10" force-main (MGD)	total ADF (MGD)	WWTP capacity (MGD)	% capacity
CT WWTP	1.043	0.312	1.355	1.750	77%

Table 5.2D shows that, as of 2019, the CT WWTP is receiving an average daily influent flow of about 1.355 MGD, representing the combination of flow from the 24-inch Evitts Run gravity sewer and flow from the Samuel Street pump station's 10-inch force-main. The WWTP's current volumetric capacity for an average daily flow of 1.75 MGD is plenty adequate to handle this influent flow; the WWTP will be at about 77% of capacity under the average daily flow conditions of 2019.

5.3 Downstream Capacity vs. 2020-2029 Projected Flow

This section considers the downstream impact of additional new flows over the 10-year period following 2019 consisting not only of ROXUL's phased flow increases but also of flows from other projected development in the Route 9 corridor and Flowing Springs service area, and the other regions served by Charles Town's WWTP.

Each downstream element is discussed individually in this section with respect to gross capacity versus capacity consumed by projected peak flow in two-year increments for the 10-year period of 2020-2029. As with Section 5.2, projected flows shown in this section are derived in Appendix 2, using the WWSP's discounted average daily flow values as a basis.

Tables 5.3A, 5.3B, 5.3C and 5.3D contain "snapshots" of flow conditions at each of the five time increments - 2021, 2023, 2025, 2027 and 2029. In each of the four tables, columns showing flows

due to post-2019 growth are shaded gray, and column headings for 2023-2029 are abbreviations of the 2021 column headings.

5.3.1 Ranson Gravity Sewer

Table 5.3A on the next page summarizes peak flow versus gross carrying capacity for each section of the 7,000-foot Ranson gravity sewer for projected 2020-2029 conditions. Columns D and E reiterate the projected 2019 peak flows of Table 5.2A, and Columns F and G show projected additional peak flows due to growth in the Route 9 corridor and due to growth tributary to the feeder sewers that connect directly.

Table 5.3A

2020-2029 Projected Peak Flow in Ranson 7,000' Gravity Sewer

2021					flow due to growth 2020-2021				
A	B	C	D	E	F	G	H	I	J
total length (ft.)	section length (ft.)	pipe dia.	2019 peak flow f/ Rt. 9 corridor (GPM)	2019 peak flow f/ feeders (GPM)	peak flow f/ Rt. 9 corridor (GPM)	peak flow f/ feeders (GPM)	2021 total peak flow (GPM)	gross capacity (GPM)	% full during peak
7,000	2,400	10"	116	34	2	9	162	442	37%
	400	12"	116	34	2	9	162	1,357	12%
	4,200	15"	116	160	2	10	289	1,036	28%

2023					flow due to growth 2020-2023				
A	B	C	D	E	F	G	H	I	J
total length	section length	pipe dia.	2019 corridor	2019 feeders	corridor	feeders	2023 total	gross capacity	% full
7,000	2,400	10"	116	34	8	19	177	442	40%
	400	12"	116	34	8	19	177	1,357	13%
	4,200	15"	116	160	8	25	309	1,036	30%

2025					flow due to growth 2020-2025				
A	B	C	D	E	F	G	H	I	J
total length	section length	pipe dia.	2019 corridor	2019 feeders	corridor	feeders	2025 total	gross capacity	% full
7,000	2,400	10"	116	34	86	30	267	442	60%
	400	12"	116	34	86	30	267	1,357	20%
	4,200	15"	116	160	86	41	403	1,036	39%

2027					flow due to growth 2020-2027				
A	B	C	D	E	F	G	H	I	J
total length	section length	pipe dia.	2019 corridor	2019 feeders	corridor	feeders	2027 total	gross capacity	% full
7,000	2,400	10"	116	34	144	42	337	442	76%
	400	12"	116	34	144	42	337	1,357	25%
	4,200	15"	116	160	144	59	479	1,036	46%

2029					flow due to growth 2020-2029				
A	B	C	D	E	F	G	H	I	J
total length	section length	pipe dia.	2019 corridor	2019 feeders	corridor	feeders	2029 total	gross capacity	% full
7,000	2,400	10"	116	34	168	42	361	442	82%
	400	12"	116	34	168	42	361	1,357	27%
	4,200	15"	116	160	168	70	515	1,036	50%

Table 5.3A shows the following projections:

- As of 2021, the 10-inch sewer is carrying 162 GPM during peak flow conditions, representing the combination of peak flow from the Route 9 corridor (ROXUL, Burr, etc.), and peak flow from the two feeders to the 10-inch sewer. The 10-inch sewer's limiting capacity of about 442 GPM is adequate to carry this flow; the flattest segment of 10-inch sewer will be about 37% full during 2021 peak flow conditions. By 2029, the 10-inch sewer is carrying 361 GPM during peak flow conditions which is 82% of its 442-GPM capacity.
- As of 2021, the 12-inch sewer is carrying 162 GPM during peak flow conditions, representing the peak flow coming from the 10-inch piping described above. The 12-inch sewer's limiting capacity of about 1,357 GPM is plenty adequate to carry this flow; the flatter segment of 12-inch sewer will be about 12% full during 2021 peak flow conditions. By 2029, the 12-inch sewer is carrying 361 GPM during peak flow conditions which is just 27% of its 1,357-GPM capacity.
- As of 2021, the 15-inch sewer is carrying 289 GPM during peak flow conditions representing the combination of peak flow from the 12-inch piping described above, and peak flow from the two feeders to the 15-inch sewer. The 15-inch sewer's limiting capacity of about 1,036 GPM is plenty adequate to carry this flow; the flattest segment of 15-inch sewer will be about 28% full during 2021 peak flow conditions. By 2029, the 15-inch sewer is carrying 515 GPM during peak flow conditions which is 50% of its 1,036-GPM capacity.

5.3.2 Ranson Flowing Springs Pump Station

Table 5.3B on the next page summarizes peak influent flow versus simplex (one pump) pumping capacity at FSPS for projected 2020-2029 conditions. Columns B, C and D reiterate the projected 2019 peak influent flows of Table 5.2B, and Columns E, F and G show projected additional peak flows due to growth in the areas tributary to FSPS.

Table 5.3B

2020-2029 Projected Peak Flow in Ranson FSPS

2021				flow due to growth 2020-2021					
A	B	C	D	E	F	G	H	I	J
	2019 peak flow f/ 15" (GPM)	2019 peak flow f/ Breck. (GPM)	2019 peak flow f/ Shen. Spgs. (GPM)	peak flow f/ 15" (GPM)	peak flow f/ Breck. (GPM)	peak flow f/ Shen. Spgs. (GPM)	2021 total peak flow (GPM)	FSPS capacity (1 pump) (GPM)	% capacity during peak
FSPS	276	271	34	12	21	5	619	900	69%

2023				flow due to growth 2020-2023					
A	B	C	D	E	F	G	H	I	J
	2019 15"	2019 Breck.	2019 Shen.	15"	Breck.	Shen. Spgs.	2023 total	FSPS capacity	% capacity
FSPS	276	271	34	33	44	9	667	900	74%

2025				flow due to growth 2020-2025					
A	B	C	D	E	F	G	H	I	J
	2019 15"	2019 Breck.	2019 Shen.	15"	Breck.	Shen. Spgs.	2025 total	FSPS capacity	% capacity
FSPS	276	271	34	127	49	13	771	900	86%

2027				flow due to growth 2020-2027					
A	B	C	D	E	F	G	H	I	J
	2019 15"	2019 Breck.	2019 Shen.	15"	Breck.	Shen. Spgs.	2027 total	FSPS capacity	% capacity
FSPS	276	271	34	203	54	17	855	900	95%

2029				flow due to growth 2020-2029					
A	B	C	D	E	F	G	H	I	J
	2019 15"	2019 Breck.	2019 Shen.	15"	Breck.	Shen. Spgs.	2029 total	FSPS capacity	% capacity
FSPS	276	271	34	239	57	17	894	900	99%

Table 5.3B shows the following projections:

- As of 2021, FSPS is receiving 619 GPM during peak flow conditions, representing the combination of peak flow from the 15-inch gravity sewer, peak flow from the Breckenridge area, and peak flow from Shenandoah Springs subdivision. FSPS' current simplex pumping capacity of 900 GPM is adequate to handle this flow; FSPS will be at about 69% of capacity during 2021 peak flow conditions.
- By 2025, FSPS is receiving 771 GPM during peak flow conditions which is about 86% of current simplex capacity. By 2027, FSPS is receiving 855 GPM during peak flow conditions which is about 95% of current simplex capacity. Thus, an FSPS upgrade will be necessary perhaps as soon as 2025 and no later than 2027.

5.3.3 Ranson Force-Main from FSPS

Section 5.3.2 above indicates that an FSPS upgrade will be necessary perhaps as soon as 2025 and no later than 2027. So as of 2021, FSPS' force-main is still carrying FSPS' current simplex pump output (720 GPM, which is 900 GPM less the 20% diversion) with resulting velocity of about 2 feet per second, which is marginally sufficient velocity to keep the force-main clean.

After upgrade, FSPS' force-main will be carrying a higher-than-current FSPS pump output under both simplex and duplex operation with resulting velocities estimated in the range of 3-5 feet per second based on cursory hydraulic analysis. This is an appropriate velocity range for the ultimate pumping condition, so the force-main's capacity is deemed plenty adequate for the post-upgrade period.

5.3.4 Ranson/Charles Town Evitts Run Interceptor Sewer

Table 5.3C on the next page summarizes peak flow versus gross carrying capacity for each section of the Evitts Run interceptor sewer for projected 2020-2029 conditions. Columns D, E and F reiterate the projected 2019 peak flows of Table 5.2C, and Columns G and H show projected additional peak flows due to growth in Old Town Ranson and due to growth tributary to the feeder sewers that connect directly.

For sake of simplicity, Column D's value (720 GPM) reflects an unchanging peak instantaneous flow rate coming from FSPS for 2021 and beyond. This disregards FSPS upgrade, after which peak instantaneous flow from FSPS will of course increase which in turn will increase peak flow in the Evitts Run sewer in the out-years of Table 5.3C.

Table 5.3C

2020-2029 Projected Peak Flow in Evitts Run Gravity Interceptor Sewer

2021						flow due to growth 2020-2021				
A	B	C	D	E	F	G	H	I	J	K
total length (ft.)	section length (ft.)	pipe dia.	2021 peak flow f/ FSPS (GPM)	2019 peak flow f/ OTR (GPM)	2019 peak flow f/ feeders (GPM)	peak flow f/ OTR (GPM)	peak flow f/ feeders (GPM)	2021 total peak flow (GPM)	gross capacity (GPM)	% full during peak
6,100	3,300	18"	720	556	57	5	0	1,338	1,417	94%
	2,800	24"	720	556	673	5	21	1,975	2,788	71%

2023						flow due to growth 2020-2023				
A	B	C	D	E	F	G	H	I	J	K
total length	section length	pipe dia.	2023 FSPS	2019 OTR	2019 feeders	OTR	feeders	2023 total	gross capacity	% full
6,100	3,300	18"	720	556	57	11	0	1,344	1,417	95%
	2,800	24"	720	556	673	11	45	2,006	2,788	72%

2025						flow due to growth 2020-2025				
A	B	C	D	E	F	G	H	I	J	K
total length	section length	pipe dia.	2025 FSPS	2019 OTR	2019 feeders	OTR	feeders	2025 total	gross capacity	% full
6,100	3,300	18"	720	556	57	15	0	1,349	1,417	95%
	2,800	24"	720	556	673	15	84	2,049	2,788	73%

2027						flow due to growth 2020-2027				
A	B	C	D	E	F	G	H	I	J	K
total length	section length	pipe dia.	2027 FSPS	2019 OTR	2019 feeders	OTR	feeders	2027 total	gross capacity	% full
6,100	3,300	18"	720	556	57	22	0	1,355	1,417	96%
	2,800	24"	720	556	673	22	124	2,095	2,788	75%

2029						flow due to growth 2020-2029				
A	B	C	D	E	F	G	H	I	J	K
total length	section length	pipe dia.	2029 FSPS	2019 OTR	2019 feeders	OTR	feeders	2029 total	gross capacity	% full
6,100	3,300	18"	720	556	57	31	0	1,364	1,417	96%
	2,800	24"	720	556	673	31	166	2,146	2,788	77%

Table 5.3C shows the following projections:

- As of 2021, the 18-inch sewer is carrying 1,338 GPM during peak flow conditions, representing the combination of peak flow from FSPS, peak flow from Old Town Ranson, and peak flow from feeders. The 18-inch sewer's limiting capacity of about 1,417 GPM is adequate to carry this flow; the flattest segments of 18-inch sewer will be about 94% full during 2021 peak flow conditions. As with the 2019 analysis earlier, it is noted that about half of the 1,338 GPM is intermittent flow, coming from FSPS' force-main only when FSPS is pumping. By 2029, the 18-inch sewer is carrying more than 1,364 GPM during peak flow conditions presuming an FSPS upgrade prior to that time (the 2029 table shows current, not upgraded, FSPS pump rate), which means that the sewer will be at more than 96% of its 1,417-GPM capacity.
- As of 2021, the 24-inch sewer is carrying 1,975 GPM during peak flow conditions, representing the combination of peak flow from the 18-inch piping described above, and peak flow from multiple feeder sewers coming from the Augustine Avenue and Mordington Avenue areas. The 24-inch sewer's limiting capacity of about 2,788 GPM is plenty adequate to carry this flow; most of the 24-inch sewer will be about 71% full during 2021 peak flow conditions. By 2029, the 24-inch sewer is carrying more than 2,146 GPM during peak flow conditions presuming an FSPS upgrade prior to that time (again, the 2029 table shows current, not upgraded, FSPS pump rate), which means that the sewer will be at more than 77% of its 2,788-GPM capacity.

5.3.5 Charles Town WWTP

Table 5.3D on the next page summarizes average daily influent flow versus average daily treatment capacity at Charles Town's WWTP for projected 2020-2029 conditions. Columns B and C reiterate the projected 2019 average daily influent flows of Table 5.2D, and Columns D and E show projected additional average daily flows due to growth in all regions served by the WWTP.

Table 5.3D							
2020-2029 Projected Average Daily Flow (ADF) in CT WWTP							
2021			flow due to growth 2020-2021				
A	B	C	D	E	F	G	H
	2019 ADF f/ 24" (MGD)	2019 ADF f/ 10" force-main (MGD)	ADF f/ 24" (MGD)	ADF f/ 10" force-main (MGD)	2021 total ADF (MGD)	WWTP ADF capacity (MGD)	% ADF capacity
CT WWTP	1.043	0.312	0.012	0.011	1.378	1.750	79%
2023			flow due to growth 2020-2023				
A	B	C	D	E	F	G	H
	2019 24"	2019 10" FM	24"	10" FM	2023 total	WWTP capacity	% capacity
CT WWTP	1.043	0.312	0.026	0.020	1.402	1.750	80%
2025			flow due to growth 2020-2025				
A	B	C	D	E	F	G	H
	2019 24"	2019 10" FM	24"	10" FM	2025 total	WWTP capacity	% capacity
CT WWTP	1.043	0.312	0.049	0.035	1.439	1.750	82%
2027			flow due to growth 2020-2027				
A	B	C	D	E	F	G	H
	2019 24"	2019 10" FM	24"	10" FM	2027 total	WWTP capacity	% capacity
CT WWTP	1.043	0.312	0.071	0.051	1.477	1.750	84%
2029			flow due to growth 2020-2029				
A	B	C	D	E	F	G	H
	2019 24"	2019 10" FM	24"	10" FM	2029 total	WWTP capacity	% capacity
CT WWTP	1.043	0.312	0.095	0.055	1.505	1.750	86%

Table 5.3D shows the following projections:

- As of 2021, the CT WWTP is receiving an average daily influent flow of about 1.378 MGD, representing the combination of flow from the 24-inch Evitts Run gravity sewer and flow from the Samuel Street pump station's 10-inch force-main. The WWTP's current capacity for an average daily flow of 1.75 MGD is adequate to handle this influent flow; the WWTP will be at about 79% of capacity under the average daily flow conditions of 2021.
- By 2029, the CT WWTP is receiving an average daily influent flow of about 1.505 MGD which is about 86% of WWTP capacity.

5.4 Downstream Capacity Conclusions/Recommendations

The analysis in Section 5.2 indicates that all five elements of the downstream system are adequate as of 2019 after addition of ROXUL Phase 1 flow, and other new-development flow, to current flow.

FSPS will be operating at about 65% of current simplex pumping capacity during 2019 peak flow conditions, if all the projections used to derive that figure come to fruition. Much of FSPS' current excess capacity is projected to be consumed by 2019 because FSPS is projected to receive new flow from:

- ROXUL
- Burr Business Park existing development (whose flows now go into Old Town Ranson), per the interception via Pump Station Options #3 and #5
- Potomac Towne Center 2018-19 development
- Breckenridge Pump Station tributary area 2018-19 development
- Shenandoah Springs 2018-19 development

At this time, it is recommended that no upgrade of FSPS' pumping capacity be included in the Project. It is, however, recommended that the above-mentioned 2018-19 development be monitored over the next several years, as this could alter the 65% figure. Based on the ROXUL and new development projections, an FSPS upgrade will be necessary perhaps as soon as 2025 and no later than 2027.

It is also recommended that no interception of flow at Lloyd's Flats pump station be included in the Project. Section 5.2 indicates that 50% interception causes FSPS to be at about 70% of current capacity in 2019, and that full interception causes FSPS to be at about 76% of current capacity in 2019. If full interception were included in the Project, it would hasten FSPS upgrade by about two years based on the progression of Table 5.3B.

The analysis in Section 5.3 indicates that four elements of the downstream system are adequate for projected flows during the period of 2020-2029. But the analysis shows that FSPS will be operating at about 86% of current simplex pumping capacity during 2025 peak flow conditions, and about 95% of current simplex pumping capacity during 2027 peak flow conditions, if all the development projections come about. It is recommended that Ranson re-examine flow conditions at FSPS in the 2019-2023 timeframe to determine if 2025 looks like an appropriate time to start planning for upgrade.

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Appendix 1

Pump Station Option Cost Opinions and EDU Derivations

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City of Ranson Route 9 Infrastructure Project
BASIS Sewer Cost Opinions

1 The cost opinions for the different OPTIONS have been prepared using a combination of estimated and factored costs to provide an intended level of accuracy of +20%/-30%. The base date of the opinions is December 2017.

2 The cost opinions for the different OPTIONS are based on the following project data and assumptions:

a Charles Town Utility Board, 2016 Gravity Sewer, Road Bores and Pump Station Project - Task 19B Bid Tabulation dated July 13, 2016.

b Jefferson County Public Sewer District, Preliminary Engineering Report for the Wastewater Improvement Project dated November 2015.

c RSMeans Data, 2017 Release used for sewer main (gravity/force) pipe, trenching, backfilling, rock, road/railroad bores, and restoration costs.

d Snyder Environmental Services, Inc., Preliminary Estimate for Project Shuttle Sewer Extension into Ranson dated August 29, 2017.

e Contractor overhead and profit are included in the unit prices.

f Sewer main lengths (gravity/force) are based on original alignment concepts by Allegheny Surveys.

g No downstream improvements are required beyond the connection at The Boulevard at Potomac Towne Center.

h Road bores are required at every public road.

i Rock requiring blasting will be encountered in the bottom 1 foot along the force-main route (8,500 CY).

j Rock requiring blasting will be encountered in the bottom 6 feet along the gravity main route 50% of the time (2,000 CY).

k Railroad bores encounter 3 feet of rock in both the launching and receiving pits (deeper than road bores).

l Road bores encounter 1 foot of rock in both the lauching and receiving pits (shallower than railroad bores).

m Restoration - shoulder/grass includes the entire length of sewer mains x 20-foot width.

n Easements are required along the entire length of sewer mains (gravity and force).

3 Construction Costs include an additional 30% since these opinions are only at a Planning-Level without detailed plans and specifications. Escalation of construction costs (2.5% +/-) would be included in this 30%.

4 Soft Costs are only opinions with some basis on engineering and professional services fee estimates. Railroad permits and fees were not verified with either CSX or Norfolk Southern Railroad.

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City of Ranson Route 9 Infrastructure Project

Preliminary Sewer Cost Opinion

Option #1: One public PS (located adjacent to ROXUL, designed for ROXUL use only)

Item	Quantity	Unit	Unit Price	Total
CONSTRUCTION:				
Jefferson Orchard (submersible) Pump Station	1	LS	$ 600,000	$ 600,000
Gravel Drive to pump station	100	SY	$ 12	$ 1,200
Force Main (C900 PVC)	23,259	LF	$ 127	$ 2,953,893
Gravity Main (SDR-35 PVC)	5,875	LF	$ 180	$ 1,057,500
Manholes	29	EA	$ 4,500	$ 132,300
Road Bores: (Charles Town Rd+Wiltshire Rd+Burr Blvd+Philip Ave+Pittsburg Lndg+Duncan Field Ln+Currie Rd+Mildred St)	560	LF	$ 500	$ 280,000
Railroad Bore	100	LF	$ 600	$ 60,000
Restoration - pavement	3,600	SY	$ 22	$ 79,200
Restoration - shoulder/grass	64,740	SY	$ 2	$ 129,480
Restoration - gravel drive	1,700	SY	$ 12	$ 20,400
SubTotal (Construction)				**$ 5,313,973**
Planning-Level Estimate (add 30%)				$ 1,594,192
Total Construction COSTS:				$ 6,908,165
SAY				**$ 6,908,000**
assumes no improvements downstream of connection at Baker Blvd.				
PROPERTY AND RIGHTS-OF-WAY:				
Easements (Temporary & Permanent)	29,134	LF	$ 5	$ 145,670
				$ -
Pump Station Site	0.50	AC	$ 50,000	$ 25,000
SubTotal (Property & RWs)				**$ 170,670**
Contingency @ 5% ±				$ 8,534
TOTAL Property & RWs COSTS:				$ 179,204
SAY				**$ 179,000**
SOFT COSTS:				
Legal and Administration:				
Local Counsel	1	LS	$ 50,000	$ 50,000
Administration - Ranson	1	LS	$ 75,000	$ 75,000
Railroad Bore Permits and Fees	1	LS	$ 150,000	$ 150,000
Misc. Permits & Fees	1	LS	$ 50,000	$ 50,000
SubTotal (Legal & Administration)				**$ 325,000**
Engineering:				
Alternatives Study, Downstream Analysis	1	LS	$ 125,000	$ 125,000
Preliminary/Final Design	1	LS	$ 513,000	$ 513,000
Prequalification, Bidding and Negotiating	1	LS	$ 46,600	$ 46,600
Engineering Construction Services **TBD**	1	LS	$ 508,000	$ 508,000
SubTotal (Engineering)				**$ 1,192,600**
Additional Professional Services				
Project Management (TO#1)	1	LS	$ 103,000	$ 103,000
Geotechnical Investigation	1	LS	$ 47,000	$ 47,000
Wetland Investigation & Permitting	1	LS	$ 22,000	$ 22,000
Land Surveys and Easement Preparation	1	LS	$ 50,000	$ 50,000
Engineering Surveys and Topo	1	LS	$ 64,000	$ 64,000
Public Agency Meetings	1	LS	$ 20,000	$ 20,000
PSC Meetings/Hearings/Coordination	1	LS	$ 10,000	$ 10,000
Phase 1 Archaeological Assessment	1	LS	$ 34,000	$ 34,000
SubTotal (Additional Professional Services)				**$ 350,000**
SUBTOTAL SOFT COSTS:				**$ 1,867,600**
Contingency @ 5% ±				$ 93,380
TOTAL Soft COSTS (Legal & Administration, Engineering, Additional Professional Services):				$ 1,960,980
SAY				**$ 1,961,000**
TOTAL PROJECT COST (Construction, Property/RW, Soft)				$ 9,048,348
SAY				**$ 9,000,000**

City of Ranson Route 9 Infrastructure Project

Preliminary Sewer Cost Opinion

Option #2: One public PS (located in Orchard East, designed to accommodate ROXUL and other users)

Item	Quantity	Unit	Unit Price	Total
CONSTRUCTION:				
Jefferson Orchard (submersible) Pump Station	1	LS	$ 600,000	$ 600,000
Gravel Drive to pump station	3,300	SY	$ 12	$ 39,600
Force Main (C900 PVC)	24,536	LF	$ 127	$ 3,116,072
Gravity Main (SDR-35 PVC)	7,861	LF	$ 180	$ 1,414,980
Manholes	39	EA	$ 4,500	$ 176,850
Road Bores: (Charles Town Rd+Wiltshire Rd+Burr Blvd+Philip Ave+Pittsburg Lndg+Duncan Field Ln+Currie Rd+Mildred St)	560	LF	$ 500	$ 280,000
Railroad Bore	100	LF	$ 600	$ 60,000
Restoration - pavement	3,600	SY	$ 22	$ 79,200
Restoration - shoulder/grass	71,990	SY	$ 2	$ 143,980
Restoration - gravel drive	1,700	SY	$ 12	$ 20,400
SubTotal (Construction)				**$ 5,931,082**
Planning-Level Estimate (add 30%)				$ 1,779,325
Total Construction COSTS:				$ 7,710,407
SAY				**$ 7,710,000**
assumes no improvements downstream of connection at Baker Blvd.				
PROPERTY AND RIGHTS-OF-WAY:				
Easements (Temporary & Permanent)	32,397	LF	$ 5	$ 161,985
				$ -
Pump Station Site	0.50	AC	$ 50,000	$ 25,000
SubTotal (Property & RWs)				**$ 186,985**
Contingency @ 5% ±				$ 9,349
TOTAL Property & RWs COSTS:				$ 196,334
SAY				**$ 196,000**
SOFT COSTS:				
Legal and Administration:				
Local Counsel	1	LS	$ 50,000	$ 50,000
Administration - Ranson	1	LS	$ 75,000	$ 75,000
Railroad Bore Permits and Fees	1	LS	$ 150,000	$ 150,000
Misc. Permits & Fees	1	LS	$ 50,000	$ 50,000
SubTotal (Legal & Administration)				**$ 325,000**
Engineering:				
Alternatives Study, Downstream Analysis	1	LS	$ 125,000	$ 125,000
Preliminary/Final Design	1	LS	$ 573,000	$ 573,000
Prequalification, Bidding and Negotiating	1	LS	$ 46,600	$ 46,600
Engineering Construction Services **TBD**	1	LS	$ 567,000	$ 567,000
SubTotal (Engineering)				**$ 1,311,600**
Additional Professional Services				
Project Management (TO#1)	1	LS	$ 103,000	$ 103,000
Geotechnical Investigation	1	LS	$ 52,500	$ 52,500
Wetland Investigation & Permitting	1	LS	$ 22,000	$ 22,000
Land Surveys and Easement Preparation	1	LS	$ 50,000	$ 50,000
Engineering Surveys and Topo	1	LS	$ 64,000	$ 64,000
Public Agency Meetings	1	LS	$ 20,000	$ 20,000
PSC Meetings/Hearings/Coordination	1	LS	$ 10,000	$ 10,000
Phase 1 Archaeological Assessment	1	LS	$ 34,000	$ 34,000
SubTotal (Additional Professional Services)				**$ 355,500**
SUBTOTAL SOFT COSTS:				**$ 1,992,100**
Contingency @ 5% ±				$ 99,605
TOTAL Soft COSTS (Legal & Administration, Engineering, Additional Professional Services):				$ 2,091,705
SAY				**$ 2,092,000**
TOTAL PROJECT COST (Construction, Property/RW, Soft)				$ 9,998,446
SAY				**$ 10,000,000**

City of Ranson Route 9 Infrastructure Project

Preliminary Sewer Cost Opinion

Option #3: One public PS (located at Burr Business Park, adjacent to War Admiral Blvd.)

Item	Quantity	Unit	Unit Price	Total
CONSTRUCTION:				
Burr (submersible) Pump Station	1	LS	$ 600,000	$ 600,000
Gravel Drive to pump station	100	SY	$ 12	$ 1,200
Force Main (C900 PVC)	21,138	LF	$ 127	$ 2,684,526
Gravity Main (SDR-35 PVC)	7,425	LF	$ 180	$ 1,336,500
Manholes	37	EA	$ 4,500	$ 166,950
Road Bores: (Charles Town Rd+Wiltshire Rd+Burr Blvd+Philip Ave+Pittsburg Lndg+Duncan Field Ln+Currie Rd+Mildred St)	560	LF	$ 500	$ 280,000
Railroad Bore	100	LF	$ 600	$ 60,000
Restoration - pavement	3,600	SY	$ 22	$ 79,200
Restoration - shoulder/grass	63,470	SY	$ 2	$ 126,940
Restoration - gravel drive	1,700	SY	$ 12	$ 20,400
SubTotal (Construction)				**$ 5,355,716**
Planning-Level Estimate (add 30%)				$ 1,606,715
Total Construction COSTS:				$ 6,962,431
SAY				**$ 6,962,000**
assumes no improvements downstream of connection at Baker Blvd.				
PROPERTY AND RIGHTS-OF-WAY:				
Easements (Temporary & Permanent)	28,563	LF	$ 5	$ 142,815
				$ -
Pump Station Site	0.50	AC	$ 50,000	$ 25,000
SubTotal (Property & RWs)				**$ 167,815**
Contingency @ 5% ±				$ 8,391
TOTAL Property & RWs COSTS:				$ 176,206
SAY				**$ 176,000**
SOFT COSTS:				
Legal and Administration:				
Local Counsel	1	LS	$ 50,000	$ 50,000
Administration - Ranson	1	LS	$ 75,000	$ 75,000
Railroad Bore Permits and Fees	1	LS	$ 150,000	$ 150,000
Misc. Permits & Fees	1	LS	$ 50,000	$ 50,000
SubTotal (Legal & Administration)				**$ 325,000**
Engineering:				
Alternatives Study, Downstream Analysis	1	LS	$ 125,000	$ 125,000
Preliminary/Final Design	1	LS	$ 517,000	$ 517,000
Prequalification, Bidding and Negotiating	1	LS	$ 46,600	$ 46,600
Engineering Construction Services **TBD**	1	LS	$ 512,000	$ 512,000
SubTotal (Engineering)				**$ 1,200,600**
Additional Professional Services				
Project Management (TO#1)	1	LS	$ 103,000	$ 103,000
Geotechnical Investigation	1	LS	$ 47,500	$ 47,500
Wetland Investigation & Permitting	1	LS	$ 22,000	$ 22,000
Land Surveys and Easement Preparation	1	LS	$ 50,000	$ 50,000
Engineering Surveys and Topo	1	LS	$ 64,000	$ 64,000
Public Agency Meetings	1	LS	$ 20,000	$ 20,000
PSC Meetings/Hearings/Coordination	1	LS	$ 10,000	$ 10,000
Phase 1 Archaeological Assessment	1	LS	$ 34,000	$ 34,000
SubTotal (Additional Professional Services)				**$ 350,500**
SUBTOTAL SOFT COSTS:				**$ 1,876,100**
Contingency @ 5% ±				$ 93,805
TOTAL Soft COSTS (Legal & Administration, Engineering, Additional Professional Services):				$ 1,969,905
SAY				**$ 1,970,000**
TOTAL PROJECT COST (Construction, Property/RW, Soft)				$ 9,108,542
SAY				**$ 9,100,000**

City of Ranson Route 9 Infrastructure Project

Preliminary Sewer Cost Opinion

Option #4: One public PS (located at Locust Knoll)

Item	Quantity	Unit	Unit Price	Total
CONSTRUCTION:				
Locust Knoll (submersible) Pump Station	1	LS	$ 600,000	$ 600,000
Gravel Drive to pump station	100	SY	$ 12	$ 1,200
Force Main (C900 PVC)	22,101	LF	$ 127	$ 2,806,827
Gravity Main (SDR-35 PVC)	7,000	LF	$ 180	$ 1,260,000
Manholes	35	EA	$ 4,500	$ 157,500
Road Bores: (Charles Town Rd+Wiltshire Rd+Burr Blvd+Philip Ave+Pittsburg Lndg+Duncan Field Ln+Currie Rd+Mildred St)	560	LF	$ 500	$ 280,000
Railroad Bore	100	LF	$ 600	$ 60,000
Restoration - pavement	3,600	SY	$ 22	$ 79,200
Restoration - shoulder/grass	64,670	SY	$ 2	$ 129,340
Restoration - gravel drive	1,700	SY	$ 12	$ 20,400
SubTotal (Construction)				**$ 5,394,467**
Planning-Level Estimate (add 30%)				$ 1,618,340
Total Construction COSTS:				$ 7,012,807
SAY				**$ 7,013,000**
assumes no improvements downstream of connection at Baker Blvd.				
PROPERTY AND RIGHTS-OF-WAY:				
Easements (Temporary & Permanent)	29,101	LF	$ 5	$ 145,505
				$ -
Pump Station Site	0.50	AC	$ 50,000	$ 25,000
SubTotal (Property & RWs)				**$ 170,505**
Contingency @ 5% ±				$ 8,525
TOTAL Property & RWs COSTS:				$ 179,030
SAY				**$ 179,000**
SOFT COSTS:				
Legal and Administration:				
Local Counsel	1	LS	$ 50,000	$ 50,000
Administration - Ranson	1	LS	$ 75,000	$ 75,000
Railroad Bore Permits and Fees	1	LS	$ 150,000	$ 150,000
Misc. Permits & Fees	1	LS	$ 50,000	$ 50,000
SubTotal (Legal & Administration)				**$ 325,000**
Engineering:				
Alternatives Study, Downstream Analysis	1	LS	$ 125,000	$ 125,000
Preliminary/Final Design	1	LS	$ 521,000	$ 521,000
Prequalification, Bidding and Negotiating	1	LS	$ 46,600	$ 46,600
Engineering Construction Services **TBD**	1	LS	$ 515,500	$ 515,500
SubTotal (Engineering)				**$ 1,208,100**
Additional Professional Services				
Project Management (TO#1)	1	LS	$ 103,000	$ 103,000
Geotechnical Investigation	1	LS	$ 48,000	$ 48,000
Wetland Investigation & Permitting	1	LS	$ 22,000	$ 22,000
Land Surveys and Easement Preparation	1	LS	$ 50,000	$ 50,000
Engineering Surveys and Topo	1	LS	$ 64,000	$ 64,000
Public Agency Meetings	1	LS	$ 20,000	$ 20,000
PSC Meetings/Hearings/Coordination	1	LS	$ 10,000	$ 10,000
Phase 1 Archaeological Assessment	1	LS	$ 34,000	$ 34,000
SubTotal (Additional Professional Services)				**$ 351,000**
SUBTOTAL SOFT COSTS:				**$ 1,884,100**
Contingency @ 5% ±				$ 94,205
TOTAL Soft COSTS (Legal & Administration, Engineering, Additional Professional Services):				$ 1,978,305
SAY				**$ 1,978,000**
TOTAL PROJECT COST (Construction, Property/RW, Soft)				$ 9,170,142
SAY				**$ 9,200,000**

City of Ranson Route 9 Infrastructure Project

Preliminary Sewer Cost Opinion

Option #5: Two public PSs (one located per Option #2, one located per Option #3)

Item	Quantity	Unit	Unit Price	Total
CONSTRUCTION:				
Jefferson Orchard & Burr (submersible) Pump Stations	2	LS	$ 600,000	$ 1,200,000
Gravel Drives to pump stations	3,400	SY	$ 12	$ 40,800
Force Main (C900 PVC)	23,027	LF	$ 127	$ 2,924,429
Gravity Main (SDR-35 PVC)	9,411	LF	$ 180	$ 1,693,980
Manholes	47	EA	$ 4,500	$ 211,950
Road Bores: (Charles Town Rd+Wiltshire Rd+Burr Blvd+Philip Ave+Pittsburg Lndg+Duncan Field Ln+Currie Rd+Mildred St)	560	LF	$ 500	$ 280,000
Railroad Bore	100	LF	$ 600	$ 60,000
Restoration - pavement	3,600	SY	$ 22	$ 79,200
Restoration - shoulder/grass	72,080	SY	$ 2	$ 144,160
Restoration - gravel drive	1,700	SY	$ 12	$ 20,400
SubTotal (Construction)				**$ 6,654,919**
Planning-Level Estimate (add 30%)				$ 1,996,476
Total Construction COSTS:				$ 8,651,395
SAY				**$ 8,651,000**
assumes no improvements downstream of connection at Baker Blvd.				
PROPERTY AND RIGHTS-OF-WAY:				
Easements (Temporary & Permanent)	32,438	LF	$ 5	$ 162,190
				$ -
Pump Station Sites (2)	1.00	AC	$ 50,000	$ 50,000
SubTotal (Property & RWs)				**$ 212,190**
Contingency @ 5% ±				$ 10,610
TOTAL Property & RWs COSTS:				$ 222,800
SAY				**$ 223,000**
SOFT COSTS:				
Legal and Administration:				
Local Counsel	1	LS	$ 50,000	$ 50,000
Administration - Ranson	1	LS	$ 75,000	$ 75,000
Railroad Bore Permits and Fees	1	LS	$ 150,000	$ 150,000
Misc. Permits & Fees	1	LS	$ 50,000	$ 50,000
SubTotal (Legal & Administration)				**$ 325,000**
Engineering:				
Alternatives Study, Downstream Analysis	1	LS	$ 125,000	$ 125,000
Preliminary/Final Design	1	LS	$ 643,000	$ 643,000
Prequalification, Bidding and Negotiating	1	LS	$ 46,600	$ 46,600
Engineering Construction Services **TBD**	1	LS	$ 636,000	$ 636,000
SubTotal (Engineering)				**$ 1,450,600**
Additional Professional Services				
Project Management (TO#1)	1	LS	$ 103,000	$ 103,000
Geotechnical Investigation	1	LS	$ 59,000	$ 59,000
Wetland Investigation & Permitting	1	LS	$ 22,000	$ 22,000
Land Surveys and Easement Preparation	1	LS	$ 50,000	$ 50,000
Engineering Surveys and Topo	1	LS	$ 64,000	$ 64,000
Public Agency Meetings	1	LS	$ 20,000	$ 20,000
PSC Meetings/Hearings/Coordination	1	LS	$ 10,000	$ 10,000
Phase 1 Archaeological Assessment	1	LS	$ 34,000	$ 34,000
SubTotal (Additional Professional Services)				**$ 362,000**
SUBTOTAL SOFT COSTS:				**$ 2,137,600**
Contingency @ 5% ±				$ 106,880
TOTAL Soft COSTS (Legal & Administration, Engineering, Additional Professional Services):				$ 2,244,480
SAY				**$ 2,244,000**
TOTAL PROJECT COST (Construction, Property/RW, Soft)				$ 11,118,674
SAY				**$ 11,100,000**

City of Ranson Route 9 Infrastructure Project

Preliminary Sewer Cost Opinion

Option #6: Three public PSs (one located per Option #2, one located per Option #3, one located per Option #4)

Item	Quantity	Unit	Unit Price	Total
CONSTRUCTION:				
Jefferson Orchard, Burr & Locust Knoll (submersible) Pump Stations	3	LS	$ 600,000	$ 1,800,000
Gravel Drives to pump stations	3,500	SY	$ 12	$ 42,000
Force Main (C900 PVC)	22,395	LF	$ 127	$ 2,844,165
Gravity Main (SDR-35 PVC)	10,648	LF	$ 180	$ 1,916,640
Manholes	53	EA	$ 4,500	$ 239,400
Road Bores: (Charles Town Rd+Wiltshire Rd+Burr Blvd+Philip Ave+Pittsburg Lndg+Duncan Field Ln+Currie Rd+Mildred St)	560	LF	$ 500	$ 280,000
Railroad Bore	100	LF	$ 600	$ 60,000
Restoration - pavement	3,600	SY	$ 22	$ 79,200
Restoration - shoulder/grass	73,430	SY	$ 2	$ 146,860
Restoration - gravel drive	1,700	SY	$ 12	$ 20,400
SubTotal (Construction)				**$ 7,428,665**
Planning-Level Estimate (add 30%)				$ 2,228,600
Total Construction COSTS:				$ 9,657,265
SAY				**$ 9,657,000**
assumes no improvements downstream of connection at Baker Blvd.				
PROPERTY AND RIGHTS-OF-WAY:				
Easements (Temporary & Permanent)	33,043	LF	$ 5	$ 165,215
				$ -
Pump Station Sites (3)	1.50	AC	$ 50,000	$ 75,000
SubTotal (Property & RWs)				**$ 240,215**
Contingency @ 5% ±				$ 12,011
TOTAL Property & RWs COSTS:				$ 252,226
SAY				**$ 252,000**
SOFT COSTS:				
Legal and Administration:				
Local Counsel	1	LS	$ 50,000	$ 50,000
Administration - Ranson	1	LS	$ 75,000	$ 75,000
Railroad Bore Permits and Fees	1	LS	$ 150,000	$ 150,000
Misc. Permits & Fees	1	LS	$ 50,000	$ 50,000
SubTotal (Legal & Administration)				**$ 325,000**
Engineering:				
Alternatives Study, Downstream Analysis	1	LS	$ 125,000	$ 125,000
Preliminary/Final Design	1	LS	$ 717,500	$ 717,500
Prequalification, Bidding and Negotiating	1	LS	$ 46,600	$ 46,600
Engineering Construction Services **TBD**	1	LS	$ 710,000	$ 710,000
SubTotal (Engineering)				**$ 1,599,100**
Additional Professional Services				
Project Management (TO#1)	1	LS	$ 103,000	$ 103,000
Geotechnical Investigation	1	LS	$ 66,000	$ 66,000
Wetland Investigation & Permitting	1	LS	$ 22,000	$ 22,000
Land Surveys and Easement Preparation	1	LS	$ 50,000	$ 50,000
Engineering Surveys and Topo	1	LS	$ 64,000	$ 64,000
Public Agency Meetings	1	LS	$ 20,000	$ 20,000
PSC Meetings/Hearings/Coordination	1	LS	$ 10,000	$ 10,000
Phase 1 Archaeological Assessment	1	LS	$ 34,000	$ 34,000
SubTotal (Additional Professional Services)				**$ 369,000**
SUBTOTAL SOFT COSTS:				**$ 2,293,100**
Contingency @ 5% ±				$ 114,655
TOTAL Soft COSTS (Legal & Administration, Engineering, Additional Professional Services):				$ 2,407,755
SAY				**$ 2,408,000**
TOTAL PROJECT COST (Construction, Property/RW, Soft)				$ 12,317,245
SAY				**$ 12,300,000**

City of Ranson Route 9 Infrastructure Project
EDU DERIVATIONS

Development	EDUs served by gravity: 2019 Day 1	EDUs served by gravity: Post-2019	
Option #1			
BOE Site	0	500	Per CTUB WWSP
Bridgefort Property	0	181	(65 AC x 500 GPD/AC) / (180 GPD/EDU)
Clay Hill Farm	0	300	Per CTUB WWSP
		981	Total (2019 and post-2019)
Option #2			
BOE Site	0	500	Per CTUB WWSP
Bridgefort Property	0	181	(65 AC x 500 GPD/AC) / (180 GPD/EDU)
Clay Hill Farm	0	300	Per CTUB WWSP
Jefferson Orchard - East	0	553	(Note 1)
		1,534	Total (2019 and post-2019)
Option #3			
Blackford Village	0	730	(Note 2)
BOE Site	0	500	Per CTUB WWSP
Bridgefort Property	0	181	(65 AC x 500 GPD/AC) / (180 GPD/EDU)
Burr	150	174	(Note 3)
Clay Hill Farm	0	300	Per CTUB WWSP
Tackley Mill	0	600	Per CTUB WWSP
		2,635	Total (2019 and post-2019)
Option #4			
BOE Site	0	500	Per CTUB WWSP
Bridgefort Property	0	181	(65 AC x 500 GPD/AC) / (180 GPD/EDU)
Clay Hill Farm	0	300	Per CTUB WWSP
Locust Knoll	0	359	Per CTUB WWSP
Locust Knoll - acreage west	0	450	(162 AC x 500 GPD/AC) / (180 GPD/EDU)
		1,790	Total (2019 and post-2019)
Option #5			
Blackford Village	0	730	(Note 2)
BOE Site	0	500	Per CTUB WWSP
Bridgefort Property	0	181	(65 AC x 500 GPD/AC) / (180 GPD/EDU)
Burr	150	174	(Note 3)
Clay Hill Farm	0	300	Per CTUB WWSP
Jefferson Orchard - East	0	553	(Note 1)
Tackley Mill	0	600	Per CTUB WWSP
		3,188	Total (2019 and post-2019)
Option #6			
Blackford Village	0	730	(Note 2)
BOE Site	0	500	Per CTUB WWSP
Bridgefort Property	0	181	(65 AC x 500 GPD/AC) / (180 GPD/EDU)
Burr	150	174	(Note 3)
Clay Hill Farm	0	300	Per CTUB WWSP
Jefferson Orchard - East	0	553	(Note 1)
Locust Knoll	0	359	Per CTUB WWSP
Locust Knoll - acreage west	0	450	(162 AC x 500 GPD/AC) / (180 GPD/EDU)
Tackley Mill	0	600	Per CTUB WWSP
		3,997	Total (2019 and post-2019)

Note 1: 553 EDU = (199 AC x 500 GPD/AC) / (180 GPD/EDU). 199 AC is f/ Land Development Plan & Plat Application, revised 7/17/2017.
Note 2: 730 EDU = (338+117+275) EDU.
338 EDU = apartments.
117 EDU = (263,200 SF retail x 80 GPD/1,000 SF) / (180 GPD/EDU). 80 GPD/1,000 SF is f/ internet search, NYC.
275 EDU = (371,000 SF office x (20 GPD/EMP / 150 SF/EMP)) / (180 GPD/EDU). 20 GPD/EMP is f/ WV sewer regulations. 150 SF/EMP is f/ internet search.
All Blackford Village figures are f/ revised sketch plan dated 1/21/2005, showing a total site of 48.27 AC comprised of 36.29 AC mixed use + 11.98 AC open space.
Note 3: 150 EDU is the estimated interception in Options #3, #5 & #6 (existing tenants in Burr constitute 167 EDU per Jefferson County Development Authority letter dated 7/15/2016). 174 EDU is per CTUB WWSP.

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Appendix 2

Flow Projections and Capacity Derivations

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City of Ranson Route 9 Infrastructure Project

GROWTH - TRIBUTARY TO RANSON 7,000' GRAVITY SEWER

Development

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Rt. 9 corridor flow into u/s end of 10"														
Blackford Village	0	0	0	0	0	0	0	0	0	0	0	0	0	
BOE site (fmr. Lloyd Property)	0	0	0	270	270	450	450	450	450	990	1,980	1,980	1,980	
Bridgefort Property	0	0	0	0	0	0	0	0	0	0	0	0	0	
Burr Business Park (Note 1)	0	0	27,000	270	540	540	270	270	540	900	900	585	180	
Clay Hill Farm	0	0	0	0	0	0	0	270	270	270	270	270	270	
Harvest Hills	0	0	0	0	0	0	0	0	0	0	0	0	0	
JCPSD	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jefferson Orchard - East	0	0	0	0	0	0	0	0	0	1,800	1,800	1,800	1,800	GPD (avg)
Locust Knoll	0	0	0	0	0	540	1,080	1,080	1,080	1,800	1,800	1,800	1,800	
Locust Knoll - West	0	0	0	0	0	0	0	0	0	0	0	0	0	
Miller Property	0	0	0	0	0	0	0	0	0	0	0	0	0	
North Ranson Development	0	0	0	0	0	0	0	0	0	0	0	0	0	
ROXUL	0	0	40,000	0	0	0	0	0	40,000	0	20,000	0	0	
Sparkle Properties / Evers	0	0	0	0	0	0	0	270	270	270	270	270	0	
Tackley Mill	0	0	0	0	0	0	0	0	0	0	540	540	540	
			116		2		8		86		144		168	GPM (peak)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
Feeder flow into 10"														
Boulevard at PTC (Note 2)	6,627	675	12,150	2,700	2,700	2,700	2,700	3,375	3,375	3,375	3,375	0	0	GPD (avg)
			34		9		19		30		42		42	GPM (peak)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
Feeder flow into 15"														
Lakeland Place at Fairfax Crossing (Note 3)	56,267	0	0	0	0	1,350	1,350	1,350	1,350	1,350	1,350	2,250	2,250	
Marketplace at PTC (Note 4)	15,925	270	270	162	162	162	162	0	0	0	0	0	0	GPD (avg)
President's Pointe		0	0	0	0	0	0	0	0	0	675	1,080	1,080	
			126		1		6		11		16		28	GPM (peak)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
		5	441	19	20	32	33	39	263	60	183	59	55	EDU

Note 1: 27,000 GPD = 150 EDU x 180 GPD/EDU. 150 EDU is the estimated interception in Options #3, #5 & #6 (existing Burr tenants constitute 167 EDU per Jefferson County Development Authority letter dated 7/15/2016).

Note 2: 6,627 GPD = (198,810 GAL/MO) / (30 DAY/MO). 198,810 GAL/MO is for 12/1/2016-11/30/2017 per Jefferson Utilities, Inc.

Note 3: 56,267 GPD = 81,552 GPD - 15,925 GPD - 9,360 GPD. 81,552 GPD is per Ranson metering data for 1/1/2017-10/31/2017; 15,925 GPD is per Note 4 below; 9,360 GPD is per Note 2 on next page.

Note 4: 15,925 GPD = (477,756 GAL/MO) / (30 DAY/MO). 477,756 GAL/MO is for 12/1/2016-11/30/2017 per Jefferson Utilities, Inc.

City of Ranson Route 9 Infrastructure Project

GROWTH - TRIBUTARY TO FLOWING SPRINGS PUMP STATION

Development	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Flow in Breck. PS & FM														
Aspen Greens		1,215	1,350	1,431	0	0	0	0	0	0	0	0	0	
Beallair		1,080	1,080	1,080	810	1,800	1,800	0	11	11	21	21	21	
Beallair West		540	540	540	540	900	900	0	38	36	73	73	73	
Breckenridge East		2,700	2,700	2,700	2,349	2,673	2,700	0	0	0	0	0	0	
Briar Run		324	270	270	270	270	270	450	450	450	630	2	5	GPD (avg)
Butler Farms		108	54	54	108	108	108	180	180	180	180	61	122	
Cambridge		0	0	0	0	0	0	0	0	173	347	347	347	
Daniel's Forest		675	675	675	540	540	540	900	0	0	0	0	0	
Existing (Note 1)	142,000	0	0	0	0	0	0	0	0	0	0	0	0	
Stonecrest		270	270	270	270	270	270	450	450	450	450	236	473	
			271		21		44		49		54		57	GPM (peak)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
Flow from Shen. Springs														
Shen. Springs Phase 1 (Note 2)	9,360	3,848	3,848	0	0	0	0	0	0	0	0	0	0	
Shen. Springs Phase 2		675	675	675	675	675	297	0	0	0	0	0	0	GPD (avg)
Villages of Shen. Springs		729	729	729	729	729	729	1,215	1,215	1,215	810	0	0	
			34		5		9		13		17		17	GPM (peak)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
		68	68	47	35	44	42	18	13	14	14	4	6	EDU

Note 1: 142,000 GPD is per Ranson metering data for 1/1/2017-10/31/2017.

Note 2: 9,360 GPD = 52 EDU x 180 GPD/EDU. 52 EDU corresponds to number of lots sold in Phase 1 per Ranson, November 2017. Build-out is expected by 2019 per Ranson, November 2017.

City of Ranson Route 9 Infrastructure Project

GROWTH - TRIBUTARY TO EVITTS RUN INTERCEPTOR SEWER

Development

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Flow into u/s end of 18"														
(excluding FSPS force-main)														
American Heritage	0	540	1,080	1,080	1,080	1,800	1,800	900	900	540	1,080	1,080	1,080	
Existing (Notes 1, 2)	345,000	0	-27,000	0	0	0	0	0	0	0	0	0	0	
Greenhill Townhomes II	0	162	162	162	243	0	0	0	0	0	0	0	0	GPD (avg)
Kable Property	0	0	0	0	0	0	0	0	0	0	540	540	540	
Old Town Ranson - Infill	0	0	0	0	0	0	0	0	563	534	1,069	1,069	1,069	
7th & George Townhomes	0	0	243	162	162	0	0	0	0	7	14	14	14	
			556		5		11		15		22		31	GPM (peak)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
Feeders into 18"														
Existing (Note 3)	33,000	0	0	0	0	0	0	0	0	0	0	0	0	GPD (avg)
			57		0		0		0		0		0	GPM (peak)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
Feeders into 24"														
Bookers Landing (Note 4)		0	0	0	0	0	0	0	0	0	0	0	0	
Craighill		0	0	0	0	0	0	0	0	0	0	0	0	
Existing (Note 5)	341,821	0	0	0	0	0	0	0	0	0	0	0	0	GPD (avg)
Hayes (Note 6)		0	0	0	0	0	0	0	0	0	0	0	0	
Huntfield (Note 7)		4,725	4,725	4,050	4,725	5,400	6,750	11,250	11,250	11,250	11,250	8,078	16,155	
Stolipher		1,755	1,755	1,755	1,755	1,728	0	0	0	0	0	0	0	
			616		21		45		84		124		166	GPM (peak)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
		40	-106	40	44	50	48	68	71	69	78	60	105	EDU

Note 1: 345,000 GPD is estimated based on (514 AC x 500 GPD/AC) + (88,000 GPD). 514 AC is the estimated contributing area of about 4,000' x 5,600'. 88,000 GPD is f/ Lloyd's Flats PS, per JCPSD info.

Note 2: 27,000 GPD (150 EDU) is removed f/ Old Town Ranson in 2019 under Options #3, #5 & #6.

Note 3: 33,000 GPD is estimated based on (66 AC x 500 GPD/AC). 66 AC is the estimated contributing area of about 1,700' x 1,700'.

Note 4: Bookers Landing is no longer an entitled development per CTUB, December 2017, so flows are shown as zero.

Note 5: 341,821 GPD is calculated such that all nine 2017 flows sum to CT WWTP's 2017 average flow (1,250,000 GPD).

Note 6: Hayes is no longer an entitled development per CTUB, December 2017, so flows are shown as zero.

Note 7: Huntfield's future flows are earmarked for Tuscawilla WWTP in CTUB's WWSP, but CTUB says for the time being these flows will go to CT WWTP due to odor issues at Tuscawilla.

City of Ranson Route 9 Infrastructure Project

GROWTH - TRIBUTARY TO CHARLES TOWN WWTP

Development	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Flow in Samuel St. PS & FM														
Existing (Note 1)	300,000	0	0	0	0	0	0	0	0	0	0	0	0	
Jefferson Crossing II		270	270	810	0	0	0	0	0	65	131	131	131	
Jefferson Heights		1,215	1,215	1,215	0	0	0	0	0	0	0	0	0	
Langlet		3,240	3,240	3,240	3,240	3,240	3,240	5,400	5,400	5,400	5,400	509	1,017	GPD (avg)
Norborne Glebe		1,080	1,080	1,080	1,080	1,350	1,350	2,250	2,250	2,250	2,250	668	1,337	
Prospect Place (Note 2)		0	0	0	0	0	0	0	0	0	0	0	0	
Windmill Crossing		351	351	351	0	0	0	0	0	2	5	5	5	
			0.312		0.011		0.020		0.035		0.051		0.055	MGD (avg)
			cum.		cum.		cum.		cum.		cum.		cum.	
			2017-2019		2020-2021		2020-2023		2020-2025		2020-2027		2020-2029	
		34	34	37	24	26	26	43	43	43	43	7	14	EDU

Note 1: 300,000 GPD from Samuel Street pump station is per CTUB, December 2017.

Note 2: Prospect Place is no longer an entitled development per CTUB, December 2017, so flows are shown as zero.

City of Ranson Route 9 Infrastructure Project

COMPUTATION OF CAPACITIES OF GRAVITY SEWERS

Ranson 7,000' Sewer (Note 1)

u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF	slope %	capacity (GPM) (Note 2)	
11V	11U	10	496.45	494.96	355	0.42	552	
11U	11T	10	494.86	493.24	385	0.42	552	
11T	11S	10	493.14	492.24	214	0.42	552	
11S	11R	10	492.14	490.79	322	0.42	552	
11R	11E	10	490.69	489.93	181	0.42	552	
11E	11D-A	10	489.15	488.30	203	0.42	552	
11D-A	11D	10	488.20	487.94	67	0.39	532	
11D	11C	10	487.84	487.05	291	0.27	442	(Notes 3, 4)
11C	11B	10	486.95	485.05	380	0.50	602	(Note 3)
11B	11A	10	483.10	477.90	72	7.22	2,288	(Note 5)
11A	11-2	12	475.91	472.69	87	3.70	2,665	
11-2	11	12	472.59	469.76	296	0.96	1,357	
11	11-1	15	469.76	469.46	179	0.17	1,036	
11-1	12	15	469.27	468.00	224	0.57	1,898	
12	13	15	467.97	466.19	254	0.70	2,103	
13	14	15	466.19	464.04	245	0.88	2,358	
14	15	15	463.94	460.54	396	0.86	2,331	
15	16	15	460.52	456.17	396	1.10	2,636	
16	17	15	456.06	454.72	380	0.35	1,487	
17	18	15	454.67	453.33	345	0.39	1,570	
18	19	15	453.28	449.40	337	1.15	2,696	
19	20	15	449.34	446.97	337	0.70	2,103	
20	21	15	446.97	445.01	358	0.55	1,864	
21	22	15	444.99	442.86	399	0.53	1,830	
22	FSPS	15	442.82	438.49	399	1.09	2,624	
Evitts Run Sewer (Note 6)								
A-27	A-26	18	485.93	485.68	62	0.40	2,587	
A-26	A-25	18	485.68	483.97	417	0.41	2,619	
A-25	A-24A	18	483.97	483.53	108	0.41	2,619	
A-24A	A-24	18	483.53	482.42	270	0.41	2,619	
A-24	A-23	18	480.86	480.16	220	0.32	2,314	
A-23	A-22	18	480.16	478.93	385	0.32	2,314	
A-22	A-21	18	478.93	478.06	273	0.32	2,314	
A-21	A-20	18	478.06	477.88	52	0.35	2,420	
A-20	A-19	18	477.88	477.39	145	0.34	2,385	
A-19	A-18A	18	477.39	476.72	210	0.32	2,314	
A-18A	A-18	18	476.72	476.20	163	0.32	2,314	
A-18	A-17A	18	475.23	475.11	98	0.12	1,417	
A-17A	A-17	18	475.11	474.89	187	0.12	1,417	
A-17	A-16	18	474.89	474.66	192	0.12	1,417	
A-16	A-15	18	474.66	474.38	236	0.12	1,417	
A-15	A-14	18	474.38	474.02	251	0.14	1,530	
A-14	A-13	18	474.02	473.95	56	0.12	1,417	
A-13	A-12	24	473.45	473.31	134	0.10	2,788	
A-12	A-11	24	473.31	473.09	223	0.10	2,788	
A-11	A-10	24	473.09	473.03	60	0.10	2,788	
A-10	A-9	24	473.03	472.75	283	0.10	2,788	
A-9	A-8	24	472.75	472.57	177	0.10	2,788	
A-8	A-7	24	472.57	472.18	390	0.10	2,788	
A-7	A-6	24	472.18	471.83	355	0.10	2,788	
A-6	A-5	24	471.83	471.60	225	0.10	2,788	
A-5	A-4	24	471.60	471.31	288	0.10	2,788	
A-4	A-3	24	471.31	471.22	94	0.10	2,788	
A-3	A-2	24	471.22	470.97	250	0.10	2,788	
A-2	A-1	24	470.97	470.70	268	0.10	2,788	
A-1	A-0	24	470.70	470.65	47	0.11	2,924	
A-0	WWTP MH	24	470.65	470.63	15	0.13	3,179	

Note 1: MHs and LFs are based on design info, and differ slightly but not significantly from those shown on Figures 9 and 10 which are based on Ranson GIS info.

Note 2: Capacities are computed using a Manning "N" factor of 0.015.

Note 3: This pipe was reportedly designed and constructed as 8" diameter at 0.50%, but was reportedly upsized to 10" diameter.

Note 4: Computed slope of 0.27% is probably closer to 0.50%. It is computed using an as-built invert for MH 11D and a design invert for MH 11C.

Note 5: This pipe was reportedly designed and constructed as 8" diameter at 7.22%, but was reportedly upsized to 10" diameter.

Note 6: MHs and LFs are based on design info, and differ slightly but not significantly from those shown on Figures 9 and 11 which are based on Ranson GIS info.

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Appendix 3

CTUB 2015 Wastewater Strategic Plan Excerpts (Development Projections)

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City of Charles Town 2015 Strategic Plan
Development Projections

Development	Utility	Region	Total EDUs	Total Flow	2014	2015	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020	Year 6 2021	Year 7 2022	Year 8 2023	Year 9 2024	Year 10 2025	Year 11 2026	Year 12 2027	Year 13 2028	Year 14 2029	Year 15 2030	Year 16 2031	Year 17 2032	Year 18 2033	Year 19 2034	Year 20 2035	Year 30 2045	TOTALS
Town of Ranson																											
Shenandoah Springs Neighborhood (Phase 1)	RA	Northern	256	46,080	0	25	25	25	25	25	25	25	25	25	25	6	0	0	0	0	0	0	0	0	0	0	256
Shenandoah Springs Neighborhood (Phase 2)	RA	Northern	161	28,980	0	25	25	25	25	25	25	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	161
The Village of Shenandoah Springs	RA	Northern	288	51,840	0	27	27	27	27	27	27	27	27	27	27	18	0	0	0	0	0	0	0	0	0	0	288
President's Pointe	RA	Northern	1100	198,000	0	0	25	40	40	40	40	50	50	50	50	50	33	33	33	33	33	33	33	33	33	333	1100
Potomac Marketplace	RA	Northern	54	9,720	0	10	10	10	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54
Ranson Gateway / Boulevard	RA	Northern	1175	211,500	0	0	25	450	100	100	100	100	75	75	75	75	0	0	0	0	0	0	0	0	0	0	1175
Lakeland Place / Lloyd's Landing	RA	Northern	600	108,000	0	0	50	50	50	50	50	50	50	50	50	50	5	5	5	5	5	5	5	5	5	50	600
American Heritage	RA	Northern	500	90,000	0	0	0	0	20	40	40	40	40	40	20	20	12	12	12	12	12	12	12	12	12	120	500
Old Town Ranson - Infill	RA	Northern	250	45,000	0	0	0	0	0	0	0	0	0	0	0	13	12	12	12	12	12	12	12	12	12	119	250
Locust Knoll	RA	Northern	359	64,620	0	0	0	0	20	40	40	40	40	40	40	40	3	3	3	3	3	3	3	3	3	30	359
Greenhill Townhomes, II	RA	Northern	27	4,860	0	0	6	6	6	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
7th & George Townhomes	RA	Northern	24	4,320	0	0	0	0	0	9	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	2	24
Jefferson Orchards / Northport	RA	Northern	555	99,900	0	0	0	25	30	30	30	30	30	30	30	30	15	15	15	15	15	15	15	15	15	145	555
Sparkle Properties / Evers	RA	Northern	50	9,000	0	0	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
Kable Property	RA	Northern	600	108,000	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	600
Tackley Mill	RA	Northern	600	108,000	0	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	600
Clayhill Farm	RA	Northern	300	54,000	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	100	300
Lloyd Property	RA	Northern	500	90,000	0	0	0	0	0	0	10	10	10	10	10	10	22	22	22	22	22	22	22	22	22	220	500
Subtotal			7,399	1,331,820	-	87	253	718	409	461	459	445	397	397	377	362	152	152	152	152	152	152	152	152	152	1,517	7,399
Jefferson Public Service District																											
Spruce Hill North	PSD	Southern	4	720	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
Aspen Green	PSD	Northern	203	36,540	20	25	45	50	53	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	5	203
Beallair	PSD	Northern	235	42,300	0	0	0	0	40	40	40	30	40	40	0	0	0	0	0	0	0	0	0	0	0	2	235
Beallair West	PSD	Northern	137	24,660	0	0	0	0	20	20	20	20	20	20		1	1	1	1	1	1	1	1	1	1	8	137
Breckenridge East	PSD	Northern	694	124,920	36	72	100	100	100	87	99	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	694
Briar Run	PSD	Northern	131	23,580	12	12	12	10	10	10	10	10	10	10	10	14	0	0	0	0	0	0	0	0	0	0	131
Burr Industrial Park & Bardane	PSD	Northern	174	31,320	10	10	10	20	20	10	10	20	20	20	13	4	0	0	0	0	0	0	0	0	0	4	174
Cambridge	PSD	Northern	77	13,860	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	4	4	39	77
Daniels Forest	PSD	Northern	192	34,560	12	25	25	25	25	20	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	192
Jefferson Crossing II	PSD	Northern	99	17,820	10	10	10	10	30	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	15	99
Norborne Glebe	PSD	Eastern	837	150,660	40	40	40	40	40	40	50	50	50	50	50	50	15	15	15	15	15	15	15	15	15	149	837
Harvest Hills	PSD	Northern	392	70,560	20	20	20	20	20	20	20	20	20	20	20	20	8	8	8	8	8	8	8	8	8	76	392
Stonecrest	PSD	Northern	225	40,500	10	10	10	10	10	10	10	10	10	10	10	10	5	5	5	5	5	5	5	5	5	53	225
Butler Farms	PSD	Northern	71	12,780	4	4	4	2	2	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1	1	14	71
Subtotal			3,471	624,780	174	230	276	287	370	261	283	284	194	174	107	103	36	36	36	36	36	36	36	36	36	364	3,471
CITY OF CHARLES TOWN																											
Huntfield	CT	Western	5965	1,073,700	100	150	175	175	150	175	200	250	250	250	250	250	180	180	180	180	180	180	180	180	180	1,795	5965
Bookers Landing	CT	Southern	100	18,000	20	20	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
Stolipher	CT	Southern	324	58,320	0	0	65	65	65	65	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	324
Winchester Cold Storage	CT	Western	675	121,500	40	40	40	40	40	40	40	40	40	40	40	100	7	7	7	7	7	7	7	7	7	68	675
Hayes (Hospital WAS PROJECTED HERE)	CT	Southern	1150	207,000	0	90	140	90	90	290	90	90	10	10	10	10	12	12	12	12	12	12	12	12	12	115	1150
Langlet	CT	Eastern	1666	299,880	120	120	120	120	120	120	120	120	120	120	120	120	11	11	11	11	11	11	11	11	11	113	1666
Craighill	CT	Eastern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jefferson Heights	CT	Eastern	225	40,500	45	45	45	45	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	225
Windmill Crossing	CT	Willow Spring	66	11,880	13	13	13	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	66
Prospect Place	CT	Eastern	1950	351,000	390	390	390	390	390	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1950
Allowance for Anticipated Development	CT	Eastern	250	45,000	25	25	25	25	25	25	25	25	25	2	2	2	1	1	1	1	1	1	1	1	1	10	250
Subtotal			12,371	2,226,780	753	893	1,033	983	958	715	539	525	445	422	422	482	210	210	210	210	210	210	210	210	210	2,101	12,371
Total Projected Development			23,241	4,183,380	927	1,210	1,562	1,988	1,737	1,437	1,281	1,254	1,036	993	906	947	398	398	398	398	398	398	398	398	398	3,982	23,241

City of Charles Town 2015 Strategic Plan
Flow Projections (Development Projections Discounted)

Discount Level								85%	85%	85%	85%	85%	85%	75%	75%	75%	75%	75%	50%	50%	50%	50%	50%	50%	50%	50%	50%	
							Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 30	
Development	**Utility**	**Current WWTP**	**Proposed WWTP**	**Region**	**Total EDUs to Go**	**Total Flow**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2045**	**TOTALS**
Town of Ranson																													
Shenandoah Springs Neighborhood (Phase 1)	RA	CT	CT / TUSC	Northern	256	46,080	675	675	675	675	675	675	675	1,125	1,125	1,125	270	-	-	-	-	-	-	-	-	-	-	-	8,370
Shenandoah Springs Neighborhood (Phase 2)	RA	CT	CT / TUSC	Northern	161	28,980	675	675	675	675	675	675	297	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,347
The Village of Shenandoah Springs	RA	CT	CT / TUSC	Northern	288	51,840	729	729	729	729	729	729	729	1,215	1,215	1,215	810	-	-	-	-	-	-	-	-	-	-	-	9,558
President's Pointe	RA	CT	CT / TUSC	Northern	1,100	198,000	-	675	1,080	1,080	1,080	1,080	1,350	2,250	2,250	2,250	2,250	1,496	2,993	2,993	2,993	2,993	2,993	2,993	2,993	2,993	2,993	29,925	73,699
Potomac Marketplace	RA	CT	CT / TUSC	Northern	54	9,720	270	270	270	162	162	162	162	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,458
Ranson Gateway / Boulevard	RA	CT	CT / TUSC	Northern	1,175	211,500	-	675	12,150	2,700	2,700	2,700	2,700	3,375	3,375	3,375	3,375	-	-	-	-	-	-	-	-	-	-	-	37,125
Lakeland Place / Lloyd's Landing	RA	CT	CT / TUSC	Northern	600	108,000	-	1,350	1,350	1,350	1,350	1,350	1,350	2,250	2,250	2,250	2,250	225	450	450	450	450	450	450	450	450	450	4,500	25,875
American Heritage	RA	CT	CT / TUSC	Northern	500	90,000	-	-	-	540	1,080	1,080	1,080	1,800	1,800	900	900	540	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	10,800	30,240
Old Town Ranson - Infill	RA	CT	CT / TUSC	Northern	250	45,000	-	-	-	-	-	-	-	-	-	-	563	534	1,069	1,069	1,069	1,069	1,069	1,069	1,069	1,069	1,069	10,688	21,403
Locust Knoll	RA	CT	CT / TUSC	Northern	359	64,620	-	-	-	540	1,080	1,080	1,080	1,800	1,800	1,800	1,800	133	266	266	266	266	266	266	266	266	266	2,655	16,157
Greenhill Townhomes, II	RA	CT	CT / TUSC	Northern	27	4,860	-	162	162	162	243	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	729
7th & George Townhomes	RA	CT	CT / TUSC	Northern	24	4,320	-	-	-	-	243	162	162	-	-	-	-	7	14	14	14	14	14	14	14	14	14	135	830
Jefferson Orchards / Northport	RA	CT	CT / TUSC	Northern	555	99,900	-	-	675	810	810	810	810	1,350	1,350	1,350	1,350	653	1,305	1,305	1,305	1,305	1,305	1,305	1,305	1,305	1,305	13,050	34,763
Sparkle Properties / Evers	RA	CT	CT / TUSC	Northern	50	9,000	-	270	270	270	270	270	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,350
Kable Property	RA	CT	CT / TUSC	Northern	600	108,000	-	540	540	540	540	540	540	900	900	900	900	900	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	18,000	41,940
Tackley Mill	RA	CT	CT / TUSC	Northern	600	108,000	-	540	540	540	540	540	540	900	900	900	900	900	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	18,000	41,940
Clayhill Farm	RA	CT	CT / TUSC	Northern	300	54,000	-	270	270	270	270	270	270	450	450	450	450	450	900	900	900	900	900	900	900	900	900	9,000	20,970
Lloyd Property	RA	CT	CT / TUSC	Northern	500	90,000	-	-	-	-	-	270	270	450	450	450	450	990	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	1,980	19,800	40,950
Subtotal					7,399	1,331,820	2,349	6,831	19,386	11,043	12,447	12,393	12,015	17,865	17,865	16,965	16,268	6,828	13,655	13,655	13,655	13,655	13,655	13,655	13,655	13,655	13,655	136,553	411,704
Jefferson Public Service District																													
Spruce Hill North	PSD	CT	CT / TUSC	Southern	4	720	54	-	-	-	-	-	-	-	-	-	-	5	9	9	9	9	9	9	9	9	9	90	230
Aspen Green	PSD	CT	CT / TUSC	Northern	203	36,540	675	1,215	1,350	1,431	-	-	-	-	-	-	-	23	45	45	45	45	45	45	45	45	45	450	5,549
Beallair	PSD	CT	CT / TUSC	Northern	235	42,300	-	-	-	1,080	1,080	1,080	810	1,800	1,800	-	11	11	21	21	21	21	21	21	21	21	21	214	8,078
Beallair West	PSD	CT	CT / TUSC	Northern	137	24,660	-	-	-	540	540	540	540	900	900	-	38	36	73	73	73	73	73	73	73	73	73	727	5,415
Breckenridge East	PSD	CT	CT / TUSC	Northern	694	124,920	1,944	2,700	2,700	2,700	2,349	2,673	2,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17,766
Briar Run	PSD	CT	CT / TUSC	Northern	131	23,580	324	324	270	270	270	270	270	450	450	450	630	2	5	5	5	5	5	5	5	5	5	45	4,066
Burr Industrial Park & Bardane	PSD	CT	CT / TUSC	Northern	174	31,320	270	270	540	540	270	270	540	900	900	585	180	16	32	32	32	32	32	32	32	32	32	315	5,879
Cambridge	PSD	CT	CT / TUSC	Northern	77	13,860	-	-	-	-	-	-	-	-	-	-	-	173	347	347	347	347	347	347	347	347	347	3,465	6,757
Daniels Forest	PSD	CT	CT / TUSC	Northern	192	34,560	675	675	675	675	540	540	540	900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,220
Jefferson Crossing II	PSD	CT	CT / TUSC	Northern	99	17,820	270	270	270	810	-	-	-	-	-	-	-	65	131	131	131	131	131	131	131	131	131	1,305	4,165
Norborne Glebe	PSD	CT	CT	Eastern	837	150,660	1,080	1,080	1,080	1,080	1,080	1,350	1,350	2,250	2,250	2,250	2,250	668	1,337	1,337	1,337	1,337	1,337	1,337	1,337	1,337	1,337	13,365	43,162
Harvest Hills	PSD	CT	CT / TUSC	Northern	392	70,560	540	540	540	540	540	540	540	900	900	900	900	342	684	684	684	684	684	684	684	684	684	6,840	20,718
Stonecrest	PSD	CT	CT / TUSC	Northern	225	40,500	270	270	270	270	270	270	270	450	450	450	450	236	473	473	473	473	473	473	473	473	473	4,725	12,904
Butler Farms	PSD	CT	CT / TUSC	Northern	71	12,780	108	108	54	54	108	108	108	180	180	180	180	61	122	122	122	122	122	122	122	122	122	1,215	3,737
Subtotal					3,471	624,780	6,210	7,452	7,749	9,990	7,047	7,641	7,668	8,730	7,830	4,815	4,640	1,638	3,276	3,276	3,276	3,276	3,276	3,276	3,276	3,276	3,276	32,755	143,645
CITY OF CHARLES TOWN																													
Huntfield	CT	CT	TUSC	Western	5,965	1,073,700	4,050	4,725	4,725	4,050	4,725	5,400	6,750	11,250	11,250	11,250	11,250	8,078	16,155	16,155	16,155	16,155	16,155	16,155	16,155	16,155	16,155	161,550	394,448
Bookers Landing	CT	CT	CT / TUSC	Southern	100	18,000	540	540	540	540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,160
Stolipher	CT	CT	CT / TUSC	Southern	324	58,320	-	1,755	1,755	1,755	1,755	1,728	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,748
Winchester Cold Storage	CT	TUSC	TUSC	Western	675	121,500	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,800	1,800	1,800	4,500	304	608	608	608	608	608	608	608	608	608	6,075	29,306
Hayes (Hospital WAS PROJECTED HERE)	CT	CT	CT / TUSC	Southern	1,150	207,000	2,430	3,780	2,430	2,430	7,830	2,430	2,430	450	450	450	450	518	1,035	1,035	1,035	1,035	1,035	1,035	1,035	1,035	1,035	10,350	45,743
Langlet	CT	CT	CT	Eastern	1,666	299,880	3,240	3,240	3,240	3,240	3,240	3,240	3,240	5,400	5,400	5,400	5,400	509	1,017	1,017	1,017	1,017	1,017	1,017	1,017	1,017	1,017	10,170	64,112
Craighill	CT	CT	CT	Eastern	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jefferson Heights	CT	CT	CT	Eastern	225	40,500	1,215	1,215	1,215	1,215	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,860
Windmill Crossing	CT	WS	WS	Willow Spring	66	11,880	351	351	351	351	-	-	-	-	-	-	-	2	5	5	5	5	5	5	5	5	5	45	1,492
Prospect Place	CT	CT	CT	Eastern	1,950	351,000	10,530	10,530	10,530	10,530	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42,120
Allowance for Anticipated Development	CT	CT	CT	Eastern	250	45,000	675	675	675	675	675	675	675	1,125	90	90	90	43	86	86	86	86	86	86	86	86	86	855	7,787
Subtotal					12,371	2,226,780	24,111	27,891	26,541	25,866	19,305	14,553	14,175	20,025	18,990	18,990	21,690	9,452	18,905	18,905	18,905	18,905	18,905	18,905	18,905	18,905	18,905	189,045	600,775
Total Projected Development					23,241	4,183,380	32,670	42,174	53,676	46,899	38,799	34,587	33,858	46,620	44,685	40,770	42,597	17,918	35,835	35,835	35,835	35,835	35,835	35,835	35,835	35,835	35,835	358,353	1,156,123

Route 9 Sewer Project
Design Report

Appendix 2
Yeomans Pump Curves

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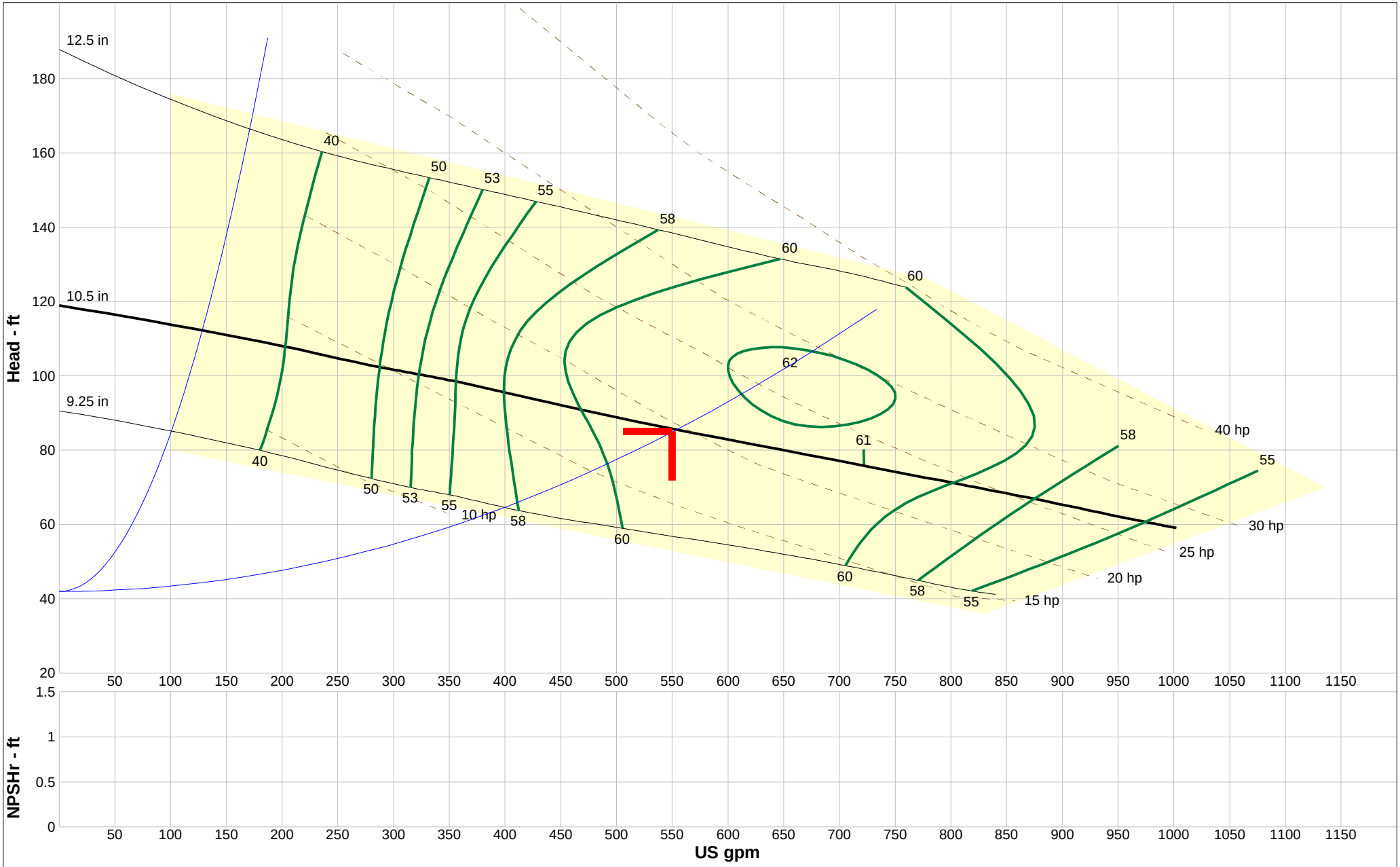


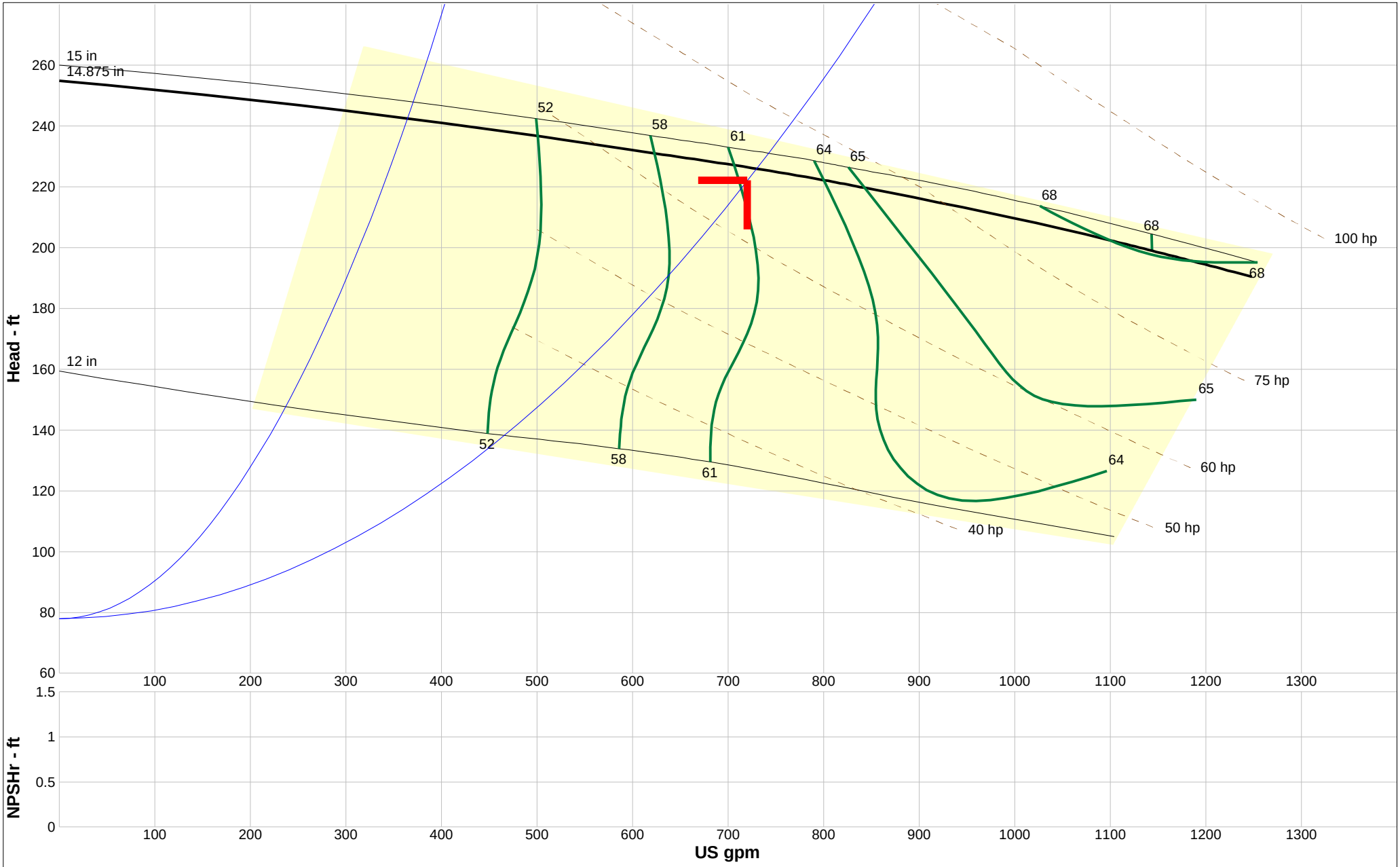
Max motor size for this model: 40HP. Default motor size is based upon max. power on the design curve plus a margin factor to allow for impeller trim variances that may occur to meet H.I. TDH requirements. Efficiencies and data are typical. Please contact the factory for guaranteed values. FOR TEMP. ABOVE 104 DEG. F (40 DEG C) REFER TO FACTORY FOR ASSISTANCE.

Company: STH, Inc.
Name: Northport Pump Station
4/18/2018

Yeomans Pump, Aurora, IL
Catalog: YP_9100.60, Vers 1
9100 - 1800
Design Point: 550 US gpm, 85 ft

Model: 412.53SV
Speed: 1765 rpm
Dia: 10.5 in
Curve ID No.: 40597
Impeller ID No.: Y-5318

YEOMANS



Default motor size is based upon max. power on the design curve plus a margin factor to allow for impeller trim variances that may occur to meet H.I. TDH requirements. Efficiencies and data are typical. Please contact the factory for guaranteed values. FOR TEMP. ABOVE 104 DEG. F (40 DEG C) REFER TO FACTORY FOR ASSISTANCE.

Company: STH, Inc.
Name: War Admiral Pump Station
4/18/2018

Yeomans Pump, Aurora, IL
Catalog: YP_9100.60, Vers 1
9100 - 1800
Design Point: 720 US gpm, 222 ft

Model: 4153
Speed: 1750 rpm
Dia: 14.875 in
Curve ID No.: 40224
Impeller ID No.: Y-5117

YEOMANS

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX D
RK&K SEWER MODEL REPORT

CHARLES TOWN UTILITY BOARD

TASK 05 SEWER MODEL

JANUARY 22, 2021

(DRAFT SUBMISSION)

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Exhibit 1 CTUB Sewer Model – Model Layout
Exhibit 2 CTUB Sewer Model – Percent Flow Capacity - Dry Weather Flow
Exhibit 3 CTUB Sewer Model – Percent Flow Capacity - Wet Weather Flow
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APPENDICES

Appendix A – Exhibits
Appendix B – Hydraulic Model Loading Table
Appendix C – Model Calibration Results
Appendix D – Current Flow Results – Dry Weather and Wet Weather Flows
Appendix E – Current Manhole Results – Dry Weather and Wet Weather Flows

I. EXECUTIVE SUMMARY

This Report contains hydraulic model development, collection system hydraulic capacity analysis, assessment of existing conditions of pumping stations, and recommendations for rehabilitation and improvements. This modeling effort consisted of creating a skeletonized model of CTUB's collection system, using the CTUB's updated GIS information and data obtained from CTUB.

Average daily sewage flows were based on EDU counts that were redistributed across the model. Wet weather flows were developed based on available meter data and utilized as the base storm event. Predicted peak flows calculated by the model were utilized to determine sewer pipe design capacity.

The majority of the CTUB conveyance system appears to be adequately sized to convey the existing average daily sewer flows; however, during wet weather flow simulations, several sections of the Evitts Run interceptor were identified as being overloaded or having capacity concerns. Results of the sewer model also showed that the Park Line is experiencing capacity issues, which was validated by evidence of manhole surcharge. However temporary flow meter results from the Park Gravity Line were 60% lower than predicted by the model. Therefore, additional flow monitoring and field observations are recommended to confirm the accuracy of the model in this area.

Additional flow monitoring is recommended for several of the pump stations within CTUB's system to determine the accuracy of pump run times from operator logs and draw down tests. For example, flow results from Clarence, Demory, and Willow pump stations were conservative by 20% compared to the results predicted by the model. On the other hand, the results from the temporary flow monitoring upstream of the Wendy's Pump Station were higher than predicted by the model. As a result, CTUB is encouraged to install temporary flow meters upstream of several pump stations to collect more data to further validate the model.

The hydraulic capacity for the pump station evaluations was based on a review of data provided by CTUB, including GIS mapping, record drawings, operator logs, and pump station O&M manuals. Each pump station was evaluated with recommendations made for operational improvements.

Continual review, data collection and calibration of the hydraulic model will provide a tool for managing the collection and conveyance system. Thereby, developing a model that improves system evaluation during system growth and troubleshooting problems as they arise.

CHARLES TOWN UTILITY BOARD

TASK 05 SEWER MODEL

(DRAFT SUBMISSION)

II. INTRODUCTION

The Charles Town Utility Board (CTUB) has concerns that flows from recent wet weather and seasonal weather cycles, as well as current and future normal flows, cannot be collected, conveyed and treated because of inadequate hydraulic capacity in parts of the collection system. In addition, pumping stations and associated pipelines are old and may need to be rehabilitated or replaced. Focused studies, reports, and analyses have been completed in recent years but there is a need for a comprehensive review of the system to identify deficiencies and the prioritization of expansion and/or upgrades for capital improvement planning and budgeting.

RK&K is pleased to provide CTUB a comprehensive review of its collection system and pumping stations. The model includes gravity sewers, pump stations and force main sewer lines specified by CTUB. This *Sewer Model* contains hydraulic model development, collection system hydraulic capacity analysis, assessment of existing conditions of pumping stations, and recommendations for model improvements.

III. HYDRAULIC MODEL DEVELOPMENT

a. Creation of Existing Hydraulic Model

The modeling effort began with GIS feature data sets which were created from Record Drawings provided by CTUB. A model was developed that included approximately 30,000 LF of gravity sewer, 150 manholes, and 33,000 LF of force mains as specified by CTUB and shown in **Exhibit 1 in Appendix A**. The model also included eight (8) of the 47 pump stations distributed across CTUB's core system. These pump stations were composed of wet wells, pumps and force mains. Infrastructure dimensions and elevation data were checked for completeness. Items that were missing or questionable (e.g. adverse slopes, incoming inverts, etc.) were flagged to be reevaluated and updated. In addition, the dry weather diurnal flow pattern and peak wet weather patterns were developed to be used as a baseline for reevaluation and applicability.

b. Base/Average Daily Flows

Model loads were based on estimated Equivalent Dwelling Units (EDU) developed from residential counts and commercial flows provided by CTUB. CTUB has determined that one EDU is equivalent to 150 gallons per day (gpd). These developed average daily flows (ADF) were then distributed to the best extent possible through the model. Sanitary Load nodes, or locations where flow is added to the model, were identified based on the collection system layout. Load nodes were typically allocated to each minor basin, whereas larger collector systems were connected to the

conveyance sewers, or adjacent to pump stations. Collector systems, within the minor basins, were assigned to the closest connection node along the modeled sewer. **Exhibit 1 in Appendix A** and the Hydraulic Model Loading Table in **Appendix B** highlight the 27 load nodes that were used to distribute model flows.

c. Steady State Evaluation and Calibration

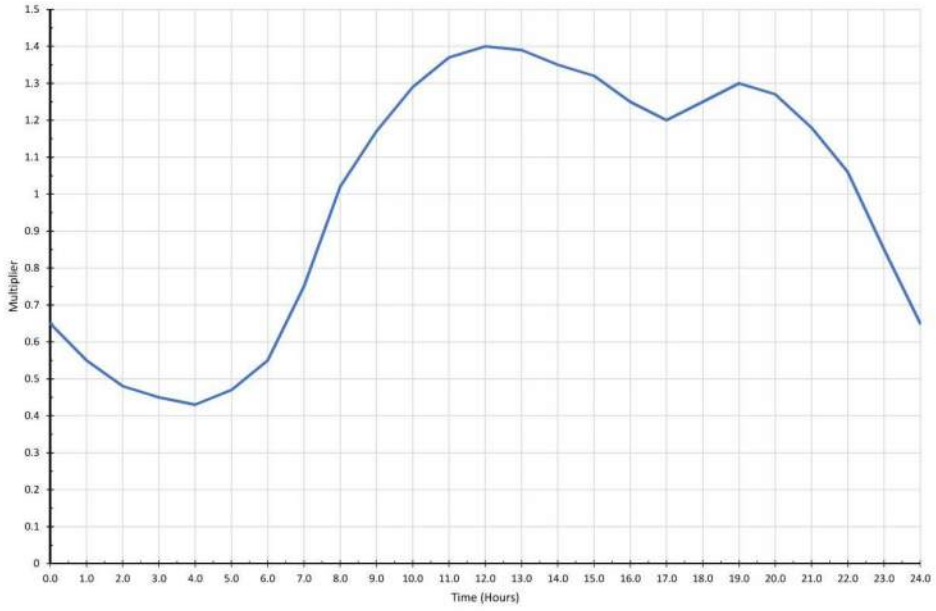
The model was assembled with the ADF loading and run under steady state conditions. The model was evaluated against the average flow at the CTUB Wastewater Treatment Plant, the eight (8) modeled pump stations, and three (3) different flow meters located across the collection system. Results are presented in **Appendix C**.

- Total Model Flows are within +/- 10% of the 2018 and 2019 ADF recorded at the WWTP. Confidence level in customer EDU count and value is high with the variation easily attributed to annual fluctuations in groundwater tables and local weather conditions.
- A month-long installation of a flow meter at CT-2 measured an average flow 3.4% higher than that predicted based on upstream EDUs. Model results along the Evitts Run (18”/24”) Interceptor should therefore be representative of actual conditions.
- The model predicts flows at the Demory Farms, Willow Spring and Clarence Drive pump stations to be approximately 20% higher than current meter readings. The model is predicting conservative results. It is therefore suggested to install temporary flow meters upstream of the pump stations to verify flow readings of the pump station flow meters.
- The model predicted flows from the Racetrack pump station are 50% greater than observed. However, observed values for the pump station are estimated based on logged pump run times and pump duty point. To increase confidence in the model, it is recommended to install flow meters upstream of the pump station to verify flows.
- A large difference in flow values was found in the area around the Wendy’s pump station. The flow meter installed at CT-362, upstream of the pump station, recorded flows approximately 90% greater than predicted by EDU counts. The Wendy’s station, on the other hand, had flows 45% lower than predicted. Additional flow monitoring in the area around the station to increase confidence in model results is recommended.
- The model predicted flow approximately 60% higher than recorded at the meter installed in CT-238. The flow meter results were 100,000 gallons per day lower than what was predicted by the model based on upstream EDU counts. It is recommended to install flow meters upstream of CT-235 where the force main from Clarence Drive PS discharges to verify the accuracy of the previous flow meter results.
- The model predicted flows to Samuel Street Pump Station that are 27% greater than observed. Additional flow monitoring in the Brownville Lane area above the station to increase confidence in model results is recommended.

d. Dynamic Diurnal Pattern - Base/Average Daily Flows

The developed model is a dynamic model and runs over an extended period. Therefore, a typical diurnal curve was generated based on average flowmeter data. The flows at each load point were applied to the curve so that the model can be evaluated over a simulated period of several days. **Figure 1** shows the curve that was used in the current model. The diurnal pattern has the peak hour flow of approximately 1.4 X ADF occurring at 12 noon.

Figure 1 – Average Daily Dry Weather Flow Typical Diurnal Pattern



e. Peak Wet Weather Flows

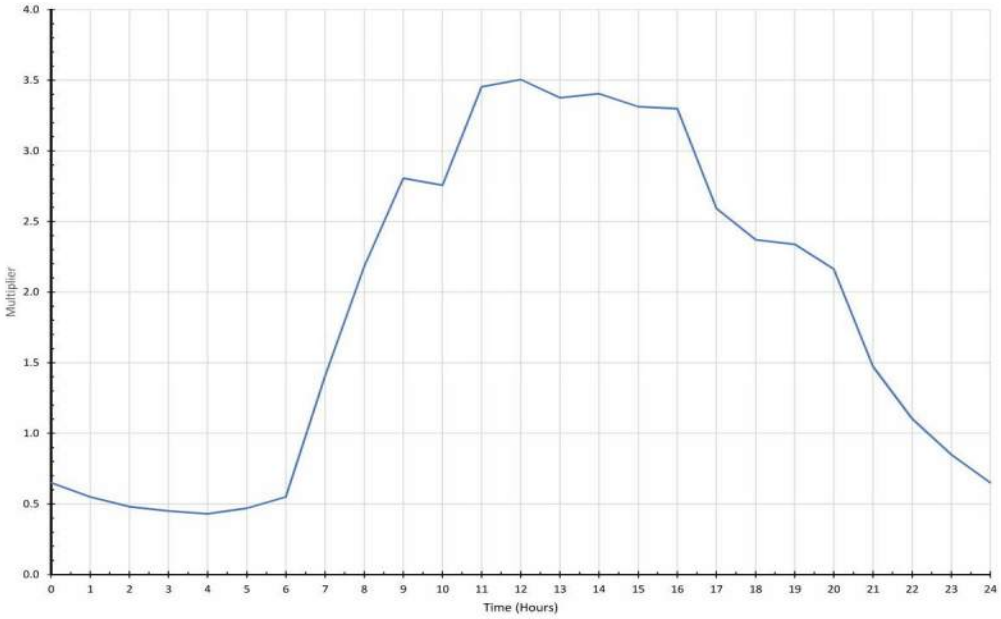
The severity of a wet weather event is defined by its duration and intensity. These events are often classified by their “return period” or frequency at which they statistically occur. When evaluating a conveyance system, a wet weather event with a 2-year to 5-year return period is often used. These are the type of events for which a sanitary sewer system must be capable of conveying sewage infiltration and inflow.

The storm pattern depicted in **Figure 2** is an approximation of the rain derived infiltration and inflow (RDII) expected from a 2-year to 5-year return period wet weather event with a duration of four hours. This approximation was derived from the synthetic storm available data from CTUB flow metering sites. This pattern has an approximate peaking factor of 3.5 times the ADF. It should be noted that CTUB’s service area is large, and it is difficult to obtain consistent system wide rainfall data with concurrent flowmeter data. A long duration flow monitoring program should be conducted to capture rain events and develop individual RDII hydrographs for the various drainage basins.

This peak wet weather flow (WWF) pattern was initially applied uniformly across all the sewer loads over an extended simulation period of 168 hours (7 days). This duration period was used to allow the flows in the model to reach a normal flow state

before the wet weather event occurred. The duration period also provided sufficient time after the wet weather event for the model to return to a normal flow state.

Figure 2 – Peak Wet Weather Flow Typical Loading Patterns



IV. COLLECTION SYSTEM HYDRAULIC CAPACITY

Predicted peak flow (PPF) calculated by the model was evaluated to determine utilization of design pipe capacity with the following criteria:

- PPF < 67% design capacity – Adequately sized
- 67% ≤ PPF < 80% - Pipe of concern; verify wet weather and future flows by implementing continuous real time flowmeter monitoring program.
- 80% ≤ PPF <100% - Pipe to be listed for redesign; utilize hydraulic modeling software to evaluate impacts of additional EDUs and wet weather events to ensure the system hydraulic capacity is not exceeded.
- PPF ≥ 100% - Pipe to be redesigned; implement moratorium on new sewer connections until hydraulic improvements to existing system are completed.

Severity of issue is dependent on whether these predicted flows are seen under dry weather or wet weather flow conditions. Numerical information for the hydraulic grade line (HGL), flow, and capacity of each conduit and associated structure (Node) are the basis of the information displayed in **Exhibit 2** and **Exhibit 3**, and can be found in **Appendices D and E**.

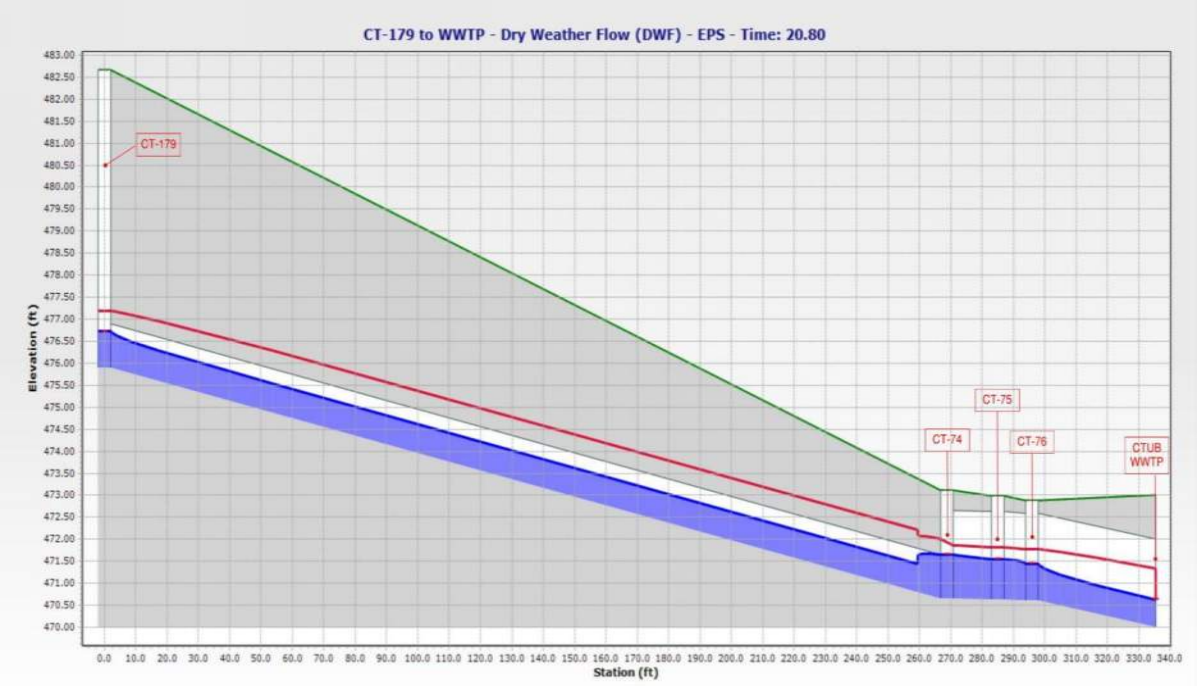
a. Current (2020) Conditions Model

Current Average Daily Dry Weather Flow/Peak Hour Flow

The majority of the CTUB conveyance system appears to be adequately sized to convey the existing dry weather sewer loading. One area along Evitts Run was identified as an area of concern. See **Exhibit 2** for a map of the predictions.

- Evitts Run Interceptor - Conduit form CT-179 to CT-74 upstream of WWTP. Predicted flows greater than 75% of capacity and a surcharged manhole CT-74. Pipes have a 24" and 12" diameter. As shown in **Figure 3**, Pipes from GIS have the same downstream invert resulting in a hydraulic jump due to a backwater condition. Usually, the smaller diameter branch pipe will share crown elevations with the main interceptor to alleviate this condition.

Figure 3 – Hydraulic Profile – CT-179 to WWTP - DWF



Current Peak Wet Weather Flow

During the wet weather flow simulations several additional interceptors were identified as having capacity concerns. In addition to the 24" Evitts Run Interceptor noted in the ADF model, additional sections of the Evitts Run Interceptor as well as portions of the Ranson sewer system were determined to be capacity deficient. Refer to **Exhibit 3** for a map of the predictions and **Appendix D or E** for a detailed listing of overflowing or surcharged manholes for the Current Wet Weather Flows.

- Evitts Run Interceptor, Charles Town, minor basin CT-64 has a predicted flow of between 67% and 80% of capacity for the majority of segments downstream to MH CT-67 and >100% for the flat slope segments between MHs CT-70 and

CT-71. An elevated HGL is predicted throughout the minor basin but the only surcharge occurs at MH CT-74. See **Figure 4.**

Figure 4 – Hydraulic Profile – CT-60 to CT-74 - WWF



- The Evitts Run Interceptor, Charles Town, minor basin CT-423 has a flow capacity utilization >100% from MH CT-49 to CT-56 and one segment downstream of MH CT- 57. Additionally, there is a segment of pipe, downstream of MH CT-56 between 80% and 100% capacity. MHs show elevated HGLs but are not surcharged. See **Figure 5.**

Figure 5 – Hydraulic Profile –CT-45 to CT-60 – WWF



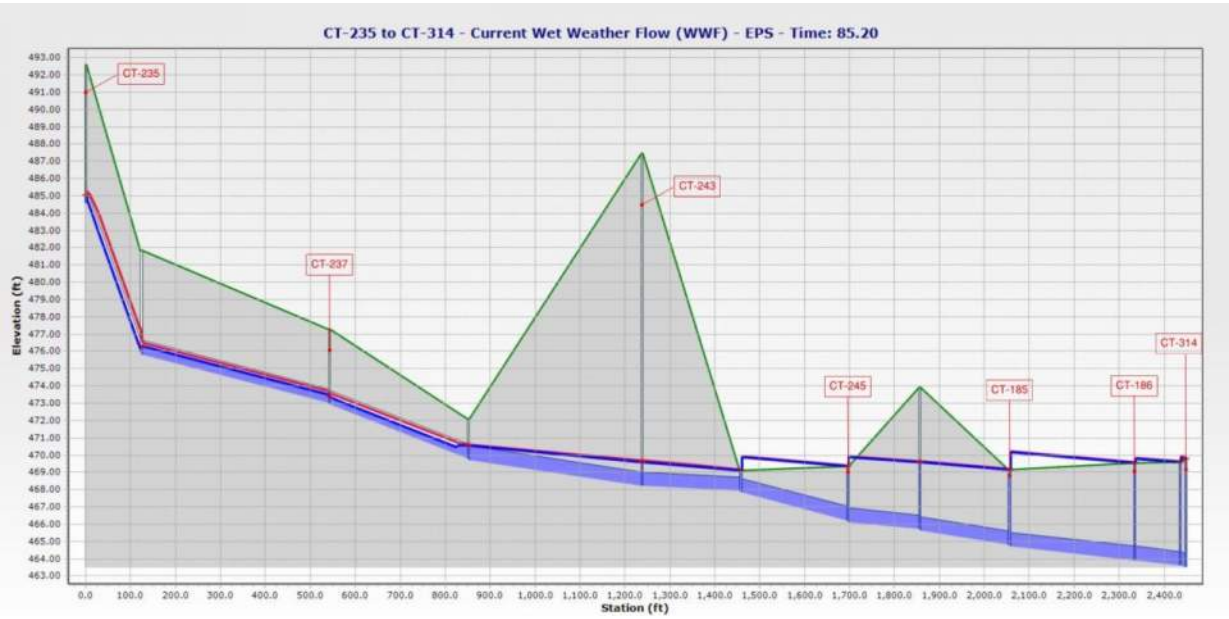
- The Ranson, minor basin R-151, has a flow capacity utilization between 80% and 100% from MH R-151 and R-249 and shows >100% for two segments downstream of MH R-242. MHs show elevated HGLs but are not surcharged. See **Figure 6.**

Figure 6 – Hydraulic Profile – R-149 to R-259 – WWF



- The Park Interceptor, Charles Town, minor basin CT-185 Park Interceptor shows capacity restrictions downstream of MH CT-238. Peak flows exceed the capacity of the downstream segments. Several manholes along this interceptor are predicted to be overflowing or surcharged. See **Figure 7.**

Figure 7 – Hydraulic Profile –CT-235 to CT-314 – WWF



V. PUMP STATION ANALYSIS

Throughout the report, 150 gallons/day per unit is used to calculate flows. This value is from the residential usage equivalents for capacity improvements fees section in CTUB's Sewer Tariff dated February 3, 2020. Information regarding pump stations and customer counts is from GIS mapping, record drawings, operator logs, and pump station O&M manuals provided by CTUB, which were used as the basis of the evaluation and contingent on the accuracy of the information provided.

Racetrack (3-6)

The Racetrack Pump Station currently runs an average of 1.2 hours per day and has a current available peaking factor of 20. Analysis indicates that the pump station is currently operating below capacity, however results of the hydraulic model indicate calculated flows based on pump run time may not be accurate and that flow monitoring should be conducted. See **Appendix F** for more information.

Pump Model	Myers 4VHX150M4-23 8,75" Impeller
No. of Pumps	2
Duty Point	250 GPM @ 67' TDH
2020 Avg. Hours/Day	1.2
2020 Max. Hours/Day	2.1
Wet Well Dim.	6' Diam. x 16'
Monitoring System	Omni
Force Main Size	6"

Pump Flow Rate: 250 GPM
Avg. Current Run Time: 1.2 hrs/day
Max. Current Run Time: 2.1 hrs/day

Avg. Current Daily Flow: (1.2 hrs/day) x (250 GPM) x (60 min./hr.) = 18,000 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (2.1 hrs/day) / (1.2 hrs/day) = 1.75
Current Available Peak Factor: (24 hrs) / (1.2 hrs) = 20

Breckenridge (3-7)

The Breckenridge Pump Station currently runs an average of 4.6 hours per day and has a current available peaking factor of 5.21. Alternate Main Line Agreements exist with Aspen Greens for 200 proposed units and with Beallair Subdivision. See **Appendix G** for more information. As stated in the RK&K Task 09 Beallair Downstream Capacity Report:

"RK&K's conclusion is that CTUB's existing system, including the Beallair Pump Station, the Breckenridge Subdivision Gravity Sewer, and the Breckenridge Pump Station can accommodate the additional flow from the previously approved Phases 3-5 and the proposed 200 units in Aspen Greens at this time. Therefore, it is RK&K's recommendation that CTUB can approve Piedmont Design Group's request for sewer service for the previously approved Beallair Phases 3-5 as a new pump station and sewer line are not necessary to serve Phases 3-5 requested by the Piedmont Design Group, LLC.

JCPSD had previously approved AMLEAs for Phases 1-5 for Beallair and 200 Aspen Greens. The analysis above confirms that there is adequate capacity in the system for the previously approved phases, however, additional requests such as Phase 6 may require pump station or pump modifications. In order to maintain a peaking factor closer to 4.0 for future unapproved development, the pumps at the Breckenridge Pump Station will need to be modified or replaced to increase pumping capacity. The existing 8" force main from Breckenridge will be able to accommodate flow from larger pumps. RK&K recommends that the development and the run times at the Breckenridge Pump Station continue to be monitored."

Pump Model	Myers 4VC300M4-43 10" Impeller
No. of Pumps	2
Duty Point	600 GPM @ 86.64' TDH
2020 Avg. Hours/Day	4.6
2020 Max. Hours/Day	10.4
Wet Well Dim.	8' Diam. X 22'4"
Monitoring System	Omni
Force Main Size	8"

Pump Flow Rate: 600 GPM
Avg. Current Run Time: 4.6 hrs/day
Max. Current Run Time: 10.4 hrs/day

Avg. Current Daily Flow: (4.6 hrs/day) x (600 GPM) x (60 min./hr.) = 165,600 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (10.4 hrs/day) / (4.6 hrs/day) = 2.26
Current Available Peak Factor: (24 hrs) / (4.6 hrs) = 5.21

Job Corps (3-8)

The Job Corps Pump Station currently runs an average of 0.9 hours a day and has a current available peaking factor of 26.7. Analysis indicates that the pump station is currently operating below capacity. See **Appendix H** for more information.

Pump Model	Flygt CP3152
No. of Pumps	2
Duty Point	80 GPM @ 117' TDH
2020 Avg. Hours/Day	0.9
2020 Max. Hours/Day	4.1
Wet Well Dim.	6' Diam. X 11'5"
Monitoring System	Omni
Force Main Size	4"

Pump Flow Rate: 80 GPM
Avg. Current Run Time: 0.9 hrs/day
Max. Current Run Time: 4.1 hrs/day

Avg. Current Daily Flow: (0.9 hrs/day) x (80 GPM) x (60 min./hr.) = 4,320 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (4.1 hrs/day) / (0.9 hrs/day) = 4.6
Current Available Peak Factor: (24 hrs) / (0.9 hrs) = 26.7

Jefferson High School (3-9)

The Jefferson High School Pump Station currently runs an average of 1.1 hours per day and has a current available peaking factor of 21.82. Analysis indicates that the Pump Station is operating below capacity. See **Appendix I** for more information.

Pump Model	Flygt CP3152
No. of Pumps	2
Duty Point	180 GPM @ 103' TDH
2020 Avg. Hours/Day	1.1
2020 Max. Hours/Day	3.1
Wet Well Dim.	6' Diam x 18'5"
Monitoring System	Omni
Force Main Size	6"

Pump Flow Rate: 180 GPM
Avg. Current Run Time: 1.1 hrs/day
Max. Current Run Time: 3.1 hrs/day

Avg. Current Daily Flow: (1.1 hrs/day) x (180 GPM) x (60 min./hr.) = 11,880 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (3.1 hrs/day) / (1.1 hrs/day) = 2.82
Current Available Peak Factor: (24 hrs) / (1.1 hrs) = 21.82

Briar Run I (3-10)

The Briar Run I Pump Station currently runs an average of 0.8 hours per day and has a current available peaking factor of 30. Analysis indicates that the Pump Station is operating below capacity. See **Appendix J** for more information.

Pump Model	Myers 4R-3BHP 6.5" Impeller
No. of Pumps	2
Duty Point	89 GPM @ 35' TDH
2020 Avg. Hours/Day	0.8
2020 Max. Hours/Day	1.2
Wet Well Dim.	5' Diam. X 16'
Monitoring System	Omni
Force Main Size	4"

Pump Flow Rate: 89 GPM
Avg. Current Run Time: 0.8 hrs/day
Max. Current Run Time: 1.2 hrs/day

Avg. Current Daily Flow: (0.8 hrs/day) x (89 GPM) x (60 min./hr.) = 4,272 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (1.2 hrs/day) / (0.8 hrs/day) = 1.50
Current Available Peak Factor: (24 hrs) / (0.8 hrs) = 30

Briar Run II (3-11)

The Briar Run II Pump Station currently runs an average of 5.2 hours per day and has a current available peaking factor of 4.62. Analysis indicates that the Pump Station is currently operating below capacity, however the capacity should be reevaluated if future development is proposed. See **Appendix K** for more information.

Pump Model	Myers 4R-3BHP 6.5" Impeller
No. of Pumps	2
Duty Point	113 GPM @ 33' TDH
2020 Avg. Hours/Day	5.2
2020 Max. Hours/Day	9.1
Wet Well Dim.	5' Diam. X 16'
Monitoring System	Omni
Force Main Size	4"

Pump Flow Rate: 113 GPM
Avg. Current Run Time: 5.2 hrs/day
Max. Current Run Time: 9.1 hrs/day

Avg. Current Daily Flow: (5.2 hrs/day) x (113 GPM) x (60 min./hr.) = 35,256 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (9.1 hrs/day) / (5.2 hrs/day) = 1.75
Current Available Peak Factor: (24 hrs) / (5.2 hrs) = 4.62

Beallair (3-13)

The Beallair Pump Station currently runs an average of 1.3 hours per day and has a current available peaking factor of 18.46. Analysis indicates that the Pump Station is currently operating below capacity. See **Appendix L** for more information.

RK&K Task 08 Beallair Downstream Capacity evaluated the capacity of the Beallair Pump Station with the addition of units in the Beallair Subdivision. The report noted:

"There are currently 111 units constructed in the Beallair subdivision, leading to a peak flow at the Beallair Pump Station of approximately 47 GPM. According to the Piedmont Design Group, LLC request, 304 units were approved in the plan, leading to a peak flow of approximately 127 GPM, which is within the pump's design rate of 204 GPM. The addition of 193 units will increase the pump station's average run time to 3.7 hours/day and peak run time to 14.8 hours/day, assuming a 4.0 peaking factor, which indicates that the station would still be operating below capacity. Therefore, the Beallair Pump Station can handle the flow from Phases 3-6 with no changes made to the pump station.

Additional capacity for the planned 132 units within Phase 6 has been requested. The additional 132 customers would increase the total number of housing units within the subdivision to 436, leading to a peak flow of approximately 182 GPM, which is within the pump's design rate of 204 GPM. The addition of 132 units will increase the pump station's average run time to 5.3 hours/day and peak run time to 21.2 hours/day with a 4.0 peaking factor, which indicates that the station would still be operating below capacity. Therefore, the Beallair Pump Station can handle the flow from the additional 132 units in Phase 6 with no changes made to the pump station."

Pump Model	Myers 4VE150M4
No. of Pumps	2
Duty Point	204 GPM @ 104' TDH
2020 Avg. Hours/Day	1.3
2020 Max. Hours/Day	3.0
Wet Well Dim.	6' Diam. X 24'
Monitoring System	Omni
Force Main Size	6"

Pump Flow Rate: 204 GPM
Avg. Current Run Time: 1.3 hrs/day
Max. Current Run Time: 3.0 hrs/day

Avg. Current Daily Flow: (1.3 hrs/day) x (204 GPM) x (60 min./hr.) = 15,912 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (3.0 hrs/day) / (1.3 hrs/day) = 2.31
Current Available Peak Factor: (24 hrs) / (1.3 hrs) = 18.46

Wendy's (4-2)

The Wendy's Pump Station currently runs an average of 1.7 hours per day and has a current available peaking factor of 14.12. Analysis indicates that the pump station is currently operating below capacity, however results of the hydraulic model indicate calculated flows based on pump run time may not be accurate and that flow monitoring should be conducted. See **Appendix M** for more information.

Pump Model	Myers 4VCX300-M4-23 10.25" Impeller
No. of Pumps	2
Duty Point	410 GPM @ 99' TDH
2020 Avg. Hours/Day	1.7
2020 Max. Hours/Day	2.4
Wet Well Dim.	6' Diam. X 24'
Monitoring System	Omni
Force Main Size	6"

Pump Flow Rate: 410 GPM
Avg. Current Run Time: 1.7 hrs/day
Max. Current Run Time: 2.4 hrs/day

Avg. Current Daily Flow: (1.7 hrs/day) x (410 GPM) x (60 min./hr.) = 41,820 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (2.4 hrs/day) / (1.7 hrs/day) = 1.41
Current Available Peak Factor: (24 hrs) / (1.7 hrs) = 14.12

Greenfield

The Greenfield Pump Station currently runs an average of 6.2 hours per day and has a current available peaking factor of 3.87. Analysis indicates that the system experiences a low amount of inflow and infiltration. Although the system has an available peaking factor less than four, the system is still operating below capacity. If future development is proposed in the service area, the capacity should be reevaluated. See **Appendix N** for more information.

Pump Model	Myers WGX75H-23-35
No. of Pumps	2
Duty Point	103 GPM @ 91' TDH
2020 Avg. Hours/Day	6.2
2020 Max. Hours/Day	11.2
Wet Well Dim.	5' Diam. X 9'5"
Monitoring System	Omni
Force Main Size	4"

Pump Flow Rate: 103 GPM
Avg. Current Run Time: 6.2 hrs/day
Max. Current Run Time: 11.2 hrs/day

Avg. Current Daily Flow: (6.2 hrs/day) x (103 GPM) x (60 min./hr.) = 38,316 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (11.2 hrs/day) / (6.2 hrs/day) = 1.81
Current Available Peak Factor: (24 hrs) / (6.2 hrs) = 3.87

Burr Park East (5-1)

The Burr Park East Pump Station currently runs an average of 1.9 hours per day and has a current available peak factor of 12.63. Analysis indicates that the pump station is operating below capacity. See **Appendix O** for more information.

Pump Model	Myers 4VC200M4-23
No. of Pumps	2
Duty Point	265 GPM @ 98' TDH
2020 Avg. Hours/Day	1.9
2020 Max. Hours/Day	3.4
Wet Well Dim.	8' Diam. X 18'6"
Monitoring System	Omni
Force Main Size	6"

Pump Flow Rate: 265 GPM
Avg. Current Run Time: 1.9 hrs/day
Max. Current Run Time: 3.4 hrs/day

Avg. Current Daily Flow: (1.9 hrs/day) x (265 GPM) x (60 min./hr.) = 30,210 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (3.4 hrs/day) / (1.9 hrs/day) = 1.79
Current Available Peak Factor: (24 hrs) / (1.9 hrs) = 12.63

Burr West (5-2)

The Burr West Pump Station currently runs an average of 0.4 hours per day and a maximum of 0.6 hours per day. An O&M Manual for the Burr West Pump Station was not available, and the model and duty point of the pumps are unknown. Based on the low run times, the current available peak factor is 60, which indicates that the pumps are operating below capacity. See **Appendix P** for more information.

Pump Model	Myers 4WHV30M4-23
No. of Pumps	2
Duty Point	unknown
2020 Avg. Hours/Day	0.4
2020 Max. Hours/Day	0.6
Wet Well Dim.	6’ Diam. X 15’9”
Monitoring System	Omni
Force Main Size	4”

Pump Flow Rate: unknown
Avg. Current Run Time: 0.4 hrs/day
Max. Current Run Time: 0.6 hrs/day

Avg. Current Daily Flow: unknown
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (0.6 hrs/day) / (0.4 hrs/day) = 1.50
Current Available Peak Factor: (24 hrs) / (0.4 hrs) = 60

Burr Royal (5-3)

The Burr Royal Pump Station currently runs an average of 0.4 hours per day and has a current available peak factor of 60. Analysis indicates that the pumps are operating below capacity. See **Appendix Q** for more information.

Pump Model	HOMA AMX434-235/13P/C
No. of Pumps	2
Duty Point	200 GPM @ 68' TDH
2020 Avg. Hours/Day	0.4
2020 Max. Hours/Day	0.9
Wet Well Dim.	8' Diam. X 14'
Monitoring System	Omni
Force Main Size	4"

Pump Flow Rate: 200 GPM
Avg. Current Run Time: 0.4 hrs/day
Max. Current Run Time: 0.9 hrs/day

Avg. Current Daily Flow: (0.4 hrs/day) x (200 GPM) x (60 min./hr.) = 4,800 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (0.9 hrs/day) / (0.4 hrs/day) = 2.25
Current Available Peak Factor: (24 hrs) / (0.4 hrs) = 60

Samuel Street (SS)

The Samuel Street Pump Station currently runs an average of 4.5 hours per day and has a current available peaking factor of 5.33. Analysis indicates that the pump station is operating below capacity. See **Appendix R** for more information. In addition, results of the hydraulic model indicate calculated flows based on pump run time may not be accurate and that flow monitoring should be conducted.

Pump Model	Flygt CP3152.181
No. of Pumps	2
Duty Point	1,005 GPM @ 49.9' TDH
2020 Avg. Hours/Day	4.5
2020 Max. Hours/Day	7.1
Wet Well Dim.	12' Diam. X 20'
Monitoring System	Mission
Force Main Size	10"

Pump Flow Rate: 1,005 GPM
Avg. Current Run Time: 4.5 hrs/day
Max. Current Run Time: 7.1 hrs/day

Avg. Current Daily Flow: (4.5 hrs/day) x (1,005 GPM) x (60 min./hr.) = 271,350 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (7.1 hrs/day) / (4.5 hrs/day) = 1.58
Current Available Peak Factor: (24 hrs) / (4.5 hrs) = 5.33

Huntfield (303)

The Huntfield Pump Station runs an average of 24.9 hours per day and has a current available peaking factor of 0.96. Analysis indicates that the pump station is operating over capacity. Because the Tuscawilla WWTP is offline, this pump station collects all flow from the Tuscawilla service area. Once the Tuscawilla WWTP is online, the pump station will be relieved from the high amount of flow. Continued monitoring of this pump station is recommended. See **Appendix S** for more information.

Pump Model	Flygt 3152.181
No. of Pumps	2
Duty Point	113.17 GPM @ 162.29 TDH
2020 Avg. Hours/Day	24.9
2020 Max. Hours/Day	49.2
Wet Well Dim.	Unknown Diam. X 27.33’
Monitoring System	Omni
Force Main Size	unknown

Pump Flow Rate: unknown
Avg. Current Run Time: 24.9 hrs/day
Max. Current Run Time: 49.2 hrs/day

Avg. Current Daily Flow: unknown
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (49.2 hrs/day) / (24.9 hrs/day) = 1.98
Current Available Peak Factor: (24 hrs) / (24.9 hrs) = 0.96

Demory (307)

The Demory Pump Station currently runs an average of 1.8 hours per day and has a current available peak factor of 13.33 hours. Analysis indicates the Pump Station is operating below capacity; however, results of the hydraulic model indicate calculated flows based on pump run time may not be accurate and that flow monitoring should be conducted. See **Appendix T** for more information.

Pump Model	Yeomans 9100-412.3SV
No. of Pumps	2
Duty Point	335 GPM @ 118' TDH
2020 Avg. Hours/Day	1.8
2020 Max. Hours/Day	3.4
Wet Well Dim.	8' Diam. X 26'
Monitoring System	Flow Meter
Force Main Size	6"

Pump Flow Rate: 335 GPM
Avg. Current Run Time: 1.8 hrs/day
Max. Current Run Time: 3.4 hrs/day

Avg. Current Daily Flow: (1.8 hrs/day) x (335 GPM) x (60 min./hr.) = 36,180 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (3.4 hrs/day) / (1.8 hrs/day) = 1.89
Current Available Peak Factor: (24 hrs) / (1.8 hrs) = 13.33

Willow Spring (309)

The Willow Spring Pump Station currently runs an average of 3.6 hours per day and has a current available peak factor of 6.67. Analysis indicates that the pump station is operating below capacity, however results of the hydraulic model indicate calculated flows based on pump run time may not be accurate and that flow monitoring should be conducted. See **Appendix U** for more information.

Pump Model	Yeomans 9100-4153
No. of Pumps	2
Duty Point	370 GPM @ 157' TDH
2020 Avg. Hours/Day	3.6
2020 Max. Hours/Day	6.7
Wet Well Dim.	8' Diam. X 28'4"
Monitoring System	Flow Meter
Force Main Size	6"

Pump Flow Rate: 370 GPM
Avg. Current Run Time: 3.6 hrs/day
Max. Current Run Time: 6.7 hrs/day

Avg. Current Daily Flow: (3.6 hrs/day) x (370 GPM) x (60 min./hr.) = 79,920 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (6.7 hrs/day) / (3.6 hrs/day) = 1.86
Current Available Peak Factor: (24 hrs) / (3.6 hrs) = 6.67

Clarence Drive (310)

The Clarence Drive Pump Station currently runs an average of 5.3 hours per day and has a current available peak factor of 4.53. Analysis indicates that the Pump Station is operating below capacity, however the capacity should be reevaluated if any future development is proposed. In addition, results of the hydraulic model indicate calculated flows based on pump run time may not be accurate and that flow monitoring should be conducted. See **Appendix V** for more information.

Pump Model	Yeomans 9100-412.3SV
No. of Pumps	2
Duty Point	425 GPM @ 79’ TDH
2020 Avg. Hours/Day	5.3
2020 Max. Hours/Day	8.8
Wet Well Dim.	8’ Diam. X 21’10”
Monitoring System	Flow Meter
Force Main Size	6”

Pump Flow Rate: 425 GPM
Avg. Current Run Time: 5.3 hrs/day
Max. Current Run Time: 8.8 hrs/day

Avg. Current Daily Flow: (5.3 hrs/day) x (425 GPM) x (60 min./hr.) = 135,150 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (8.8 hrs/day) / (5.3 hrs/day) = 1.66
Current Available Peak Factor: (24 hrs) / (5.3 hrs) = 4.53

Marlowe Road / Tractor Supply (313)

The Marlowe Road/Tractor Supply Pump Station is currently running an average of 5.3 hours per day and has a current available peak factor of 4.5. Analysis indicates that the Pump Station is currently operating below capacity. If future development is proposed, the capacity of the pump station should be reevaluated. See **Appendix W** for more information.

Pump Model	Ebara 80DVCFU6152
No. of Pumps	2
Duty Point	unknown
2020 Avg. Hours/Day	5.3
2020 Max. Hours/Day	7.2
Wet Well Dim.	unknown
Monitoring System	Omni
Force Main Size	unknown

Pump Flow Rate: unknown
Avg. Current Run Time: 5.3 hrs/day
Max. Current Run Time: 7.2 hrs/day

Avg. Current Daily Flow: unknown
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (7.2 hrs/day) / (5.3 hrs/day) = 1.36
Current Available Peak Factor: (24 hrs) / (5.3 hrs) = 4.5

Flowing Spring (R-1)

The Flowing Spring Pump Station is currently running an average of 4.5 hours per day and has a current available peak factor of 5.33. Analysis indicates that the Pump Station is currently operating below capacity. If future development is proposed in the service area, the impact on the pump station's capacity should be evaluated. See **Appendix X** for more information.

Pump Model	unknown
No. of Pumps	3
Duty Point	900 GPM
2020 Avg. Hours/Day	4.5
2020 Max. Hours/Day	6.8
Wet Well Dim.	10' Diam. X 27'
Monitoring System	Omni
Force Main Size	12"

Pump Flow Rate: 900 GPM
Avg. Current Run Time: 4.5 hrs/day
Max. Current Run Time: 6.8 hrs/day

Avg. Current Daily Flow: (4.5 hrs/day) x (900 GPM) x (60 min./hr.) = 243,000 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (6.8 hrs/day) / (4.5 hrs/day) = 1.51
Current Available Peak Factor: (24 hrs) / (4.5 hrs) = 5.33

4th Avenue (R-2)

The 4th Avenue Pump Station is currently running an average of 2.2 hours per day and has a current available peak factor of 10.9. Analysis indicates that the Pump Station is currently operating below capacity. See **Appendix Y** for more information.

Pump Model	unknown
No. of Pumps	2
Duty Point	unknown
2020 Avg. Hours/Day	2.2
2020 Max. Hours/Day	4.5
Wet Well Dim.	6' Diam. X 20'
Monitoring System	Mission
Force Main Size	unknown

Pump Flow Rate: unknown
Avg. Current Run Time: 2.2 hrs/day
Max. Current Run Time: 4.5 hrs/day

Avg. Current Daily Flow: unknown
Industry Standard Peaking Factor: 3.5 to 4.0
Current Actual Operating Peak Factor: (Max. Current Run Time) / (Avg. Current Run Time) = (4.5 hrs/day) / (2.2 hrs/day) = 2.05
Current Available Peak Factor: (24 hrs) / (2.2 hrs) = 10.9

Forrest Street (R-4)

The Forrest Street Pump Station pump hours are not recorded by operators. The Mission System does record the number of gallons per day. Based on the Mission System and O&M Manuals, the Pump Station is running an average of 2.2 hours per day and has a current available peak factor of 10.9. Analysis indicates that the pump station is currently operating below capacity. See **Appendix Z** for more information.

Pump Model	Hydromatic HPG200M2-2
No. of Pumps	2
Duty Point	45 GPM
Wet Well Dim.	4' Diam X 10'
Monitoring System	Mission
Force Main Size	2"

Pump Flow Rate: 45 GPM

Avg. Current Daily Flow: 5,750 GPD
Industry Standard Peaking Factor: 3.5 to 4.0
Avg. Current Run Time: (Gallons Per Day) / (Duty Point) = (5,750 GPD) / (45 GPM x 60 min/hr) = 2.2 hrs/day
Current Available Peak Factor: (24 hrs) / (2.2 hrs/day) = 10.9

VI. SUGGESTED FUTURE MODELING EFFORTS

a. GIS Data

1. Sewer segments of conveyance sewers south of the Park, from MH CT-243 to MH CT-314 should be surveyed. Current GIS data in this area is questionable, resulting in inaccurate model predictions. **Exhibit 4** shows the area to be surveyed. Upon review of the model results it appears that existing Manhole and Sewer GIS data may be in an alternate datum.

b. Flow Allocation/EDU Distribution

1. EDU allocations based on flow meter results should be adjusted. Although these areas will no longer be customer based, the model will be more representative of observed flows.

2. The skeletonized nature of the current model leads to multiple basins being associated with each load node. The model was developed to be easily updated as new basins are added and EDUs are reallocated.

3. The minor basin delineation should be updated as the model is refined. It is recommended that the delineation be parcel-based as it helps maintain more accurate EDU counts for each basin. Maintaining accurate EDU counts is needed to improve the accuracy of the model.

c. Flow Monitoring/Wet Weather Analysis

1. It is recommended that the next round of flow metering studies be conducted within the Ranson service area. The flow meters will help to verify contributions from the northern drainage basins and verify any variation in diurnal patterns.

2. A flowmeter/rain gauge monitoring program for maintaining model ready data should be developed. The regular review of data will provide improved tools for managing system wide I/I as well as a means for updating and further calibrating the conveyance system model. Thereby, developing a model that improves system evaluation during system growth and troubleshooting problems as they arise.

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX E
RK&K MANHOLE EVALUATION REPORT

CHARLES TOWN UTILITY BOARD

MANHOLE INSPECTION REPORT

JUNE 8, 2021

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INTRODUCTION

The Charles Town Utility Board (CTUB) sewer system consists of three (3) separate sewer systems (City of Charles Town, City of Ranson, and Jefferson County Public Service District) that were combined into a single sewer utility owned and operated by CTUB. Within the overall sewer system there are 45 individual sewer pumping stations.

Following the submission of the December 11, 2020 Manhole Evaluation Report, CTUB Staff agreed with the recommendations from the 2020 Report to continue the manhole evaluations based on the hydrogen sulfide issues discovered downstream of the five (5) pumping stations evaluated within the two known problem areas. The two areas in question included the "bottleneck" along the Evitt's Run Interceptor near the Flowing Springs Pump Station discharge and the Brownville Lane area. RK&K inspected 65 sanitary sewer manholes in these known problem areas and discovered severe manhole deterioration in 32 of the manholes, which resulted in RK&K's recommendation within the previous report.

Inspection of these areas confirmed that several of the manholes were in need of immediate rehabilitation. Because these manholes were downstream of pump stations, and at the request of CTUB, RK&K inspected 1-5 manholes downstream of every pump station in CTUB's system. Many of these areas also experienced hydrogen sulfide issues, specifically the areas downstream of the Burr East Pump Station, Jefferson High School Pump Station, Jett's Farm Pump Station, Lloyd's Flat Pump Station, Race Track Pump Station, Wendy's Pump Station, County Green Pump Station, Belvedere Height's Pump Station, Greenfield Pump Station, and Mountaineer Court Pump Station.

The concrete deterioration shown in the sanitary sewer manholes can be attributed to hydrogen sulfide which is common in sewers with flat slopes, low wastewater velocities, and long detention times, especially in force mains and their discharges. Over time, hydrogen sulfide eats away at the walls of manholes, which leads to corrosion, leaks, groundwater intrusion, exposed rebar, and weakened structural strength.

In addition to concrete deterioration from hydrogen sulfide, inflow and infiltration (I&I) can also become an issue in sewer systems. I&I is the result of excess storm water and groundwater entering the sanitary sewer system. Without proper remediation of I&I, costs to pump the excess water as well as treatment costs increase. At the request of CTUB, RK&K also inspected manholes in Ranson for inflow and infiltration. A total of 244 manholes in CTUB's system were inspected. In addition to the 244 manholes inspected, seven manholes were located, but were unable to be accessed, and 91 manholes were unable to be located. A map showing the inspection status of the manholes in CTUB's system is included at the end of this report.

FINDINGS

Overall Rating

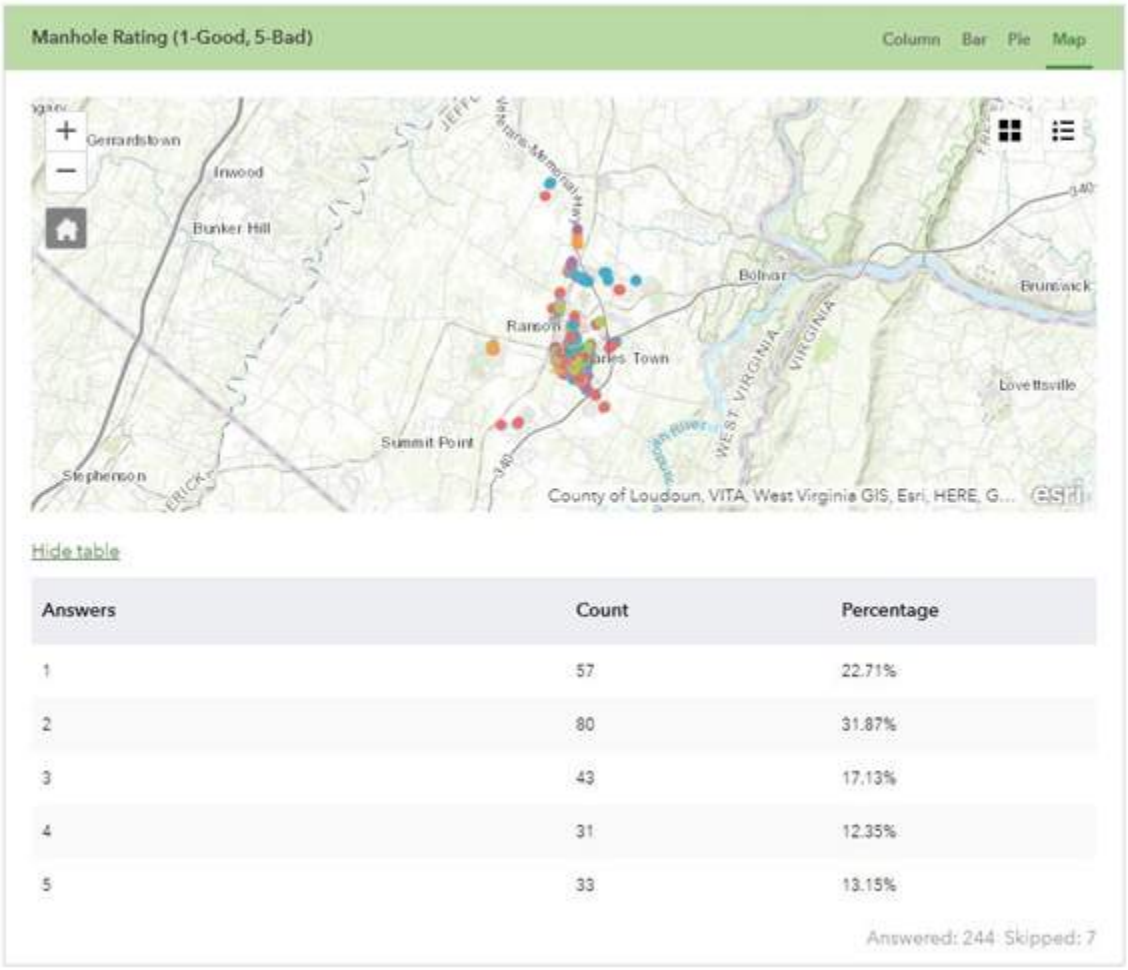
During the inspection process, manholes were rated on a 1 to 5 scale: 1 being good condition and 5 being poor condition. Ratings were assigned on the significance of the defects, extent of damage, amount of wall loss due to deterioration, or amount of inflow or infiltration detected. Ratings and definitions are listed below:

5 – Most significant defect grade
4 – Significant defect grade
3 – Moderate defect grade
2 – Minor to moderate defect grade
1 – Minor or no defect grade

Of the 244 manholes inspected:

- 33 were rated as 5
- 31 were rated as 4
- 43 were rated as 3
- 80 were rated as 2
- 57 were rated as 1

Manholes with a rating of 5 and 4 require immediate attention, and manholes with a rating of 3 will soon require attention. Generally, manholes rated 5 & 4 (poor condition) were closer to the discharge of the various force mains. Longer force mains and pump stations with longer detention times resulted in worse downstream conditions than shorter force mains. A map of the manholes and their respective ratings is shown in **Figure 1** and in **Appendix A** at the end of this report.



Answers	Count	Percentage
1	57	22.71%
2	80	31.87%
3	43	17.13%
4	31	12.35%
5	33	13.15%

Answered: 244 Skipped: 7

Figure 1 – Manhole Rating from GIS

Inflow and Infiltration

During inspections, any indications of inflow or infiltration were noted. However, due to the high amount of concrete deterioration in most of the manholes downstream of pump stations, it was difficult to note any specific instances of inflow or infiltration. In the manholes where the concrete is very soft, it is assumed that water is able to enter through the manhole walls. In addition, hydrogen sulfide has rusted the frame and cover of these manholes, allowing water to enter the manhole.

Many of the manholes inspected in Old Charles Town were brick manholes, which can be susceptible to inflow and infiltration because of their age. Overall, the manholes inspected in Old Charles Town did not show much indication of inflow and infiltration and were generally in good condition.

Overall, there were 76 manholes found with evidence of I&I out of the 244 manholes inspected, as shown in **Figure 2**. Recommendations to fix the manholes with inflow and infiltration are included in the back of this report. These recommendations primarily consisted of lining with epoxy, lining with cement, replacing riser, and replacing frame and cover.

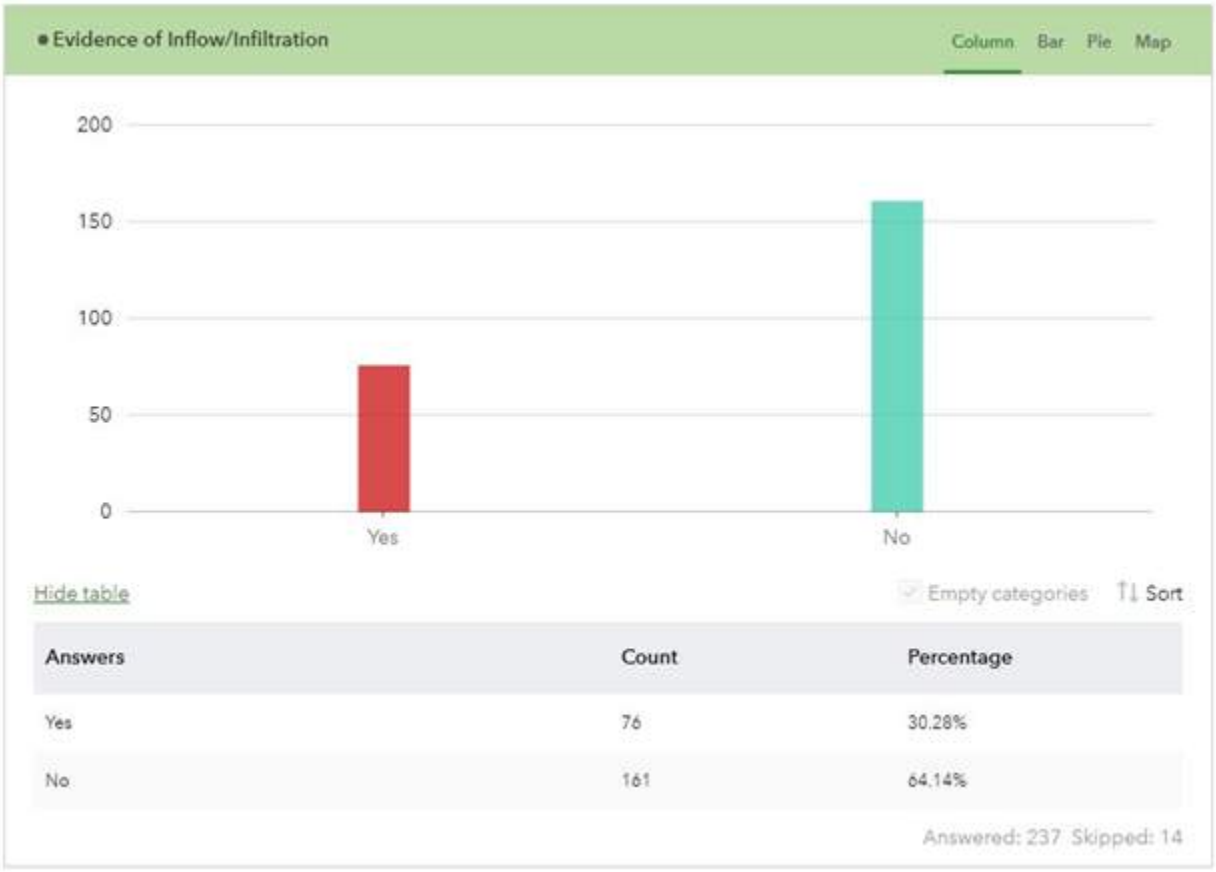


Figure 2 – Evidence of I&I from GIS

Miscellaneous Issues

Many manholes throughout the Old Charles Town System area were buried under asphalt and in yards, needing risers to bring them up to grade to allow access. Buried manholes on Brownsville Lane were uncovered by CTUB Staff and were inspected because they were downstream of a force main discharge. Ninety-one additional manholes throughout the rest of the Old Charles Town System were unable to be located. These manholes were marked yellow on the map in **Appendix B** and shown as not found. It is recommended that Charles Town Operators locate, inspect, and raise the manholes to the grade of the pavement.

Manholes throughout the Old Charles Town System have bolted frame and covers with six hexagon shaped bolts. Discussions with Charles Town Operators and Staff have indicated that maintaining these manholes is more difficult because access is harder and standard risers cannot be used with these frames. It is recommended that these frames and covers are replaced with standard frames and covers.



Figure 2 Six-Bolt Covers and Buried Manholes (typ.)

Hydrogen Sulfide Issues

During inspections, concrete deterioration from hydrogen sulfide was the most commonly observed issue, as shown in the photos on the following pages in **Figure 4A** and **Figure 4B**. Photos on the following two pages correspond with the maps in **Appendix C**. More severe hydrogen sulfide conditions were seen closer to force main discharges, with conditions improved downstream, as shown in **Appendix C** at the end of this report. Force mains from the Burr East Pump Station, Jefferson High School Pump Station, Jett's Farm Pump Station, Lloyd's Flat Pump Station, Race Track Pump Station, Wendy's Pump Station, County Green Pump Station, Belvedere Height's Pump Station, Greenfield Pump Station, and Mountaineer Court Pump Station displayed the worst issues from hydrogen sulfide.

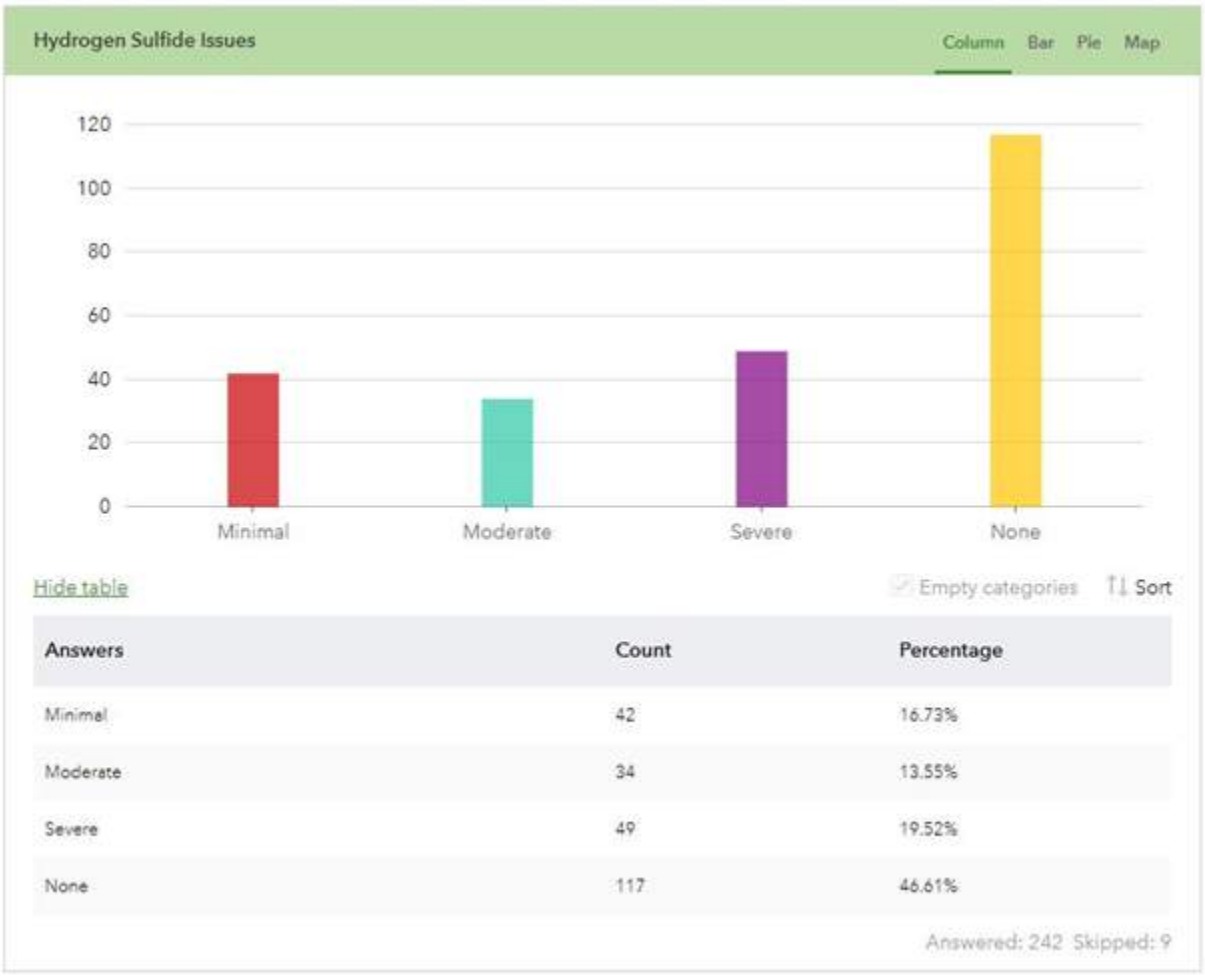


Figure 3 - Hydrogen Sulfide Issues from GIS



Figure 4A - Concrete Deterioration from Hydrogen Sulfide



Figure 4B - Concrete Deterioration from Hydrogen Sulfide

RECOMMENDATIONS

Manhole Rehabilitation

RK&K's recommendations for rehabilitation and maintenance include epoxy coating, cement coating/repairs, standard manhole cover/frame installation, manhole replacement, repair bench/invert, reset existing frame and cover, flush/jet main, install riser, and install drop connection.

Various manholes inspected were noted as already being lined. Most of these manholes were lined by PolyCoating Solutions with products specified in **Appendix D** to this report, and the lining is withstanding the hydrogen sulfide. One of these manholes is MH R-251 which was lined by Ranson using unknown products. This lining is not withstanding the hydrogen sulfide. Because of this, RK&K recommends that CTUB continues to utilize PolyCoating Solutions for the manhole lining. Cost estimates for lining are based on utilization and application of these products by PolyCoating Solutions.

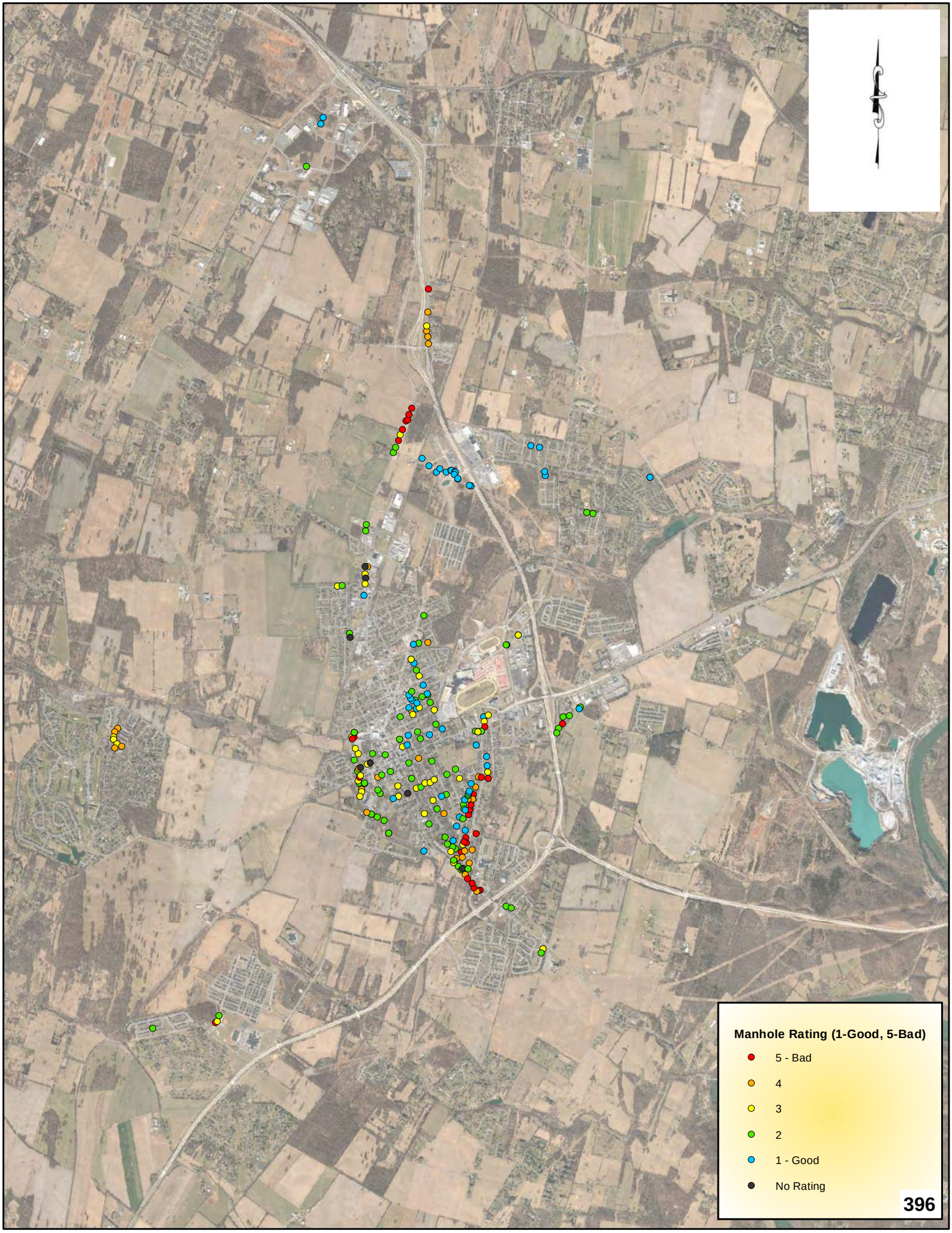
Projects currently under design will involve some of the manholes being rehabilitated or abandoned. These manholes have been noted on the cost estimate because rehabilitation will occur with the project and does not need to happen at this time.

Cost estimates for the rehabilitation efforts are included in **Appendix E** and are summarized in the table below. Cost estimates have been broken into levels based on severity. Note that bypass pumping will be required for manhole lining, and bypass pumping cost is not included in the cost estimates.

	Cost
Level 5 Manholes (33)	$94,540
Level 4 Manholes (31)	$91,500
Level 3 Manholes (43)	$87,750
Level 2 Manholes (80)	$80,650
Level 1 Manholes (57)	$2,240
Total	$356,680

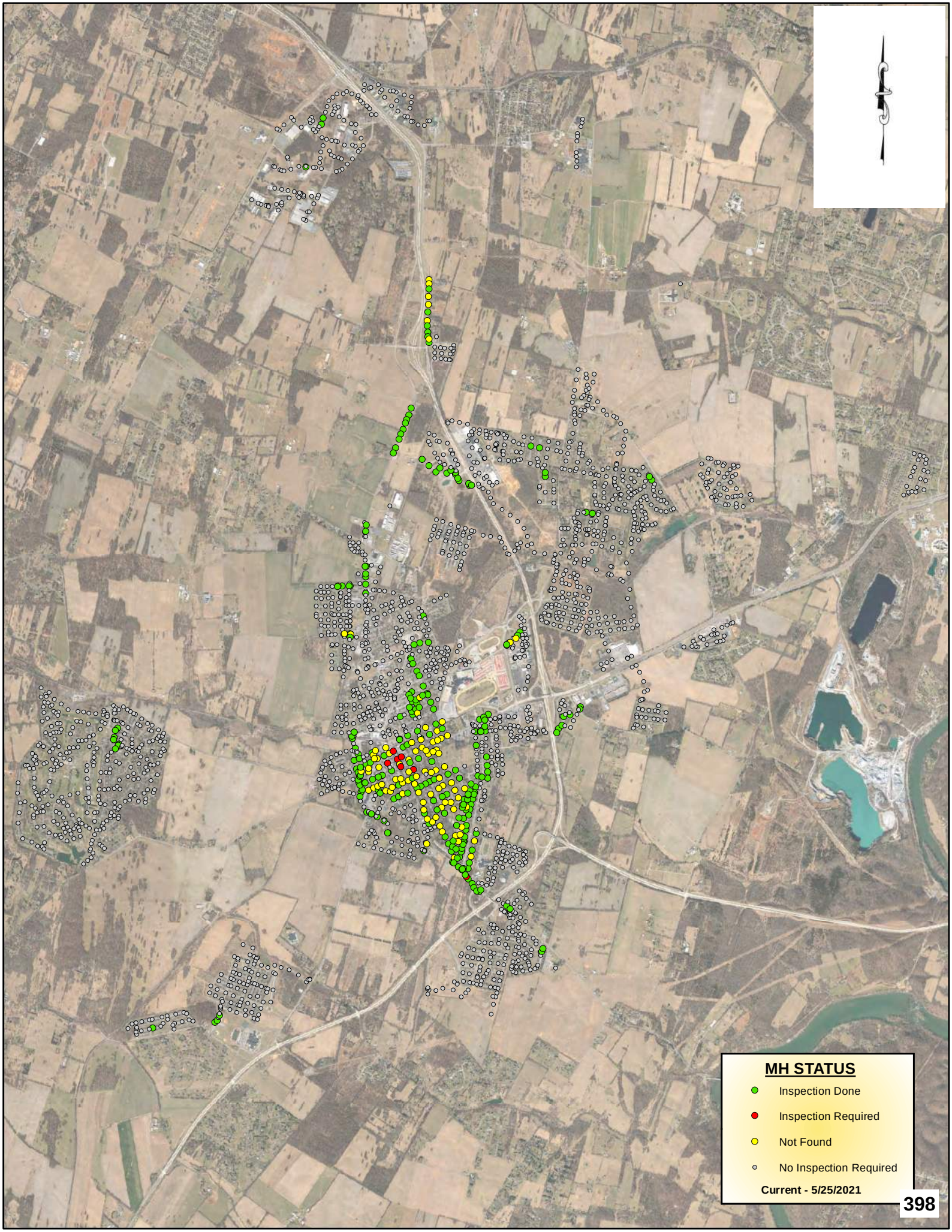
APPENDIX A

MANHOLE RATINGS

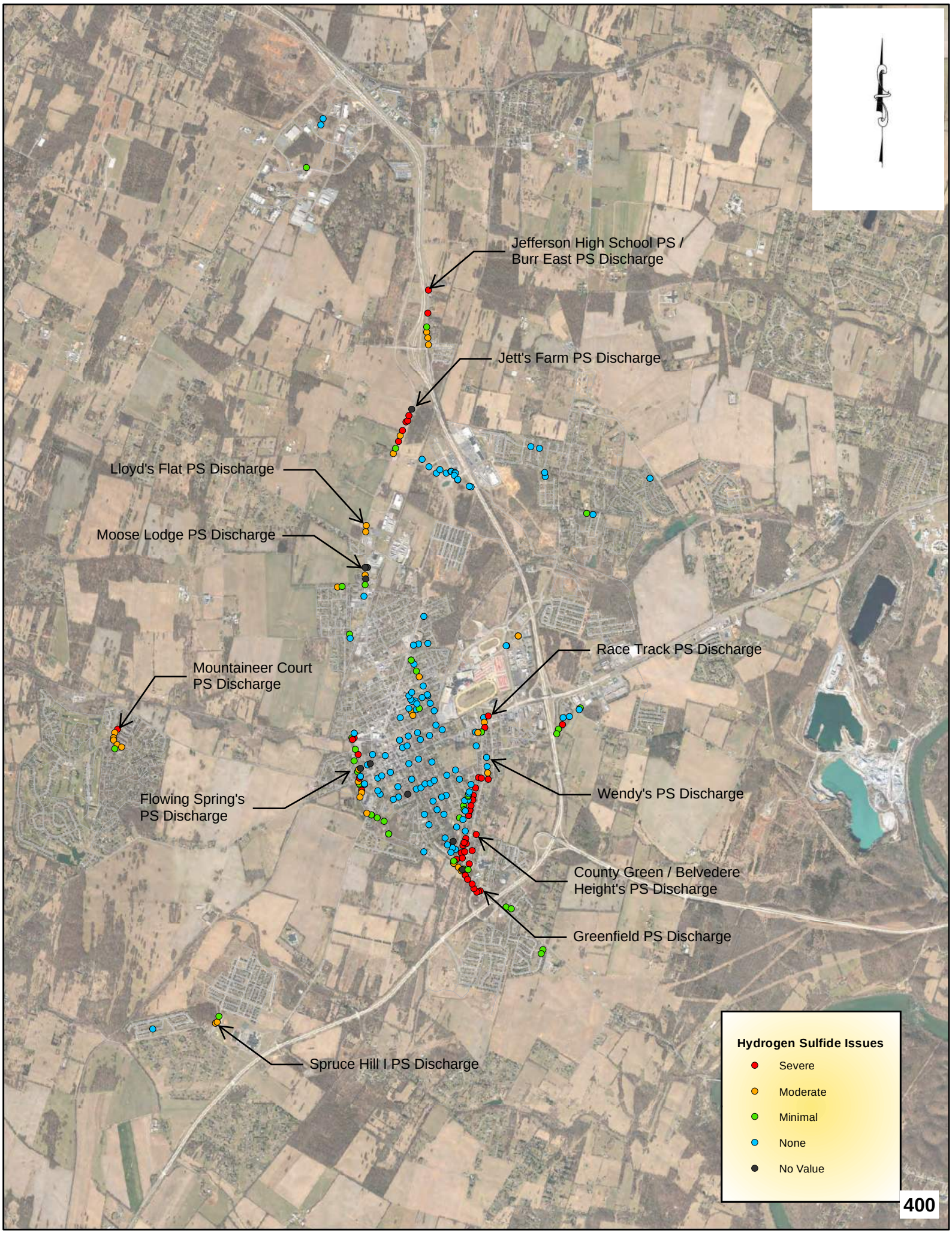

Manhole Rating (1-Good, 5-Bad)
5 - Bad
4
3
2
1 - Good
No Rating
396

APPENDIX B

MANHOLE INSPECTION STATUS


MH STATUS
Inspection Done
Inspection Required
Not Found
No Inspection Required
Current - 5/25/2021
398

APPENDIX C
HYDROGEN SULFIDE ISSUES


Jefferson High School PS /
Burr East PS Discharge
Jett's Farm PS Discharge
Lloyd's Flat PS Discharge
Moose Lodge PS Discharge
Race Track PS Discharge
Mountaineer Court
PS Discharge
Flowing Spring's
PS Discharge
Wendy's PS Discharge
County Green / Belvedere
Height's PS Discharge
Greenfield PS Discharge
Spruce Hill I PS Discharge
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No Value
400


Clem's Addition
MH 24C
Jefferson High School PS / Burr East PS Discharge
Woodland Park
600 ft
610 ft
561 ft
609 ft
Jett's Farm PS Discharge
9
MH 41
MH 43
Orchard Lodge Ln
West Virginia Way
Marcus Field
Boulevard At Potomac Towne Center
Briar Run Estates
Presidents Pointe Park
538 ft
Lloyd's Flat PS Discharge
Wescott Dr
115
Old Leetown Pike
Oak Farm
N Fairfax Blvd
Lakeland Place At Fairfax Crossing
Foal St
Moose Lodge PS Discharge
Robelei
American Heritage East
579 ft
16th Ave
574 ft
West Edgewood
Stayman Dr
E Park Ave
Esri Community Maps Contributors, Jefferson, VITA, Esri, HERE, Garmin, SafeGraph, INCR
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No
401


Race Track PS Discharge
Wendy's PS Discharge
MH CT-336
MH CT-300
MH CT-301
County Green / Belvedere Heights PS Discharge
MH CT-312
MH CT-307
MH CT-325
MH CT-310
Greenfield PS Discharge
MH CT-406
MH CT-401
MH CT-405
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No
Edge Hill Cemetery
Willow Spring Farm
Magnolia Springs
Jefferson Memorial Park
Belvedere Heights
Green Meadows
Berryville Pike
Jefferson Ave
E Washington St
Esri Community Maps Contributors, County Office, VITA, Esri, HERE, Garmin, SafeGraph,
402


Flowing Spring's
PS Discharge
MH R-251
MH CT-43
Ranson Civic Center
Charles Town Skate Park
Evitts Run Park
Jefferson County Museum
Charles Town
CVS/pharmacy
Save-A-Lot
Evitts Run
CSX
N George St
N Lawrence St
W North St
N Charles St
W Liberty St
N West St
N Water St
Higgs Blvd
Center St
W Washington St
W Congress St
S Charles St
W Avis St
W Academy St
S George St
Augustine Ave
Mordington Ave
Weirick Row
Creamery Pl
Valley Pl
115
51
340
526 ft
525 ft
508 ft
518 ft
506 ft
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No
Esri Community Maps Contributors, County Office, VITA, West Virginia GIS, Building
SafeGraph, INCREMENT P, METI/NASA, U


Mountaineer Court PS Discharge
Middleway Pike
Tuscawilla Dr
Westhall Dr
Beekman Pl
Bradford Ct
Tall Oak Dr
Berkeley Ct
Berkeley Dr
Standish Ct
Tuscawilla Dr
Tall Oak Dr
Fenway Dr
Packett Dr
Webhannet Dr
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No
Esri Community Maps Contributors,
Jefferson County GIS Office, VITA, West Virgi
HERE, Garmin, SafeGraph, INCREMENT P

APPENDIX D
POLYCOATING SOLUTIONS SPECIFICATIONS

PARSONPOXY FS1

DESCRIPTION: PARSONPOXY FS1 is a 100% solids epoxy coating that sets up in approximately 45 minutes for fast repair of manhole inverts.

PHYSICAL PROPERTIES:

Slant Shear Strength ASTM C882	100% concrete failure
Compressive Strength ASTM D695	19,500 psi
Tensile Strength ASTM D638	8,000 psi
Shore D Hardness ASTM D2240	88

SURFACE PREPARATION: Plug or bypass incoming line. Use a minimum 3500 psi waterblast to remove all grease, loose material, existing coatings etc. from application surface. Stop all hydrostatic leaks using PARSON QUICK PLUG or SEAL-TITE. Remove any standing water with air blast or towels prior to application. Surface must be as dry as possible.

MIXING: Premix Parts A and B separately for approximately 3 minutes. Combine 3 Parts A and 1 Part B into a clean container and mix for approximately 1-2 minutes with mechanical mixer until a uniform color is achieved. Only mix amount that be applied in 10 minutes.

SAFETY: Wear protective clothing and eyewear.

APPLICATION: Apply PARSONPOXY FS1 using a brush to a thickness of 100 mils. Application time should not exceed 10 minutes.

SET TIME: Approximately 45 minutes @ 75°F. Time may decrease as temperatures rise and visa versa. Carefully remove pipe plugs as not to disturb or damage coating.

STORAGE: Store PARSONPOXY FS1 in dry environment between 65°F and 85°F. Shelf life is 2 years from date of manufacturing, in unopened containers.

PACKAGING: PARSONPOXY FS1 is available in 1 gallon kits.

COVERAGE: One kit will cover approximately 4 – 48" inverts with 6" pipe when applied at 100 mils thick.

ADVANTAGES:

- Non-toxic – 100% solids
- Chemically resistant
- No primer required
- Easy application
- Return manholes to service quickly

PARSON ENVIRONMENTAL
PO Box 25
Wernersville, PA 19565
(800)356-9023
info@parsonenvironmental.com
www.parsonenvironmental.com

Chemline ARC-F

Aromatic Polyurea Coating

USGBC LEED, EQ Credit 4:
Low-emitting VOC Compliant Materials

Description

Chemline ARC-F is a fast-set, spray applied, two component polyurea that is 100% solids and contains Zero VOCs. It is highlighted by:

- √ Excellent corrosion protection and chemical resistance
- √ Excellent impact resistance even in sub-freezing weather
- √ High abrasion resistance for harsh environments
- √ Seamless monolithic waterproof membrane that is tough and durable
- √ Odorless, non-toxic vapors

Application Recommendations

Chemline ARC-F adheres extremely well to properly prepared metal, wood, concrete, fiber glass, and other various metal surfaces.

Chemline ARC-F must be applied through a two component, high pressure proportioning unit. Material and hoses should be heated to 150°F, with pressure at a minimum of 2200 psi.

Application Properties

Property	Value
Gel time	5 seconds
Tack free time	20 seconds

Physical Properties

Property	Value
Hardness, D-2240	D 50
Tensile strength, D-412	3200 psi
100% Modulus, D-412	1500 psi
200% Modulus, D-412	1800 psi
300% Modulus, D-412	2350 psi
Tear strength, DIE-C, D-624	480 pli
Ultimate elongation, D-412	360 %
Abrasion Resistance (CS17 wheels, 1000g, 1000 cycles), D-4060	20 mg loss

*Values obtained in laboratory setting for comparison purposes only and should not be considered specifications.

Mixing Instructions: Agitate resin blend (B) component thoroughly with a drum mixer before use to disperse pigment and assure homogeneity. Do not thin. Do not agitate in air and moisture.

Consult a Technical Representative regarding specific metal/steel surface preparation and priming requirements. For concrete applications, we recommend **Chemprime 3558** or **Chemprime CP**.

Packaging, Storage & Shelf Life

Chemline ARC-F is available in 5 gallon pails, 55 gallon drums, and 275 gallon totes. It should be stored in sealed containers at 60-90°F. Shelf life is 12 months in factory sealed containers.

Safety

Chemline ARC-F is for industrial use only. Avoid contact with eyes and skin. Do not inhale or ingest. When spraying, wear a respirator or fresh air hood. Spraying indoors requires forced ventilation. Be sure to read SDS in its entirety prior to use.

Revised 07/2018

Chemline, Inc. • 5151 Natural Bridge Ave. • St. Louis, MO 63115 • Phone: (314) 664 - 2230
• 19500 S. Alameda St. • Los Angeles, CA 90221 • Phone: (310) 764 - 0820

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Chemline ARC-F

Aromatic Polyurea Coating

USGBC LEED, EQ Credit 4:
Low-emitting VOC Compliant Materials

Surface Preparation

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion. Minimum recommended surface preparation:

Steel: Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (3 mils / 75 microns). Prime any bare steel the same day as it is cleaned or before flash rusting occurs, as required.

Concrete & Masonry: SSPC-SP13/NACE 6 or ICRI No. 310.2R-2013, CSP 3-5. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with recommended repair material.

Moisture content: Use calcium chloride test: 3 lb./24 hr./1,000 ft^2. Concrete shall be 5% maximum as per ASTM F2170 & ASTM F2420. Substrate and air temperature must be 5°F above dew point and rising before material application.

Check for soluble salts on surfaces to be coated. If amount of soluble salts exceeds recommended limits, treat accordingly. Repeat process until acceptable limits are reached. Maximum amounts of soluble salts (micrograms per square centimeter): Chlorides - 3 immersion, 7 non-immersion. Nitrates - 5 immersion, 10 non-immersion. Sulfates - 10 immersion, 20 non-immersion.

If required, holiday test in accordance with ASTM D5162 for steel, or ASTM D4787 for concrete.

Revised 07/2018

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• 19500 S. Alameda St. • Los Angeles, CA 90221 • Phone: (310) 764 - 0820

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180 River House Lane
Boyce, VA 22620
540-277-7316
www.polycoatingsolutions.com

5 Year Limited Warranty

Poly Coating Solutions, LLC, certified applicator/installer, warranty the installation of the Chemline ARC-F Polyurea/Parson MH Liner composite system against failure for a period of 5 years. Warranty covers failures resulting from groundwater infiltration, substrate deterioration and protective liner de-lamination. Warranty does not cover failures due to an Act of God or Mechanical/Chemical means. Poly Coating Solutions, LLC will perform a complete replacement of composite system if failure is recognized within 5 years of initial installation date. Written notice must be provided. An inspection must be allowed to determine root cause of failure and to create resolution plan.

Poly Coating Solutions, LLC makes no warranties express or implied other than those specifically stated in this 5 year warranty.

Any liability for incidental damages is expressly disclaimed. Liability is limited to the initial purchase price paid.

PARSON
MH LINER

DESCRIPTION: PARSON MH LINER is a high strength, fiber-reinforced, Portland Cement based, microsilica enhanced Mortar for use in rehabilitating manholes, lift station wet wells and other wastewater structures.

PHYSICAL PROPERTIES:

Compressive Strength ASTM C109	1 day > 4,000 psi 28 days > 9,000 psi	Bond ASTM C882	> 2,000 psi
Flexural Strength ASTM C293/C78	28 days > 1,600 psi	Shrinkage ASTM C596	28 days 0.0% at 90% RH
Tensile Strength ASTM C496	28 days >800 psi	Freeze/Thaw ASTM C666	300 cycles, No damage
Applied Density	125 pcf	Sulfide Resistance ASTM C267	No weight loss after 90 days in 20,000 ppm aqueous sulfuric acid solution
Permeability AASHTO T277	< 300 coulombs		

SURFACE PREPARATION: Thoroughly clean and remove any loose or foreign materials including paints, dirt, oil, grease, surface coatings, laitance and any other bond-inhibiting material from surface to be coated, using minimum 3500 psi waterblast. Stop all active leaks. (Please refer to our Manhole Rehabilitation Specifications for product selections.) Surface should be Saturated Surface Dry (SSD) just prior to material application. Any standing water must be removed.

MIXING: Using a slow-speed mortar mixer or large mechanical jiffy mixer, add approximately 3/4 gallon of clean, potable water per 50 lb. bag of PARSON MH LINER. Add water to mixer and then add powder. Mix thoroughly for approximately 3 minutes until a uniform consistency has been obtained.

APPLICATION: Using low pressure spray equipment or trowel, apply mixed product on vertical, horizontal and overhead surfaces to a minimum thickness of 1/4" and up to 3". Trowel or brush to a smooth finish as soon as possible, but within two hours. If additional material is required, apply up to 2" of product within 4–6 hours, then trowel or brush to a smooth finish as soon as possible, but within two hours. Ambient temperature should be minimum 40° F and remain above 32°F for 12 hours after application. Do not apply to frozen surfaces.

COVERAGE: Approximately 1 vertical foot per 50 lb. bag at 1/2 inch thick.

PACKAGING: Available in 50 lb. multiwall paper bags with moisture barrier.

STORAGE: Keep product dry and above 50°F. Shelf life should be 2 years for unopened bags when stored accordingly.

PRECAUTIONS: Use protective eye wear, cover exposed skin and use breathing protection. See SDS for specific instructions



ADVANTAGES:

- Cost–effective alternative to replacement
- Stops infiltration and exfiltration
- Restores structural integrity
- Provides low to moderate corrosion protection
- High Strengths and Low Permeability
- Excellent Bond to damp surfaces
- Apply up to 3" in a single coat
- Spincast, Spray Gun or trowel application

PO Box 25
Wernersville, PA 19565

(800)356-9023
info@parsonenvironmental.com
www.parsonenvironmental.com

APPENDIX E

RECOMMENDATION COST ESTIMATE

Replace Existing Manhole	MH ID	Depth (feet)	Cost	
	CT-336	5.8	$ 4,000	
	CT-364	6.33	$ 4,450	
	CT-405	6.9	$ 4,450	
	R-251	6.4	-	evitts run
		Replace Existing Manhole Subtotal	$ 12,900	
Apply Interior Coating (Epoxy)	MH ID	Depth (feet)	Cost	
	37	6	-	abandoned with Jett's project
	38	4.25	-	abandoned with Jett's project
	39	4	-	abandoned with Jett's project
	40	4.5	-	abandoned with Jett's project
	41	4.4	-	abandoned with Jett's project
	43	5.8	-	abandoned with Jett's project
	24C	8.2	$ 3,900	
	CT-294	13.4	$ 6,370	
	CT-298	7.3	-	lined following first report
	CT-300	4.9	-	lined following first report
	CT-301	4.5	-	lined following first report
	CT-302	6.3	-	lined following first report
	CT-303	6	$ 2,850	
	CT-305	7	$ 3,330	
	CT-306	4.6	$ 2,190	
	CT-307	6.2	$ 2,950	
	CT-310	5.1	$ 2,430	
	CT-327	6.6	$ 3,140	
	CT-336	5.8	$ 2,760	
	CT-362	9.9	$ 4,710	
	CT-364	6.33	$ 3,010	
	CT-401	7.9	$ 3,760	
	CT-402	13	$ 6,180	
	CT-404	11.5	$ 5,470	
	CT-405	6.9	$ 3,280	
	CT-406	7.7	$ 3,660	
	CT-423	11.2	-	evitts run
	CT-43	9.4	-	evitts run
	CT-463	9.8	$ 4,660	
	HF-1	8.2	$ 3,900	
	JC-9	9.9	$ 4,710	
	R-251	6.4	-	evitts run
	R-259	10.5	-	evitts run
	26	4.9	$ 2,330	
	24F	5.6	$ 2,660	
	26B	3.6	$ 1,710	
	CT-232	6.9	$ 3,280	
	CT-272	11.8	$ 5,610	
	CT-293	12.8	$ 6,080	
	CT-297	11	$ 5,230	
	CT-299	6.7	$ 3,190	
	CT-309	5.5	$ 2,620	
	CT-311	4.9	$ 2,330	
	CT-312	4.8	$ 2,280	
	CT-313	5	$ 2,380	
	CT-323	4.9	$ 2,330	
	CT-325	5	$ 2,380	
	CT-359	12.4	$ 5,890	
	CT-39	8.1	-	evitts run
	CT-403	15.7	$ 7,460	
	CT-408	4.4	$ 2,090	
	CT-48	5.8	-	evitts run
	CT-57	5.8	-	evitts run
	CT-94	8.75	$ 4,160	
	R-108	4.25	$ 2,020	
	R-3	4.6	-	included in moose lodge project
	R-303	10.45	$ 4,970	
	TW-43	6	$ 2,850	
	TW-48	2.5	$ 1,190	
	TW-53	6	$ 2,850	
	TW-67	7.6	$ 3,610	
	WL-1A	4	$ 1,900	
	25	4.3	$ 2,050	
	42	4.2	-	abandoned with Jett's project
	CT-144	5.1	$ 2,430	
	CT-194	9.1	$ 4,330	
	CT-2	7.1	$ 3,380	

	CT-224	4.3	$ 2,050	
	CT-225	3.9	$ 1,860	
	CT-279	13.6	$ 6,460	
	CT-3	7.1	$ 3,380	
	CT-308	4.2	$ 2,000	
	CT-316	5.75	$ 2,740	
	CT-337	9.9	$ 4,710	
	CT-363	9.3	$ 4,420	
	CT-365	3.3	$ 1,570	
	CT-41	9.2	-	evitts run
	CT-45	7.3	-	evitts run
	CT-49	7.6	-	evitts run
	CT-50	4.4	-	evitts run
	CT-59A	5.7	-	evitts run
	CT-77	7.9	$ 3,760	
	CT-81	6.9	$ 3,280	
	HF-2	6	$ 2,850	
	JC-14	4.8	$ 2,280	
	OH-6	6.2	$ 2,950	
	R-158	6.3	$ 3,000	
	R-209	5.42	$ 2,580	
	R-294	3.6	$ 1,710	
	R-301	5.9	$ 2,810	
	R-4	5.8	$ 2,760	
	R-7	4.6	$ 2,190	
	TW-49	3.9	$ 1,860	
	TW-50	2.7	$ 1,290	
	TW-51	6	$ 2,850	
	44	4.75	-	abandoned with Jett's project
	45	7	-	abandoned with Jett's project
	BI-74	13.6	$ 6,460	
	CT-107	4.8	$ 2,280	
	CT-110	6.15	$ 2,930	
	CT-143A	3.8	$ 1,810	
	CT-153	6.55	$ 3,120	
	CT-219	4.3	$ 2,050	
	CT-235	7	$ 3,330	
	CT-236	5.5	$ 2,620	
	CT-271	7.7	$ 3,660	
	CT-314	7.1	$ 3,380	
	CT-318	3.8	$ 1,810	
	CT-319	2.8	$ 1,330	
	CT-322	3.5	$ 1,670	
	CT-42	4.5	-	evitts run
	CT-46	6.2	-	evitts run
	CT-462	10.5	$ 4,990	
	CT-465	4.9	$ 2,330	
	CT-59A	6.8	$ 3,230	
	CT-64	6.9	-	evitts run
	CT-65	6.25	-	evitts run
	CT-67	7.5	-	evitts run
	CT-93	8.5	$ 4,040	
	DF1	7.3	$ 3,470	
	GF-6	3.6	$ 1,710	
	R-206	7.4	$ 3,520	
	R-33	7.2	$ 3,420	
	WS2	11.8	$ 5,610	
		Apply Interior Coating (Epoxy) Subtotal	$ 302,980	
Apply Interior Coating (Cement)	MH ID		Cost	
	CT-221	*6*	$ 100	
	CT-114	4.8	$ 100	
	CT-167	5.3	$ 100	
	CT-250	10.35	$ 100	
	CT-282	13	$ 100	
	CT-317	5.9	$ 100	
	JC-13	5.1	$ 100	
	R-208	6.25	$ 100	
	R-306	8.05	$ 100	
	SH-16	7.2	$ 100	
		Apply Interior Coating (Cement) Subtotal	$ 1,000	
Install New Standard Frame and Cover	MH ID		Cost	
	37		-	abandoned with Jett's project
	38		-	abandoned with Jett's project

	39		-	abandoned with Jett's project
	40		-	abandoned with Jett's project
	41		-	abandoned with Jett's project
	43		-	abandoned with Jett's project
	24C		$ 310	
	CT-294		$ 310	
	CT-300		$ 310	
	CT-301		$ 310	
	CT-302		$ 310	
	CT-303		$ 310	
	CT-305		$ 310	
	CT-306		$ 310	
	CT-307		$ 310	
	CT-310		$ 310	
	CT-327		$ 310	
	CT-336		$ 310	
	CT-364		$ 310	
	CT-402		$ 310	
	CT-404		$ 310	
	CT-405		$ 310	
	CT-406		$ 310	
	JC-9		$ 310	
	26		$ 310	
	24F		$ 310	
	26B		$ 310	
	CT-232		$ 310	
	CT-293		$ 310	
	CT-297		$ 310	
	CT-299		$ 310	
	CT-309		$ 310	
	CT-311		$ 310	
	CT-312		$ 310	
	CT-313		$ 310	
	CT-323		$ 310	
	CT-325		$ 310	
	CT-359		$ 310	
	CT-403		$ 310	
	CT-408		$ 310	
	R-108		$ 310	
	R-3		-	included in moose lodge project
	TW-43		$ 310	
	TW-48		$ 310	
	TW-53		$ 310	
	25		$ 310	
	42		-	abandoned with Jett's project
	CT-185		$ 310	
	CT-2		$ 310	
	CT-224		$ 310	
	CT-279		$ 310	
	CT-3		$ 310	
	CT-308		$ 310	
	CT-337		$ 310	
	CT-363		$ 310	
	CT-365		$ 310	
	CT-50		-	evitts run
	CT-59A		-	evitts run
	CT-80		$ 310	
	JC-14		$ 310	
	OH-6		$ 310	
	R-107		$ 310	
	R-209		$ 310	
	R-252		-	evitts run
	R-4		$ 310	
	R-7		$ 310	
	TW-49		$ 310	
	TW-50		$ 310	
	TW-51		$ 310	
	45		-	abandoned with Jett's project
	CT-103		$ 310	
	CT-204		$ 310	
	CT-219		$ 310	
	CT-258		$ 310	
	CT-281		$ 310	
	CT-282		$ 310	
	CT-322		$ 310	

	CT-98		$ 310	
	GF-5		$ 310	
	GF-6		$ 310	
	JC-13		$ 310	
	OH-8		$ 310	
	R-2		$ 310	
	R-208		$ 310	
	R-33		$ 310	
	R-36		$ 310	
	R-6		$ 310	
	R-98		$ 310	
	CT-285		$ 310	
	CT-364A		$ 310	
	R-207		$ 310	
	R-23		$ 310	
		Install New Standard Frame and Cover Subtotal	$ 24,800	
Repair Bench and/or Invert	MH ID		Cost	
	CT-303		$ 500	
	CT-404		$ 500	
	CT-423		-	evitts run
	CT-143		$ 500	
	CT-272		$ 500	
	CT-48		-	evitts run
	CT-144		$ 500	
	CT-225		$ 500	
	CT-3		$ 500	
	CT-107		$ 500	
	CT-318		$ 500	
	CT-466		$ 500	
	CT-47		-	evitts run
	JC-10		$ 500	
	R-208		$ 500	
	FC-31		$ 500	
	FC-36		$ 500	
		Repair Bench and/or Invert Subtotal	$ 7,000	
Reset Existing Frame and Cover	MH ID		Cost	
	CT-57		$ -	evitts run
	R-295		$ -	
	CT-241		$ -	
	FC-56		$ -	
	R-290		$ -	
		Reset Existing Frame and Cover Subtotal	$ -	
Flush/Jet Main	MH ID		Cost	
	CT-364		$ -	
	CT-402		$ -	
	CT-404		$ -	
	JC-9		$ -	
	CT-143		$ -	
	CT-408		$ -	
	TW-53		$ -	
	WL-1A		$ -	
	CT-144		$ -	
	CT-229		$ -	
	CT-279		$ -	
	JC-14		$ -	
	R-294		$ -	
	R-301		$ -	
	CT-466		$ -	
	JC-10		$ -	
	JC-13		$ -	
	R-107		$ -	
	R-208		$ -	
	R-249		$ -	
	R-286		$ -	
		Flush/Jet Main Subtotal	$ -	
Install Drop Connection	MH ID		Cost	
	CT-327		$ 100	
	CT-401		$ 100	
	CT-463		$ 100	
	CT-94		$ 100	
	R-303		$ 100	

	CT-81		$ 100	
	CT-200		$ 100	
	CT-230		$ 100	
	CT-240		$ 100	
	CT-271A		$ 100	
	R-286		$ 100	
		Install Drop Connection Subtotal	$ 1,100	
Install Riser/Repair Riser	MH ID	Height (in.)	Cost	
	37	21.5	-	abandoned with Jett's project
	38	18	-	abandoned with Jett's project
	39	13	-	abandoned with Jett's project
	40	12	-	abandoned with Jett's project
	41	16	-	abandoned with Jett's project
	CT-300	5	$ 300	
	CT-301	9.5	$ 300	
	CT-302	8.5	$ 300	
	CT-303	7.5	$ 300	
	CT-401		$ 300	
	26B	8	$ 300	
	CT-359	7	$ 300	
	CT-279	4	$ 300	
	CT-112		$ 300	
	CT-114		$ 300	
	CT-163		$ 300	
	CT-167	7	$ 300	
	CT-267		$ 300	
	R-7	8	$ 300	
	45B	12	-	included in Moose Lodge project
	44	6	-	abandoned with Jett's project
	45	12	-	abandoned with Jett's project
	CT-156		$ 300	
	CT-198		$ 300	
	CT-236	8	$ 300	
	CT-321	2	$ 300	
	CT-97	8.7	$ 300	
	R-2	6	$ 300	
	R-288		$ 300	
	R-298		$ 300	
	R-6	2	$ 300	
		Install Riser Subtotal	$ 6,900	
		TOTAL COST	**$ 356,680**	
		LEVEL 5 COST	**$ 94,540**	
		LEVEL 4 COST	**$ 91,500**	
		LEVEL 3 COST	**$ 87,750**	
		LEVEL 2 COST	**$ 80,650**	
		LEVEL 1 COST	**$ 2,240**	
		***Bypass Pumping Cost Not Included**		

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX F
2020 ANNUAL REPORT

Annual Report Section
Received By E-Filing on: 10/30/2020
AR Utility ID: 204
Class: A

Annual Report Section
Received By E-Filing on: 2/5/2021
AR Utility ID: 204
Class: A
Includes
Audit

WASTEWATER UTILITIES

(Class A & B)

ANNUAL REPORT
For Year Ended 2020
For

NAME OF UTILITY: City of Charles Town Sewer
PHYSICAL ADDRESS: 661 S George Street, Suite 101, Charles Town, WV 25414
MAILING ADDRESS: 661 S George Street, Suite 101, Charles Town, WV 25414

NAME Of MAYOR/ CHAIRPERSON/ PRESIDENT: Daryl Hennessy
PHYSICAL ADDRESS: 101 E. Washington Street, Charles Town, WV 25414

UTILITY CONTACT PERSON: Kristen Stolipher
TELEPHONE NO: 304-724-7080
E-MAIL ADDRESS: kstolipher@ctubwv.com

ACCOUNTING CONTACT PERSON: April Shultz
ACCOUNTANT'S MAILING ADDRESS: 661 S George Street, Suite 101, Charles Town, WV 25414
TELEPHONE NO: 304-724-3255
E-MAIL ADDRESS: ashultz@ctubwv.com

TO THE
PUBLIC SERVICE COMMISSION
OF
WEST VIRGINIA

FOR THE YEAR ENDED: 06/30/2020
Utility Class: A
Revision Date: 10/30/2020
Audit Report Filed Date:

Utility Description Information

All data entered is for the Annual Report period.

Those cells that are not shaded require the utility to enter data .All others will be automatically filled in.

General Information

Name	City of Charles Town Sewer
Address	661 S George Street, Suite 101, Charles Town, WV 25414
Areas Served County or counties :	Jefferson County
Phone number	304-724-7080
Fax number	304-725-7150

Total number of full time employees:	Full Time Employees:	Contract Employees:
Field:	8.00	-
Customer Billing:	2.00	-
Administrative & General	2.00	-

Gross Annual Revenues	Gross Plant in Service	No. of Active customers
6,133,529	71,517,990	7,880

	# of Wastewater Systems	NPDES Permit Number(s)
Wastewater Systems:	(3) WV0022349	WV008461, UIC0665-03-037-001

Number of : 1. Treatment Plants	2. Pumping Stations	3. Grinder Pumping Stations
4	44	19

Total treatment capacity in MGD's**	2.26

**Million Gallons per Day

Number of: 1.Vacuum stations	2. Miles of Gravity Collection Mains	3. Miles of Force Collection Mains
0	102	25

Number of permitted combined system overflows (CSO)	N/A

IMPORTANT CHANGES DURING THE YEAR

Here under give particulars concerning the matters indicated below. Make the statements explicit and precise, and number them in accordance with the inquiries. Each inquiry must be answered. However, if the word "none" states the fact it may be used in answering any inquiry, or if information is given in the report which answers any inquiry, reference to such other schedules will be sufficient.

1 Changes in, and additions to franchise rights: describing (a) the actual consideration given therefore, and (b) from whom acquired. If acquired without the payment of any consideration, state that fact.
2 Acquisition of other companies, reorganization, merger or consolidation with other companies: give names of companies involved, particulars concerning the transactions, and reference to Commission authorization, if any.
3 Purchase or sale of operating units or systems such as generating plants, transmission lines, etc; specifying items, parties, dates and also reference to Commission authorization, if any.
4 Important leaseholds acquired, given, assigned or surrendered, giving effective dates, lengths of terms, names of parties, rents, Commission authorization, if any, and other conditions.
5 Important extensions of system, giving location, new territory covered by distribution system, and dates of beginning operations.
6 Estimated increase or decrease in annual revenues due to important rate changes, giving basis of estimate and stating for each revenue classification the amounts of increase or decrease and the number of customers affected for each such classification.
7 Obligation incurred or assumed by respondent as guarantor for the performance by another of any agreement or obligation, excluding ordinary commercial paper maturing on demand or not later than one year after date of issue, and giving Commission authorization, if any.
8 Changes in articles of incorporation or amendments to charter.
9 Additional matters of fact (not elsewhere provided for) which the respondent may desire to include in its report.

None.

CORPORATE CONTROL OVER RESPONDENT

1. Did any corporation, business trust, or similar organization, hold control over the respondent at the close of the year?
No

2. If control was so held, state:
   (a) The form of control, whether sole or joint.

   (b) The name of the controlling corporation or organization.

   (c) The manner in which control was held.

   (d) The extent of control.

   (e) Whether control was direct or indirect.

   (f) The name or names of the intermediary or intermediaries through which control, if indirect, was held (see note).

3. If any individual, association or corporation held control, as trustees, over the respondent, give the information called for below:

   (a) The name of the trustee.

   (b) The name of the beneficiary or beneficiaries for whom the trust was maintained.

   (c) The purpose of the trust.

4. Give particulars as to any change during the year in the corporate control over the respondent.

Note: In cases where control of the respondent was in a holding company organization, submit a statement showing the chain of ownership or control to the main parent company or organization.

IDENTITY OF RESPONDENT

Type of Utility: Sewer

Public: Yes

Association or Authority:

Private:

1. Exact name of Respondent(Utility Name)
   City of Charles Town Sewer

2. If name of respondent was changed during the year, give particulars of change and date change became effective

3. Address of principal business office at end of year
   661 S George Street, Suite 101, Charles Town, WV 25414

4. Names and titles of officer having custody of the general corporate books of account and address of where the general corporate books are kept.
   April Shultz, Assistant Utility Manager

5. Name of State under the laws of which respondent is incorporated and date of incorporation.
   WV

6. If respondent is not incorporated, give the type of organization and date organized.

7. If at any time during the year the property of respondent was held by a receiver or trustee, give (a) name of receiver or trustee, (b) date such receiver or trustee took possession, (c), the authority by which the receivership or trusteeship was created, and (d) date when possession by receiver or trustee ceased.

8. State the classes of utility and other services furnished by the respondent during the year in each state in which the respondent operated
   Water Class A and Sewer Class A

NOTICE

GENERAL INSTRUCTIONS

1. The original of this report form properly filled Public Service Commission of West Virginia on or before the last day of the third month following the close of the calendar or established fiscal year by each Class A or B public utility (as defined in the Uniform System of Accounts). One copy of the report should be retained by the respondent in its files.

2. The form of annual report is prepared in conformity with Uniform System of Accounts for Public Utilities prescribed by the Public Service Commission of West Virginia, and all accounting words and phrases are to be interpreted in accordance with the said classification.

3. Instructions should be carefully observed and each question should be answered fully and accurately whether it has been answered in a previous annual report or not. Where the word "none" truly and completely states the fact, it should be given to any particular inquiry unless in a numeric field. Where dates are called for, the month and day should be stated as well as the year. Customary abbreviations may be used in stating dates.

4. If any schedule does not apply to the respondent such fact should be shown on the schedule by the words "not applicable."

5. All entries should be made in permanent form. Entries of a contrary or opposite character (such as decreases reported in a column providing for both increases and decreases) should be enclosed in parentheses.

6. Commission authorization (abbreviated Comm. Auth.) used in the report means the authorization of this Commission or any other commission. Where a commission authorization is shown, the identity of the commission should also be given.

7. The annual report should in all particulars be complete in itself. Reference to reports of previous years or to other reports should not be made in lieu of required entries except as specifically authorized.

8. Wherever schedules call for comparison of figures of a previous year, the figures reported must be based upon those shown by the annual report of the previous year, or an appropriate explanation stating why the different figures were used.

9. Additional statements inserted for the purpose of further explanation of accounts or schedules should be made on schedule 801A-801B.

10. The word "respondent" wherever used in this report means the person, firm, association, corporation or municipal corporation on whose behalf the report is made.

11. If the respondent makes a report for a period other than a calendar year, the beginning and the end of the period covered must be clearly stated on page 1, and throughout the report where the year or period is required to be stated.

LIST OF SCHEDULES

Designate in column (c) by terms "none" or "not applicable" as appropriate, in instances where no information or amounts have been reported in certain schedules.

	Title of Schedule (a)	Schedule Page No. (b)	Remarks (c)
1	**Summary Financial Statements**		
2	Income Statement	100A-100B	
3	Balance Sheet	101-102	
4	Statement of Changes in Financial Position	103/103A	
5	Notes to Balance Sheet and Statement of Changes in Financial Position	104	
6	Retained Earnings - Appropriated and Unappropriated	105	
7	**Balance Sheet Supporting Schedules**		
8	Utility Plant		
9	Utility Plant and Accumulated Depreciation	500	
10	Utility Plant Adjustments	500	
11	**Other Property and Investments**		
12	Nonutility Property and Accumulated Depreciation	200	
13	Investments in Associated Companies, Utility and Other Investments	201	
14	Cash, Sinking, Depreciation, and Other Special Funds	202	
15	Assets in Sinking, Depreciation, and Other Special Funds	202A	
16	**Current and Accrued Assets**		
17	Accounts Receivable and Notes Receivable	203	
18	Accumulated Provision for Uncollectible Accounts	203	
19	Accounts and Notes Receivable from Associated Companies or Funds	204	
20	Materials and Supplies, Explanation of Inventory Adjustments	205	
21	Prepayments and Miscellaneous Current and Accrued Assets	206	
22	**Deferred Debits**		
23	Miscellaneous Deferred Debits	206	
24	Unamortized Debt Discount and Expense and Unamortized Premium on Debt	207	
25	Extraordinary Property Losses and Preliminary Survey and Investigation Charges	208	
26	**Equity Capital**		
27	Capital Stock And Preferred Stock	209	
28	Securities Holders and Voting powers	209A	
29	Securities Issued or Assumed During Year	209B	
30	Corporation Controlled by Respondent	209C	
31	Capital Stock And Preferred Stock Subscribed	210	
32	Common and Preferred Stock Liability for Conversion	210	
33	Other Paid-in Capital, Discount on Capital Stock, and Capital Stock Expense	211	
34	Retained Earnings	105	
35	**Long-Term Debt**		
36	Bonds and Reacquired Bonds	212-212A	
37	Other Long-Term Debt	212B	
38	Advance from Associated	213	

LIST OF SCHEDULES

Designate in column (c) by terms "none" or "not applicable" as appropriate, in instances where no information or amounts have been reported in certain schedules.

	Title of Schedule (a)	Schedule Page No. (b)	Remarks (c)
1	**Current and Accrued Liabilities**		
2	Notes Payable and Advances from Associated Companies	213	
3	Accounts and Notes Payable to Associated Companies	214	
4	Accrued Taxes and Miscellaneous Current and Accrued Liabilities	215-216	
5	Accounts Payable, Accrued Interest, Customer Deposit, and Other Deferred Credits	216	
6	Advances for Construction	216A	
7	Accumulated Deferred Investment Tax Credits	217	
8	Operating Reserves	218	
9	Contributions In Aid of Construction and Accumulated Deferred Income Taxes	219-219A	
10			
11	**Income Statement Supporting Schedules**		
12	Taxes Other Than Income Taxes	300-300A	
13	Distribution of Income Taxes And Accumulated Deferred Income Taxes	301	
14	Reconciliation of Reported Net Income with Taxable Income	302	
15	Income from Utility Plant Leased to Others and Gain or Loss on Disposition of Property	303	
16	Income from Merchandising, Jobbing, and Contract Work	304	
17	Interest and Dividend Income	304	
18	Nonutility Income and Miscellaneous Nonutility Expenses	305	
19	Allowance for Construction and Amortization Expenses	305	
20	Interest Expenses and Extraordinary Items	306-307	
21	**Utility Plant**	500	
22	Wastewater Plant In Service	501A-501B	
23	Wastewater Plant Leased to Others and Held for Future Use	502	
24	Wastewater Plant Retirement and Replacement	503	
25	Construction Work in Progress	504A - 504E	
26	Accumulated Provisions for Depreciation and Amortization	505A	
27	**Operating Revenues**	600	
28			
29	Sales of Wastewater to General Customers and Resale- By Months	601-602	
30	Other Operating Revenues	602A-602B	
31	**Operation and Maintenance Expenses**	603A-603B	
32	Purchased Wastewater Treatment	604	
33	Regulatory Commission Expenses and Miscellaneous Expenses	605	
34	Salaries , Wages, and Number of Employees	606A	
35	Salaries & Wages- Officers, Directors and Majority Stockholders	606B-606C	
36	Employee Health, Safety , And Training Hours	606D	
37	Rental of Building/Real Property and Rental of Equipment	607	
38	Insurance	607A	
39	Purchased Power, Fuel for Power Production, Chemicals, and Materials and Supplies	607B	
40	Contractual Services	608-608E	
41	Construction Clearances	609	
42	**Statistical Section**		
43	Important Changes During the Year	700	
44	Pumping Station Equipment	700A-700I	
45	Wastewater Mains	701	
46	Pumping and Purchased Wastewater Treatment Statistics	702	
47	Main Blockages, Treatment Rate, System Integrity, Customer Satisfaction	702A	
48	Proposed Summary Budget	703	
49	**General Corporate Information**		
50	Evaluation	800	
51	**Explanation Notes**	801A-801B	
52	**Verification and Oath**	802	
53	**Performance Measures**		

INCOME STATEMENT

Line No.	Account (a)	Sch Page No. (b)	This Year (c)	Last Year (d)	Increase or (Decrease) (e)
1	**UTILITY OPERATING INCOME**				
2	Operating Revenues (400)	600	6,133,529	5,299,498	834,031
3	Operating Expenses:				
4	Operating Expenses (401)	603A-603B	3,343,575	3,363,879	(20,305)
5	Depreciation Expenses (403)	505A	1,529,533	1,193,073	336,459
6	Amortization (406-407)				-
7	**Taxes Other than Income (408)**				
8	Utility Regulatory Assessment Fees (408.10)	300A	26,636	38,461	(11,825)
9	Property Taxes (408.11)	300A	-	-	-
10	Payroll Taxes (408.12)	300	66,920	66,163	757
11	Other Taxes and Licenses (408.13)	300A	-	-	-
12	**Income Taxes (409)**	301			
13	Federal Income Taxes, Utility Operating Income (409.10)	301	-	-	-
14	State Income Taxes, Utility Operating Income (409.11)	301	-	-	-
15	Local Income Taxes, Utility Operating Income (409.12)	301	-	-	-
16	**Provision for Deferred Income Taxes (410)**				
17	Deferred Federal Income Taxes (410.10)	301	-		-
18	Deferred State Income Taxes (410.11)	301	-		-
19	Deferred Local Income Taxes (410.12)	301	-		-
20	**Provision for Deferred Income Taxes - Credit (411)**				
21	Provision for Def. Inc. Taxes - Credit, Utility Operating Income (411.10)	301	-		-
22	**Investment Tax Credits (412)**				
23	Inv. Tax Credits Def. to Future Periods, Utility Operations (412.10)	301	-	-	-
24	Inv. Tax Credits Restored to Operating Inc., Utility Operations (412.11)	301	-	-	-
25	**Total Operating Expenses**		4,966,663	4,661,577	305,087
26	**Operating Income**		1,166,866	637,921	528,945
27	Income From Utility Plant Leased to Others (413)	303	-	-	-
28	Gains (Losses) From Disposition of Utility Property (414)	303	-	-	-
29	**Total Operating Income**		1,166,866	637,921	528,945
30	**OTHER INCOME AND DEDUCTIONS**				
31	Other Income:				
32	Income from Merchandising, Jobbing and Contract Work (415-416)	304	-	-	-
33	Interest and Dividend Income (419)	304	47,503	41,790	5,714
34	Allowance for Funds Used During Construction (420)	305	-	-	-
35	Nonutility Income (421)	305	284,333	191,936	92,398
36	**Total Other Income**		**331,836**	**233,725**	**98,111**

INCOME STATEMENT

Line No.	Account (a)	Sch Page No. (b)	This Year (c)	Last Year (d)	Increase or (Decrease) (e)
37	**Other Income Deductions:**				
38	Miscellaneous Nonutility Expenses (426)	305	-	-	-
39	**Total Other Income Deductions**		-	-	-
40	**Taxes Applicable to Other Income and Deductions:**				
41	**Taxes Other than Income (408):**				
42	Taxes Other than Income, Other Income and Deductions (408.20)	300	-	-	-
43	**Income taxes (409)**				
44	Income Taxes, Other Income and Deductions (409.20)	301	-	-	-
45	**Provision for Deferred Income Taxes (410)**				
46	Provision for Def. Inc. Taxes, Other Income and Deductions (410.20)	301	-		-
47	**Provision for Deferred Income Taxes - Credit (411)**				
48	Provision for Def. Inc. Taxes - Cr., Other Inc. and Deductions (411.20)	301	-		-
49	**Investment Tax Credits (412)**				
50	Investment Tax Credits - Net, Nonutility Operations (412.20)	301	-	-	-
51	Inv. Tax Credits Restored to Nonoperating Inc., Utility Ops. (412.30)	301	-	-	-
52	**Total taxes on other income and deductions**		-	-	-
53	**Net other income and deductions**		331,836	233,725	98,111
54	**INTEREST EXPENSE**				
55	Interest Expense (427)	306	426,267	386,677	39,590
56	Amortization of Debt Discount and Expense (428)	305	50,262	50,262	-
57	Amortization of Premium on Debt (429)	305	-	-	-
58	**Total Interest Expenses**		476,530	436,939	39,590
59	**Income Before Extraordinary Items**		1,022,173	434,707	587,466
60	**EXTRAORDINARY ITEMS**				
61	Extraordinary Income (433)	307	-	-	-
62	Extraordinary Deductions (434)	307	-	-	-
63	**Income Taxes (409.30):**				
64	Income Taxes, Extraordinary Items (409.30)	301	-	-	-
65	**Total Extraordinary Items**		-	-	-
66	**NET INCOME**		**1,022,173**	**434,707**	**587,466**

BALANCE SHEET

Line No.	Assets and Other Debits (a)	CLASS	Sch Page No. (b)	Balance Beginning of Year (c)	Balance End of Year (d)	Increase or (Decrease) (e)
1	**UTILITY PLANT**					
2	Utility Plant (101-106)	A & B	500	66,376,179	71,517,990	5,141,811
3	Less: Accumulated Prov. for Depr. and Amort. (108-110)	A & B	505A	(19,812,080)	(19,555,661)	256,419
4	Net Utility Plant			46,564,099	51,962,329	5,398,230
5	Utility Plant Acquisition Adjustments (114-115)	A & B	505A	618,261	590,406	(27,855)
6	Other Utility Plant Adjustments (116)	A	505A	-	-	-
7	**Total Net Utility Plant**			**47,182,359**	**52,552,735**	**5,370,375**
8	**OTHER PROPERTY AND INVESTMENTS**					
9	Nonutility Property (121)	A & B	200	-	-	-
10	Less: Accumulated Provision for Depr. and Amort. (122)	A & B	200	-	-	-
11	Net Nonutility Property			-	-	-
12	Investment in Associated Companies (123)	A & B	201	-	-	-
13	Utility Investments (124)	A & B	201	-	-	-
14	Other Investments (125)	A & B	201	-	-	-
15	Sinking Funds (126.1)	A	202	1,245,737	1,304,816	59,079
16	Depreciation Funds (126.2)	A	202	-	-	-
17	Other Special Funds (127)	A & B	202	830,439	966,085	135,646
18	**Total Other Property and Investments**			**2,076,176**	**2,270,901**	**194,725**
19	**CURRENT AND ACCRUED ASSETS**					
20	Cash (131)	A & B	202	355,435	1,245,460	890,026
21	Special Deposits (132-133)	A & B	202	1,790,926	5,707,156	3,916,230
22	Working Funds (134)	A & B	202	-	-	-
23	Temporary Cash Investments (135)	A & B	202	-	-	-
24	Customer Accounts Receivable (141)	A & B	203	327,109	237,958	(89,150)
25	Other Accounts Receivable (142)	A & B	203	-	-	-
26	Accum. Provision for Uncollectible Accounts- Cr.(143)	A & B	203	(13,000)	-	13,000
27	Notes Receivable (144)	A & B	203	-	-	-
28	Receivables from Associated Companies (145-146)	A & B	204	-	-	-
29	Materials and Supplies (151-161)	A & B	205	1,768	1,768	-
30	Prepayments (162)	A & B	206	-	-	-
31	Accrued Interest and Dividends Receivable (171)	A & B	206	-	-	-
32	Rents Receivable (172)	A	206	-	-	-
33	Accrued Utility Revenues (173)	A	206	565,037	547,606	(17,431)
34	Miscellaneous Current and Accrued Assets (174)	A & B	206	-	-	-
35	**Total Current and Accrued Assets**			**3,027,275**	**7,739,949**	**4,712,674**
36	**DEFERRED DEBITS**					
37	Unamortized Debt Discount and Expense (181)	A & B	207	226,682	200,001	(26,680)
38	Extraordinary Property Losses (182)	A & B	208	-	-	-
39	Preliminary Survey and Investigation Charges (183)	A	208	-	-	-
40	Clearing Accounts (184)	A				-
41	Temporary Facilities (185)	A				-
42	Miscellaneous Deferred Debits (186)	A & B	206	156,983	193,018	36,035
43	Research and Development Expenditures (187)	A	206	-	-	-
44	Accumulated Deferred Income Taxes (190)	A & B	301	-	-	-
45	**Total Deferred Debits**			**383,665**	**393,019**	**9,354**
46						
47	**Total Assets and Other Debits**			**52,669,475**	**62,956,604**	**10,287,129**

BALANCE SHEET (Continued)

Line No.	Liabilities and Other Credits (a)	CLASS	Sch Page No. (b)	Balance Beginning of Year (c)	Balance End of Year (d)	Increase or (Decrease) (e)
1	**EQUITY CAPITAL**					
2	Common Stock Issued (201)	A & B	209	-	-	-
3	Common Stock Subscribed (202)	A	210	-	-	-
4	Common Stock Liability for Conversion (203)	A	210	-	-	-
5	Preferred Stock Issued (204)	A & B	209	-	-	-
6	Preferred Stock Subscribed (205)	A	210	-	-	-
7	Preferred Stock Liability for Conversion (206)	A	210	-	-	-
8	Premium on Capital Stock (207)	A	211	-	-	-
9	Reduction in Par on Stated Value of Capital Stock (209)	A	211	-	-	-
10	Gain on Resale or Cancellation of Reacquired Capital Stock (210)	A	211	-	-	-
11	Other Paid-in Capital (211)	A & B	211	-	-	-
12	Discount on Capital Stock (212)	A & B	211	-	-	-
13	Capital Stock Expense (213)	A & B	211	-	-	-
14	Retained Earnings (214-215)	A & B	105	22,090,222	23,112,395	1,022,173
15	Reacquired Capital & Preferred Stock (216)	A & B	209	-	-	-
16	Proprietary Capital (218)	A & B	211	-	-	-
17	**Total Equity Capital**			**22,090,222**	**23,112,395**	**1,022,173**
18	**LONG-TERM DEBT**					
19	Bonds (221-222)	A & B	212-212A	24,106,331	22,924,655	(1,181,676)
20	Advances from Associated Companies (223)	A & B	213	113,707	111,071	(2,636)
21	Other Long-Term Debt (224)	A & B	212B		12,330	12,330
22	**Total Long-Term Debt**			**24,220,038**	**23,048,056**	**(1,171,983)**
23	**CURRENT AND ACCRUED LIABILITIES**					
24	Accounts Payable (231)	A & B	216	138,042	176,007	37,965
25	Notes Payable (232)	A & B	213	1,997	-	(1,997)
26	Payables to Associated Companies (233-234)	A & B	214	-	-	-
27	Customer Deposits (235)	A & B	216	156,726	145,325	(11,401)
28	Accrued Taxes (236)	A & B	215	-	-	-
29	Accrued Interest (237)	A & B	216	52,389	50,667	(1,722)
30	Accrued Dividends (238)	A & B	216	-	-	-
31	Matured Long-Term Debt (239) & interest (240)	A & B	216	1,262,118	1,181,676	(80,442)
32	Miscellaneous Current and Accrued Liabilities (241)	A & B	216	59,759	76,849	17,091
33	**Total Current and Accrued Liabilities**			**1,671,030**	**1,630,524**	**(40,506)**
34	**DEFERRED CREDITS**					
35	Unamortized Premium on Debt (251)	A & B	207	100,491	96,218	(4,273)
36	Advances for Construction (252)	A & B	216A	-	10,500,000	10,500,000
37	Other Deferred Credits (253)	A & B	216	669,906	651,624	(18,282)
38	Accumulated Deferred Investment Tax Credits (255)	A & B	217	-	-	-
39	**Total Deferred Credits**			**770,397**	**11,247,842**	**10,477,445**
40	**OPERATING RESERVES**					
41	Property Insurance Reserve (261)	A & B	218	-	-	-
42	Injuries and Damages Reserve (262)	A & B	218	-	-	-
43	Pensions and Benefits Reserve (263)	A & B	218	-	-	-
44	Miscellaneous Operating Reserves (265)	A & B	218	-	-	-
45	**Total Operating Reserves**			**-**	**-**	**-**
46	**CONTRIBUTIONS IN AID OF CONSTRUCTION**					
47	Contributions in Aid of Construction (271)	A & B	219	3,917,787	3,917,787	-
48	Accumulated Amort. Of Contributions in Aid of Construction (272)	A & B	219	-	-	-
49	**Total Contributions in Aid of Construction**			**3,917,787**	**3,917,787**	**-**
50	**ACCUMULATED DEFERRED INCOME TAXES**					
51	Accelerated Amortization (281)	A & B	219A	-	-	-
52	Liberalized Depreciation (282)	A & B	219A	-	-	-
53	Other (283)	A & B	219A	-	-	-
54	**Total Accumulated Deferred Income Taxes**			**-**	**-**	**-**
55	**Total Liabilities and Other Credits**			**30,579,253**	**39,844,209**	**9,264,956**
56	**Total Liabilities and Equity**			**52,669,475**	**62,956,604**	**10,287,129**

STATEMENT OF CASH FLOWS

The overall design of the form has been categorized in accordance with FASB #95-Statement of Cash Flows using the direct method. For those completing the form without the assistance of an accountant, categorize receipts and disbursements using captions given and the blank lines as necessary to reconcile with cash accounts.

Cash Flows from Operating Activities include the cash effects of items normally appearing on an income statement. Other cash transactions should be reported as investing or financing activities, whichever appears to be the most appropriate for each circumstance.

Notes: please enter the inflow as positive numbers and out flow as negative numbers.

Line No.	Statement of Cash Flows	Amount for Year
1	**Cash Flows from Operating Activities**	
2	Cash from Customers Attributable to Operating Revenues	6,227,110
3	Less: Cash Paid for Operation & Maintenance Expenses	(3,290,516)
4	Cash Paid for Taxes Other Than Income Taxes	(66,920)
5	Income Taxes Paid	(26,636)
6	**Subtotal of Cash Flows from Operating Activities**	**2,843,039**
7	Interest and Other income Received	331,836
8	(Interest Paid)	(427,990)
9	Other Cash Inflows(Outflows) from Operating Activities:	
10	Other Income Adjustments	
11		
12	**Net Cash Provided by (Used in) Operating Activities**	**2,746,885**
13	**Cash Flows from Investing Activities:**	
14	**Cash inflows:**	
15	Proceeds from Sale of Utility Plant	
16	Contributions and Advances in Aid of Construction	10,500,000
17	Contributions and Advances from Associated Companies	(2,636)
18	Proceeds from Sale of Investment Securities	
19	Proceeds from Disposal of Other Non-current Assets	
20	**Cash Outflows:**	
21	Expenditures on Additions to Utility Plant	(5,141,811)
22	Refunds of Customer Advances for Construction	
23	Investments in and Advances to Associated Companies	
24	Purchase of Investment Securities	
25	Acquisition of Other Non-current Assets	
26	**Other Cash Inflows(Outflows) from Investing Activities:**	
27	Cost of Removal Net of Salvage	(249,041)
28	Acquisition Costs	
29	Preliminary Survey and Investigation Costs	(1,785,952)
30	**Net Cash Provided by (Used in) Investing Activities**	**3,320,559**
31	**Cash Flows from Financing Activities:**	
32	Cash Inflows - Proceeds from Issuance of:	
33	Long-Term Debt	
34	Preferred Stock	
35	Common Stock	
36	**Cash Outflows**	
37	Payments for Retirement of:	
38	Long-Term Debt	(1,249,789)
39	Preferred Stock	
40	Common Stock	
41	Dividends on Preferred Stock	
42	Dividends on Common Stock	
43	Other Cash Inflows(Outflows) from Financing Activities:	
44	Net Increase or (Decrease) in Short-Term Debt	
45	Net Increase or (Decrease) in Customer Deposits	(11,401)
46	Debt Issuance Costs	
47	Net Borrowings Under Line-of-Credit Agreement	
48	**Net Cash Provided by (Used in) Financing Activities**	**(1,261,189)**
49	Net Increase (Decrease) in Cash and Cash Equivalents	4,806,255
50	Cash and Cash Equivalents - Beginning of Year	2,146,361
51	**Cash and Cash Equivalents - End of Year**	**6,952,616**

STATEMENT OF CASH FLOWS

Line No.	Reconciliation of Net Income to Net Cash Provided by Operating Activities	Amount for Year
52	**Net Income**	1,022,173
53	**Adjustments to reconcile net income to net cash provided by operating activities:**	
54	Depreciation and amortization	1,529,533
55	Net deferred taxes & investment tax credits	
56	(Allowance for funds used during construction)	
57	(Gain) Loss recognized on disposition of assets	
58	Amortization of debt discount (premium) on debt	50,262
59	Net (increase) decrease in receivables	76,150
60	(Increase) decrease in materials and supplies	-
61	(Increase) decrease in prepayments	-
62	Net (increase) decrease in other accrued revenues & assets	17,430
63	Increase (decrease) in accounts payable	35,968
64	Increase (decrease) in interest accrued	(1,722)
65	Net increase (decrease) in taxes accrued & taxes payable	-
66	Net increase(decrease) in other accrued expenses	17,091
67	Increase (decrease) in operating reserves	
68	Other adjustments	
69	Income adjustments	
70		
71		
72		
73	**Net Cash Provided by Operating Activities**	**2,746,885**

NOTES TO BALANCE SHEET, STATEMENT OF CASH FLOWS AND OPERATIONAL PROGRAMS

Please provide a note on Schedule 801A-801B if needed.

Main Extensions

Main Extensions Performed per Rule 5.5:	0
Alternate Main Line Extensions Agreements	2
Total # customers added	106
Total number of long service lines added during year	0

Inspections Reports - DEP

# DEP violations cited (pretreatment permit)	3
Compliance achieved	Yes
If no, expected date of compliance achievement	

Capacity Development Report (WV Bureau for Public Health - OED)

Capacity Development Report prepared?	No
Compliance achieved with recommendations	
If no, expected date of compliance achievement	

Revenue Bonds

Has Audit Report by CPA been submitted this year?	FY 2019
List Bond Issues that are in default and amounts	None

Additional Notes:

APPROPRIATED RETAINED EARNINGS (Account 214)

Line No.	Purpose of Appropriation (a)	Balance Beginning of Year (b)	Balance End of Year (c)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
	Total for Account 214	**-**	**-**

UNAPPROPRIATED RETAINED EARNINGS - (Account 215)

Line No.	Particulars (a)	This Year (b)	Preceding Year (c)
1	Unappropriated retained earnings (at beginning of period)	22,090,222	12,488,484
2			
3	Balance Transferred from Income (435)	1,022,173	434,707
4	Appropriations of Retained Earnings (436)		
5	Dividends Declared - Preferred Stock (437)		
6	Dividends Declared - Common Stock (438)		
7	Adjustments of Retained Earnings (439)		9,167,031
8			
9			
10	Net increase (decrease) to retained earnings	1,022,173	9,601,738
11	Unappropriated retained earnings (at end of period)	23,112,395	22,090,222

NOTES TO STATEMENT OF RETAINED EARNINGS

NONUTILITY PROPERTY (Accounts 121)

ACCUMULATED DEPRECIATION AND AMORTIZATION OF NONUTILITY PROPERTY (Account 122)

MINOR ITEMS MAY BE GROUPED BY CLASSES.

Line No.	Description and Location (a)	Balance Beginning of Year (b)	Balance End of Year (c)
1	N/A		
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16	Total for Account 121	-	-
17	Less Accum. prov. for depr. and amort. (122)		
18	Net nonutility property	-	-

INVESTMENTS IN ASSOCIATED COMPANIES, UTILITY INVESTMENTS AND OTHER INVESTMENTS (Accounts 123-125)

1. Report with separate subheadings for each account, the securities owned by the utility.
2. Include date of issue and date of maturity in description of any debt securities owned.
3. Designate any securities pledged and explain purpose of pledge in footnote on Schedule 801A-801B
4. Minor investments in Account 125 may be grouped by classes.
5. If book cost is different from cost to respondent, give cost to respondent in a footnote (on Schedule 801A-801B) and explain difference.

No.	Description of Investment (a)	Book Cost Beginning of Year (b)	Purchases or Additions During Year (c)	Sales or Other Dispositions During Year (d)	Book Cost End of Year (e)	Principal Amount or No. of Shares End of Year (f)	Revenues for Year (g)	Gain or Loss from Investments Disposed of (h)
1	**Investment in Assoc. Co. (123)**							
	N/A				-			
					-			
					-			
					-			
					-			
	Total Account 123	-	-	-	-	-	-	-
2	**Utility Investments (124)**							
	N/A				-			
					-			
					-			
					-			
					-			
	Total Account 124	-	-	-	-	-	-	-
3	**Other Investments (125)**							
	N/A				-			
					-			
					-			
					-			
					-			
	Total Account 125	-	-	-	-	-	-	-

CASH ,SINKING FUNDS ,SPECIAL DEPOSIT, OTHER SPECIAL DEPOSIT, AND OTHER SPECIAL FUNDS
Accounts 126 -135

Line No.	Name of Fund (a)	Balance Beginning of Year (b)	Additions Principal (c)	Additions Income (d)	*Enter as Negative Number* Deductions (e)	Balance End of Year (f)
1	**Cash on Hand and Cash in Bank (131.1 & 131.2)**	355,435				1,245,460
2	**Sinking Funds (126.1)-CLASS A ONLY!**					
		1,245,737	1,801,575	22,886	(1,765,383)	1,304,816
						-
						-
						-
						-
	Total Account 126.1	**1,245,737**	**1,801,575**	**22,886**	**(1,765,383)**	**1,304,816**
3	**Depreciation Fund (126.2)-CLASS A ONLY!**					
						-
						-
						-
						-
						-
	Total Account 126.2	**-**	**-**	**-**	**-**	**-**
4	**Other Special Funds (127)**					
	Renewal & Replacement	134,300	293,868	1,365	(166,064)	263,470
	Working Capital Reserve	696,140		6,476		702,616
						-
						-
						-
	Total Account 127	**830,439**	**293,868**	**7,842**	**(166,064)**	**966,085**
5	**Special Deposits (132-133)**					
	Customer Security Deposits	157,391	591	2,240	(10,875)	149,346
	Huntfield CIFS	60,814		613		61,427
	2005A Bond Repayment - CIF	807,461		7,760		815,221
	Sewer CIFS	765,260	326,715	6,008	(81,250)	1,016,733
	Rt. 9 Project Escrow Account	-	10,500,000	46,010	(6,881,581)	3,664,429
	Total Accounts 132 &133	**1,790,926**	**10,827,306**	**62,631**	**(6,973,706)**	**5,707,156**
6	**Working Funds (134)**					
						-
						-
						-
						-
						-
	Total Account 134	**-**	**-**	**-**	**-**	**-**
7	**Temporary Cash Investments (135)**					
						-
						-
						-
						-
						-
	Total Account 135	**-**	**-**	**-**	**-**	**-**

B. ASSETS IN SINKING, DEPRECIATION, AND OTHER SPECIAL FUNDS

1. List the securities and other assets comprising the balance of each fund at end of year. Minor items may be grouped for each account.

2. Include date of issue and date of maturity in description of any debt securities owned.

3. For any securities pledged state name of pledges and purpose of pledge.

Line No.	Name of Fund and Description of Asset	Interest or Dividend Rate	Cost to Respondent	Par Value	Book Cost End of Year
1	Sinking funds				
2	Bonds 1988 - 2018				
3	(Details on page 212)				
4					
5					
6					
7					
8					
9					
10					
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12					
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15					
16					
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29					
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31					
32					
33					
34					
35					
36					
37	**Total**	**xxxx**	**-**	**-**	**-**

ACCOUNTS RECEIVABLE AND OTHER RECEIVABLE (Account 141-142)

No.	Particulars (a)	Amount Beginning of Year (b)	Amount End of Year (c)
1	**Customer accounts receivable (Acct.141):**		
	Utility service	327,109	237,958
	Total for Account 141	**327,109**	**237,958**
2	**Other accounts receivable (acct. 142):**		
	Total for Account 142	**-**	**-**

ACCUMULATED PROVISION FOR UNCOLLECTIBLE ACCOUNTS-CR. (Account 143)

1. Report below the information called for concerning this accumulated provision.
2. Explain any important adjustments of sub accounts.
3. Entries with respect to officers and employees shall not include items for utility services.

Line No.	Item (a)	Utility Customers (b)	Merchandise Jobbing and Contract Work (c)	Officers and Employees (d)	Other (e)	Total (f)
1	**Balance Beginning of Year**	(13,000)				(13,000)
2	Prov. for uncollectibles for year					-
3	Accounts written off	13,000				13,000
4	Coll. of accounts written off					-
5	Adjustments (explain):					-
6						-
7						-
8	**Balance End of Year**	**-**	**-**	**-**	**-**	**-**

NOTES RECEIVABLE (Account 144)

Give particulars of any notes discounted or pledged. Minor items may be grouped showing number of such items. Designate notes from officers and employees.

Line No.	Name of Maker and Purpose for Which Received (a)	Date of Issue (b)	Date of Maturity (c)	Amount (d)	Interest Rate (e)	Interest Amount (f)
1	**Balance Beginning of Year**					
2	**current Year's Activities:**					
3	N/A					
4						
5						
6						
7						
8	**Total for the Year**			**-**		**-**

ACCOUNTS RECEIVABLE FROM ASSOCIATED COMPANIES (Account 145)

Line No.	Name of Associated Company (a)	Balance Beginning of Year (b)	Totals for Year		Balance End of Year (e)
			Debits (c)	Credits (d)	
1	N/A				-
2					-
3					-
4					-
5					-
6					-
7					-
8					-
9					-
10					-
11	**Total for Account 145**	-	-	-	-

NOTES RECEIVABLE FROM ASSOCIATED DIVISIONS OR FUNDS (Account 146)

1. Give particulars of any notes pledged or discounted.
2. Include date of issue and date of maturity in description of note.

Line No.	Name of Maker and Description (a)	Balance Beginning of Year (b)	Totals for Year		Balance End of Year (e)	Interest for Year	
			Debits (c)	Credits (d)		Rate (f)	Amount (g)
1	N/A				-		
2					-		
3					-		
4					-		
5					-		
6					-		
7					-		
8					-		
9					-		
10	**Total for Account 146**	-	-	-	-		-

PLANT, MATERIAL, AND SUPPLIES

MERCHANDISE, OTHER MATERIAL AND SUPPLES, AND STORE EXPENSE (Accounts 151-161)

1. Report below the amount of materials and supplies at end of year under titles which are indicative of the character of the material included.
2. In section B give an explanation of inventory adjustments during year showing general classes of material affected and the various classes of accounts (operating expense, clearing accounts, etc.) debited or credited. Debits or credits to stores expense-clearing shall be shown separately.

A. Summary of Plant, Material, and Supplies at End of Year

Line No.	Class of Material (a)	Class of Account Affected (b)	Departments to Which Predominant Use of Material is Attributable (c)	Amount ($) (d)
1	**Beginning Balance (Accts. 151-161)**			**1,768**
	(151) Plant Material and Supplies			
	Current Year's Activities			
	Total for current Year for Account 151			**-**
2	(152) Merchandise- CLASS A ONLY!			
	Current Year's Activities			
	Total for current Year for Account 152			**-**
3	(153) Other Material and Supplies-CLASS A ONLY!			
	Current Year's Activities			
	Total for current Year for Account 153			**-**
4	(161) Stores Expense-CLASS A ONLY!			
	Current Year's Activities			
	Total for current Year for Account 161			**-**
	End of Year Balance (Accts. 151-161)			**1,768**

B. Explanation of Inventory Adjustments

1	
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PREPAYMENTS (Account 162)
MISCELLANEOUS CURRENT AND ACCRUED ASSETS (Account 171-174)
MISCELLANEOUS DEFERRED DEBITS (Account 186)
RESEARCH AND DEVELOPMENT EXPNESE (ACCOUNT 187)

1. Give below the particulars called for concerning each prepayment.
2. Minor items may be grouped by classes, showing number of such items.

Line No.	Description (a)	Balance Beginning of Year (b)	Balance End of Year (c)
1	**Prepayments (Acct.162)**		
	N/A		
	Total for Account 162	-	-
2	**Accrued Interest and Dividends Receivable (Acct.171)**		
	N/A		
	Total for Account 171	-	-
3	**Rents Receivable (Acct. 172)-CLASS A ONLY!**		
	N/A		
	Total for Account 172	-	-
4	**Accrued Utility Revenues(Acct. 173)-CLASS AONLY!**		
		565,037	547,606
	Total for Account 173	**565,037**	**547,606**
5	**Miscellaneous Current and Accrued Assets (Acct. 174)**		
	N/A		
	Total for Account 174	-	-
6	**Miscellaneous Deferred Debits (186)**		
	Deferred Rate Case Expense (Acct.186.1):		
	N/A		
	Other Deferred Debits (Acct.186.2):		
	Implementation of GASB 68	114,450	105,875
	Deferred Outflows	42,533	87,143
	Regulatory Assets (Acct.186.3):		
	Total for Account 186	**156,983**	**193,018**
7	**Research and Development Expense (Acct. 187)-CLASS A ONLY!**		
	Total for Account 187	-	-

UNAMORTIZED DEBT DISCOUNT AND EXPENSE AND UNAMORTIZED PREMIUM ON DEBT (Accounts 181, 251)

Report below the particulars called for with respect to the unamortized debt discount and expense or net premium applicable to each class and series of long-term debt. Show separately any amortized debt discount and expense or call premiums applicable to refunded issues, including separate subtotal therefore. Show in column (a) the method of amortization for each amount of debt discount and expense or premium. In column (b) show principal amount of debt on which the total discount and expense or premium, shown in column (c), was incurred.

Explain any charges or credits in column (e) and (f) other than amortization of Account 428 or 429.

Line No.	Debt to Which Related (a)	Principal Amount of Debt to Which Dis. and Exp. or Net Premiums Relate (b)	Total Discount and Expense or (Net Premiums) (c)	Balance Beginning of Year (d)	Debits During Year (e)	Credits During Year (f)	Balance End of Year (g)
1	**Unamortized Debt Disc. and Exp. (181)**						
2	Def Loss			457,933			457,933
3	Accum Amort of Def Loss			(367,688)		(17,432)	(385,120)
4	Def Loss Prem on 98 Refund & Acc Amort on 98 Ref			5,698		(712)	4,986
5	Insurance 2015A Bond & Accum Amort Insurance on 2015A			4,522		(348)	4,174
6	Insurance 2015B Bond & Accum Amort Insurance on 2015B			5,262		(585)	4,677
7	Insurance 2016B Bond & Accum Amort Insurance 2016B			36,613		(1,356)	35,257
8	Insurance 2018B Bond			29,568			29,568
9	Accum Amort Insurance on 2018A			(2,039)		(2,039)	(4,078)
10	Bond Discount 2018A			61,023			61,023
11	Accum Amort Bond Discount on 2018A			(4,208)		(4,208)	(8,417)
12	**Total for Account 181**	**-**	**-**	**226,682**	**-**	**(26,680)**	**200,001**
13	**Unamortized Premium on Debt (251)**						
14	2015A			2,908			2,908
15	2015A Amortization			(684)		(171)	(855)
16	2015B			9,016			9,016
17	2015B Amortization			(2,774)		(694)	(3,468)
18	2016B			102,250			102,250
19	2016B Amortization			(10,225)		(3,408)	(13,633)
20							-
21							-
22							-
23							-
24	**Total for Account 251**	**-**	**-**	**100,491**	**-**	**(4,273)**	**96,218**

EXTRAORDINARY PROPERTY LOSSES (Account 182)

1. Report the information indicated concerning this account.
2. Include in the description the date the property was abandoned or other extraordinary loss incurred.
3. Show in column (c) the entire period over which the loss is to be written off.

Line No.	Description of Property Loss or Damage (a)	Comm. Authority (b)	Period of Amortization (c)	Balance Beginning of Year (d)	Debits (e)	Credits		Balance End of Year (h)
						Account Charged (f)	Amount (g)	
1	N/A							-
2								-
3								-
4								-
5								-
6								-
7								-
8								-
9								-
10	**Total for Account 182**			-	-		-	-

PRELIMINARY SURVEY AND INVESTIGATION CHARGES (Account 183)

CLASS A ONLY!

1. Report below the particulars called for concerning this account.
2. Minor items may be grouped by classes, showing number of such items.

Line No.	Description and Purpose of Project (a)	Balance Beginning of Year (b)	Debits (c)	Credits		Balance End of Year (f)
				Account Charged (d)	Amount (e)	
1	N/A					-
2						-
3						-
4						-
5						-
6						-
7						-
8						-
9	**Total for Account 183**	-	-		-	-

CAPITAL STOCK & PREFERRED STOCK (Accounts 201, 204, and 216)

1. Report below the particulars called for concerning common and preferred stock at end of year, distinguishing separate series of any general class. Show totals separately for common and preferred stock.
2. Entries in column (b) should represent the number of shares authorized by the articles of incorporation as amended to end of year.
3. Give particulars concerning shares of any class and series of stock authorized to be issued by a regulatory commission which have not yet been issued.
4. The designation of each class of preferred stock should show the dividend rate and whether the dividends are cumulative or non-cumulative.
5. State if any capital stock which has been nominally issued is nominally outstanding at end of year.
6. Give particulars of any nominally issued capital stock, reacquired stock, or stock in sinking and other funds which is pledged, stating name of pledgee and purpose of pledge.

Line No.	Class and Series of Stock (a)	Number of Shares Authorized by Charter (b)	Par or Stated Value Per Share (c)	Call Price at End of Year (d)	OUTSTANDING PER BALANCE SHEET		HELD BY RESPONDENT			
							AS REACQUIRED STOCK (Account 216)		IN SINKING AND OTHER FUNDS	
					Shares (e)	Amount (f)	Shares (g)	Cost (h)	Shares (i)	Amount (j)
1	**Common Stock - Account 201**									
2	**Balance Beginning of year**									
3	**Balance for the Current Year**									
4	N/A									
5										
6										
7										
8										
9										
10										
11	**End of Year Balance for Acct. 201**	-	-	-	-	-	-	-	-	-
12	**Preferred Stock - Account 204**									
13	**Balance Beginning of year**									
14	**Balance for the Current Year**									
15	N/A									
16										
17										
18										
19										
20										
21										
22	**End of Year Balance for Acct. 204**	-	-	-	-	-	-	-	-	-

SECURITY HOLDERS AND VOTING POWERS

1. (A) Give the names and addresses of the security holders of the respondent who, at the date of the latest closing of the stock book or compilation of list of stockholders of the respondent, prior to the end of the year, each held 5% or more of the voting powers in the respondent, and state the number of votes which each would have had a right to cast on that date if a meeting were then in order. If any such holder held in trust, give in a footnote (Schedule 801A-801B) the known particulars of the trust,if the stock book was not closed or a list of stockholders not compiled within one year prior to the end of the year, or if since the previous compilation of a list of stockholders, some other class of security has become vested with voting rights, then show such largest security holders as of the close of the year. Arrange the names of security holders in the order of voting power commencing with the highest. Show in column (a) the title of officers and directors included in such list of security holders.
(B) Give also the voting powers resulting from ownership of securities of the respondent of each officer and director not included in the list of largest security holders.

2. Give the date of the latest closing of the stock book prior to the end of the year, and state the purpose of such closing:

Closing Date: _____ **Purpose:** _____

3. State the total number of votes cast on the latest general meeting prior to end of year for the election of directors of the respondent and number of such votes cast by proxy.
Total: _____
By Proxy:

4. Give the date and place of such meeting.

Line No.	Security Holder (a)	Title of Officer OR Director (b)	Number of Votes as of: Total Number of Votes (c)	Common Stock (d)	Preferred Stock (e)	Other Securities With Voting Power (f)
1	N/A					
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12	Total Votes Represented by above (insert total here).					

5. Show below the total number of security holders and total number of votes entitled to be cast for each series and class of security vested with voting rights as of the date for which the foregoing list of security holders is furnished.

a. No. of Security Holders: _____
b. No. of Votes: _____
c. Class: _____

6. If voting rights are attached to any securities other than stock, name in a supplemental statement each such security to which voting rights are attached, and state the relation between holdings and corresponding voting rights, whether voting rights are actual or contingent, and if contingent, describe the contingency.

7. If any class or issue of securities has any special privileges in the election of directors, trustees, or managers, or in the determination of corporate action by any method, describe fully in a footnote on 801A-801B each such class or issue, and give a succinct statement showing clearly the character and extent of such privilege.

SECURITIES ISSUED OR ASSUMED DURING YEAR

1. Report below the particulars called for concerning securities issued or assumed during year.
2. Group and show separate totals for each class of security.
3. Give particulars concerning the assumption of long-term debt of others.
4. Non-par stock should be reported in column (c) at stated or assigned values, or if there is not stated or assigned value, they should be reported at the cash value of the consideration received.
5. Give particulars concerning consideration other than cash received for securities issued during year.
6. Designate premiums in column (f) by appropriate symbol.
7. Show in column (g) expenses applicable to securities issued during year and any delayed items of expense applicable to securities issued during preceding year. For such delayed items, entries should be made only in columns (a), (b), and (g).

Line No.	Class of Security (a)	Comm. Auth. No. (b)	Principal Amount Issued During Year (Omit Cents) (c)	Number of Shares of Stock Issued (d)	Par value Per Share of Stock (e)	Discount or Premium (f)	Expenses (g)
1	N/A						
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21	**Total**		-	-	xxxxxxx	-	-

CORPORATIONS CONTROLLED BY RESPONDENT

1. Show the names of all corporations, business trusts, and similar organizations, controlled directly or indirectly by respondent at any time during the year. If control ceased prior to end of year, give particulars in an attached memorandum.
2. Direct control is that which is exercised without interposition of an intermediary.
3. Indirect control is that which is exercised by the interposition of an intermediary which exercises direct control.

Line No.	Name of Company Controlled (a)	Kind of Business (b)	% Voting Stock Owned (c)	Character of Control			
				Form of Control (d)	Sole or Joint (e)	Direct or Indirect (f)	Other Parties to Joint Control (g)
1	N/A						
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

COMMON STOCK SUBSCRIBED (Account 202)
COMMON STOCK LIABILITY FOR CONVERSION (Account 203)
PREFERRED STOCK SUBSCRIBED (Account 205)
PREFERRED STOCK LIABILITY FOR CONVERSION (Account 206)

1. Show for each of the above accounts the amounts applying to each class and series of common and preferred stock.
2. Describe the agreement and transaction under which a conversion liability existed under accounts 203 & 206, Stock Liability for Conversion, at end of year.
3. For Stock Subscribed, Accounts 202 & 205, show the subscription price and the balance due on each class at end of year.

Line No.	Name of Account and Description of Item	Number of Shares	Balance Beginning of Year	Balance End of Year
	(a)	(b)	(c)	(d)
1	**Common Stock Subscribed (Acct. 202)- CLASS A ONLY!**			
	N/A			
	Total Account 202	-	-	-
2	**Common Stock Liability for Conversion (Acct. 203)- CLASS A ONLY!**			
	Total Account 203	-	-	-
3	**Preferred Stock Subscribed (Acct. 205)-CLASS A ONLY!**			
	Total Account 205	-	-	-
4	**Preferred Stock Liability for Conversion (Acct 206)-CLASS A ONLY!**			
	Total Account 206	-	-	-

OTHER PAID - IN CAPITAL (Accounts 207-211)

Line No.	Particulars (a)	Balance First of Year (b)	Balance End of Year (c)	Increase or (Decrease) (d)
1	Premium on Capital Stock (207)- CLASS A ONLY!			-
2	Reduction in Par or Stated Value of Capital Stock (209)- CLASS A ONLY!			-
3	Gain on Resale or Cancellation of Reacquired Capital Stock (210)- CLASS A ONLY!			-
4	Other Paid-in Capital (211)			-
5	Installments Received on Capital Stock (211):			
6				-
7				-
8	**Total Account 211**	**-**	**-**	**-**
9	**Total Accounts 207-211**	**-**	**-**	**-**
10	Explain changes during year:			
11				
12				

DISCOUNT ON CAPITAL STOCK (Account 212)
CAPITAL STOCK EXPENSE (Account 213)

1. Report below the particulars by account.
2. Explain each debit and credit in detail.

Line No.	Class and Series of Stock (a)	Balance Beginning of Year (b)	Debits (c)	Credits (d)	Balance End of Year (e)
1	**Discount on Capital Stock (212)**				
2					-
3					-
4					-
5					-
6	**Total Account 212**	**-**	**-**	**-**	**-**
7	**Capital Stock Expense (213)**				
8					-
9					-
10					-
11					-
12	**Total Account 213**	**-**	**-**	**-**	**-**

PROPRIETARY CAPITAL (Account 218)

Line No.	Sole Proprietorship or Partnership (a)	Balance Beginning of Year (b)	Gains (c)	Losses (d)	Balance End of Year (e)
1					-
2					-
3					-
4					-
5					-
6	**Total Account 218**	**-**	**-**	**-**	**-**

LONG-TERM DEBT (Account 221)

Bonds

1. Report below the particulars indicated of the long-term debt at end of year represented by unmatured obligations issued or assumed by the respondent, exclusive of advances from associated companies.
2. Group amounts according to accounts and show the total for each account.

3. If the respondent has pledged any of its long-term debt securities give particulars in a footnote (on schedule 801A-801B), including name of the pledgee and purpose of the pledge.

Notes:

Acct 427- See Schedule 306.

Administrative Fees should be included in Acct. 775.8, Schedule 605.

Acct 239-240 See Schedule 216.

Example:" Debt Holder: "WDA", Class:"WDA 1999", Series: "A"

Line No.	Debt Holder, Class, Series (a)	Nominal Date of Issue (b)	Date of Maturity (c)	Outstanding per Balance Sheet (d)	Rate (%) (e)	Interest for Year- Acct. 427.3 ($) (f)	Matured P.& I. Acct-239 & 240 ($) (g)	Principal for Year ($) (h)	Reserve Requirements ($) (i)	Total Funding Required (F + H + I) (j)
1	**Bonds (221)**									
2	Series 1988B	5/4/1988		68,276	0.00%			7,588		7,588
3	1998 Design	01/01/1998	09/01/19	-	2.00%	33		6,617		6,650
4	Series 2000A	06/28/2000		283,499	2.00%	7,980		184,340		192,320
5	Series 2014D	12/01/2014		945,000	0.50%	48,888		95,000		143,888
6	Series 2011 A & B	01/01/2011		5,257,829	0.00%			250,373	25,037	275,410
7	Series 2013A	06/01/2013		485,280	0.50%	2,485		18,776	-	21,261
8	Series 2013B	06/01/2013		1,630,600	5.29%	80,453		37,200		117,653
9	Series 2014A	12/01/2014		3,520,213	0.50%	18,001		127,780	14,578	160,359
10	Series 2015A & B	11/30/2015		1,400,100	var	41,938		115,450		157,388
11	Series 2010C	1/1/2010		874,988	0.00%			41,668	-	41,668
12	Series 2010D	1/1/2010		349,988	0.00%			16,668	-	16,668
13	Series 2016B	9/30/2016		3,870,000	3.00%	127,825		25,000		152,825
14	Series 2018 A, A3, A4, A5, A6 (WDA)	12/29/2018		2,530,558	var	6,501		160,658	-	167,160
15	Series 2018B	12/29/2018		2,890,000	var	93,438		175,000		268,438
16	Less Matured Long Term Debt			(1,181,676)						-
17										-
18										-
19										-
20										-
	Total Account 221			**22,924,655**		**427,541**	**-**	**1,262,118**	**39,615**	**1,729,275**

LONG-TERM DEBT (Account 222)- CLASS A ONLY!

Reacquired Bonds

1. Report below the particulars indicated of the long-term debt at end of year represented by unmatured obligations issued or assumed by the respondent, exclusive of advances from associated companies.
2. Group amounts according to accounts and show the total for each account.

3. If the respondent has pledged any of its long-term debt securities give particulars in a footnote (on schedule 801A-801B), including name of the pledgee and purpose of the pledge.

Notes:

Acct 427- See Schedule 306.

Administrative Fees should be included in Acct. 775.8, Schedule 605.

Acct 239-240 See Schedule 216.

Example:" Debt Holder: "WDA", Class:"WDA 1999", Series: "A"

Line No.	Debt Holder, Class, Series (a)	Nominal Date of Issue (b)	Date of Maturity (c)	Outstanding per Balance Sheet (d)	Rate (%) (e)	Interest for Year- Acct. 427.3 ($) (f)	Matured P.& I. Acct-239 & 240 ($) (g)	Principal for Year ($) (h)	Reserve Requirements ($) (i)	Total Funding Required (F + H + I) (j)
1	**Reacquired Bonds (222)**									
2	N/A									-
3										-
4										-
5										-
6										-
7										-
8										-
9										-
10										-
11										-
12										-
13										-
14										-
15										-
16										-
17										-
18										-
19										-
20										-
21	**Total Account 222**			-		-	-	-	-	-

LONG-TERM DEBT (Account 224)

Other Long-Term Debt

1. Report below the particulars indicated of the long-term debt at end of year represented by unmatured obligations issued or assumed by the respondent, exclusive of advances from associated companies.
2. List each account separately and show the total for each account.
3. If the respondent has pledged any of its long-term debt securities, give particulars in a footnote (on Schedule 801A-801B), including name of the pledgee and purpose of the pledge.

Notes:

Acct 427- See Schedule 306.

Administrative Fees should be included in Acct. 775.8, Schedule 605.

Acct 239-240 See Schedule 216.

Example:" Debt Holder: "WDA", Class:"WDA 1999", Series: "A"

Line No.	Debt Holder, Class, Series (a)	Nominal Date of Issue (b)	Date of Maturity (c)	Outstanding per Balance Sheet (d)	Rate (%) (e)	Interest for Year- Acct. 427.3 ($) (f)	Matured P.& I. Acct-239 & 240 ($) (g)	Principal for Year ($) (h)	Reserve Requirements ($) (i)	Total Funding Required (F + H + I) (j)
1	**Other Long-Term Debt (224)**									
2	Leases Payable	10/23/2019	2/23/2024	12,330	2.30%					-
3										-
4										-
5										-
6										-
7										-
8										-
9										-
10										-
11										-
12										-
13										-
14										-
15										-
16										-
17										-
18										-
19										-
20										-
21	**Total Account 224**			**12,330**		-	-	-	-	-

ADVANCES FROM ASSOCIATED COMPANIES (Account 223)

LIST EACH NOTE SEPARATELY.

Line No.	Name of Associated Company (a)	Date of Note (b)	Date of Maturity (c)	Balance Beginning of Year (d)	Principal Advanced During Year (e)	Principal Repaid During Year (f)	Balance End of Year (g)	Interest Expense For Year Rate (h)	Interest Expense For Year Amount (i)	Comm. Auth. (j)
1	City of Charles Town General Fund	6/15/2012		113,707	(2,636)		111,071			
2							-			
3							-			
4							-			
5							-			
6							-			
7							-			
8							-			
9							-			
10	**Total for account 223**			**113,707**	**(2,636)**	**-**	**111,071**		**-**	

NOTES PAYABLE (Account 232)

1. Give below the particulars indicated concerning notes payable at end of year.
2. Give particulars or collateral pledged, if any.
3. Any demand notes should be described as such in column (d).
4. Minor amounts may be grouped by classes, showing the number of such amounts.

Line No.	Payee (a)	Purpose for Which Issued (b)	Balance Beginning of Year (c)	Date of Note (d)	Date of Maturity (e)	Interest Rate (f)	Interest Amount (g)	Balance End of Year (h)
1	BB & T	Land	1,997				23	-
2								
3								
4								
5								
6								
7								
8								
9								
10	**Total for account 232**		**1,997**				**23**	**-**

ACCOUNTS PAYABLE TO ASSOCIATED COMPANIES (Account 233)

Line No.	Payee and Description (a)	Balance Beginning of Year (b)	Totals for Year Debits (c)	Totals for Year Credits (d)	Balance End of Year (e)
1	N/A				-
2					-
3					-
4					-
5					-
6					-
7					-
8					-
9					-
10					-
11	**Total for Account 233**	-	-	-	-

NOTES PAYABLE TO ASSOCIATED COMPANIES (Account 234)

1. If collateral has been pledged as security to the payment of any note, describe such collateral.
2. Include date of note and date of maturity in description of note.

Line No.	Payee and Description (a)	Balance Beginning of Year (b)	Totals for Year Debits (c)	Totals for Year Credits (d)	Balance End of Year (e)	Interest for Year Rate (f)	Interest for Year Amount (g)
1	N/A				-		
2					-		
3					-		
4					-		
5					-		
6					-		
7					-		
8					-		
9					-		
10					-		
11	**Total for Account 234**	-	-	-	-		-

ACCRUED TAXES (Account 236)

1. The balance of accruals for income taxes should be classified by the years to which the tax is applicable

Enter payments as negative numbers.

Line No.	Kind of Tax (a)	Balance First of Year (b)	Amounts Accrued (c)	Payments During Year (d)	Other Items Debit or (Credit) (e)	Balance End of Year (f)
1	**Accrued taxes, Other than Income (236.11)**					
	N/A					-
						-
						-
						-
						-
						-
						-
						-
						-
						-
						-
2	**Accrued Taxes, Income Taxes (236.12)**					
	N/A					-
						-
						-
						-
						-
						-
						-
						-
						-
						-
						-
3	**Accrued Taxes, Other Income and Deductions (236.2)**					
	N/A					-
						-
						-
						-
						-
						-
						-
						-
						-
						-
	Total Account 236	-	-	-	-	-

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ACCOUNTS PAYABLE (231)
CUSTOMER DEPOSIT(235)
ACCRUED INTEREST (237)
ACCRUED DIVIDENDS (238) AND MATURED LONG TERM DEBT AND INTEREST(239& 240)
MISCELLANEOUS CURRENT AND ACCRUED LIABILITIES (Account 241)
OTHER DEFERRED CREDITS (Account 253)

1. Report the amount and description of other current and accrued liabilities at end of year.
2. Minor items may be grouped under appropriate title.

No.	Items (a)	Balance Beginning of Year (b)	Balance End of Year (c)
1	**Accounts Payable (Acct.-231)**		
		138,042	176,007
	Total for Account 231	**138,042**	**176,007**
2	**Customer Deposit (Acct.-235)**		
		156,726	145,325
	Total for Account 235	**156,726**	**145,325**
3	**Accrued Interest on Long Term Debt & Other Liabilities (Acct.-237.1 & 237.2)**		
		52,389	50,667
	Total for Account 237	**52,389**	**50,667**
4	**Accrued Dividends(Acct.-238)**		
	Total for Account 238	**-**	**-**
5	**Matured Long-Term Debt & Matured Interest (Acct- 239 & 240)**		
		1,262,118	1,181,676
	Total for Account 239 & 240	**1,262,118**	**1,181,676**
6	**Misc. Current and Accrued Liabilities (Acct.-241)**		
	Salaries Payable	17,261	18,791
	Accrued Vacation	42,498	58,058
	Total Balance for Account 241	**59,759**	**76,849**
7	**Other Deferred Credits (Regulatory and Others)(Acct.-253)**		
	Net Pension Liability	159,529	113,446
	Def Inflows	138,660	145,554
	Net OPEB Liability	301,443	251,688
	OPEB Def Inflows	70,274	140,936
	Total for Account 253	**669,906**	**651,624**

ADVANCES FOR CONSTRUCTION (Account 252)

Line No.	Class of Utility Service (a)	Balance Beginning of Year (b)	Debits		Credits (e)	Balance End of Year (f)
			Account (c)	Amount (d)		
1	Rt. 9 Sewer Project	-			10,500,000	10,500,000
2						-
3						-
4						-
5						-
6						-
7						-
8						-
9						-
10						-
11						-
12						-
13						-
14						-
15						-
16						-
17						-
18						-
19						-
20						-
21						-
22						-
23						-
24						-
25						-
26						-
27						-
28						-
29						-
30						-
31						-
32						-
33						-
34						-
35						-
36						-
37						-
38						-
39						-
40						-
41						-
42						-
43						-
44						-
45	**Total for Account 252**	**-**		**-**	**10,500,000**	**10,500,000**

ACCUMULATED DEFERRED INVESTMENT TAX CREDITS (Account 255)

Report as specified below information applicable to Account 255. Where appropriate, segregate the balances and transactions by utility and Non-utility operations. Explain by footnote (on Schedule 801A-801B) any correction adjustments to the account balance shown in column (g). Include in column (I) the average period over which the tax credits are amortized.

Line No.	Utility OR Nonutility (a)	Balance Beginning of Year (b)	Deferred for Year		Allocations to Current Year's Income		Adjustments (g)	Balance End of Year (h)	Average Period of Allocation to Income (i)
			Account No. (c)	Amount (d)	Account No. (e)	Amount (f)			
1	Wastewater Utility(255.1):							-	
	3%							-	
	4%							-	
	7%							-	
	10%							-	
	Other: (list separately and show							-	
	3%, 4%, 7%, 10%, and total)							-	
	N/A							-	
								-	
								-	
								-	
	Total for Wastewater Utility	**-**	**xxxxx**	**-**	**xxxxx**	**-**	**-**	**-**	
2	Non Utility (255.2)								
	N/A							-	
								-	
								-	
								-	
								-	
								-	
								-	
								-	
								-	
								-	
	Total for Wastewater NonUtility	**-**	**xxxxx**	**-**	**xxxxx**	**-**	**-**	**-**	
	Total for Account 255	**-**		**-**		**-**	**-**	**-**	

PROPERTY INSURANCE AND INJURIES AND DAMAGES RESERVES (Accounts 261 - 262)

Line No.	Particulars (a)	Property Insurance (Account 261) (b)	Injuries & Damages (Account 262) (c)
1	**Balance beginning of year**		
2	Additions during year (specify department and account charged)		
3	N/A		
4			
5			
6			
7			
8	Total Additions	-	-
9	**Deductions during year (specify)**		
10			
11			
12			
13			
14			
15	Total Deductions	-	-
16			
17	**Balance end of year**	-	-

PENSIONS AND BENEFITS RESERVE (Account 263)

MISCELLANEOUS OPERATING RESERVES (Account 265)

Line No.	Particulars (a)	Pensions & Benefits (Account 263) (b)	Miscellaneous (Account 265) (c)
1	**Balance beginning of year**		
2	Additions during year (specify department and account charged)		
3			
4			
5			
6			
7			
8	**Total additions**	-	-
9	Deductions during year (specify)		
10			
11			
12			
13			
14			
15	**Total deductions**	-	-
16			
17	**Balance end of year**	-	-
18	Explain nature of risks for which above reserves have been established and give actual or estimated liability		
19	for claims at end of year.		
20			
21			
22			
23			
24			
25			

CONTRIBUTIONS IN AID OF CONSTRUCTION (Account 271)

REPORT AMOUNTS APPLICABLE TO EACH WASTEWATER UTILITY DEPARTMENT .

Line No.	Class of Utility Service (a)	Balance Beginning of Year (b)	Debits		Credits (e)	Balance End of Year (f)
			Account Number Credited (c)	Amount (d)		
1	Contribution in aid of construction	3,773,307				3,773,307
2	Capacity Improvement	144,480				144,480
3						-
4						-
5						-
6						-
7						-
8						-
9						-
10						-
11						-
	Total for account 271	**3,917,787**		**-**	**-**	**3,917,787**

ACCUMULATED AMORTIZATION OF CONTRIBUTIONS IN AID OF CONSTRUCTION (Account 272)

Report the information indicated concerning this account.

Line No.	Description (a)	Balance Beginning of Year (d)	Credits Account 403 (e)	Balance End of Year (f)	Comm. Approval (b)	Period of Amortization (c)
1	N/A			-		
2				-		
3				-		
4				-		
5				-		
6				-		
7				-		
8				-		
9				-		
10				-		
11				-		
12				-		
13				-		
14				-		
15				-		
16				-		
17				-		
	Total for account 272	**-**	**-**	**-**		

ACCUMULATED DEFERRED INCOME TAXES (Accounts 281 - 283)

SEGREGATE BETWEEN EACH UTILITY DEPARTMENT AND NONUTILITY PROPERTY

Line No.	Description (a)	Balance Beginning of Year (b)	Deferred for Year		Allocations to Current Year's Income		Adjustments (g)	Balance End of Year (h)	Average Period of Allocation to Income (i)
			Account No. (c)	Amount (d)	Account No. (e)	Amount (f)			
1	Accelerated amortization (281)								
	N/A							-	
								-	
								-	
								-	
								-	
								-	
								-	
	Total for Account 281	-		-		-	-	-	
2	Liberalized depreciation (282)								
	N/A							-	
								-	
								-	
								-	
								-	
								-	
								-	
	Total for Account 282	-		-		-	-	-	
3	Other (283)								
	N/A							-	
								-	
								-	
								-	
								-	
								-	
								-	
	Total Account 283	-		-		-	-	-	

TAXES OTHER THAN INCOME, PAYROLL TAXES (408.12)
TAXES OTHER THAN INCOME, OTHER INCOME AND DEDUCTIONS (408.20)

Line No.	Particulars (a)	Amount (408.12) (b)	Other Income and Deductions (408.20) (c)	Total (d)	Charged to Plant Accounts (e)	Other (Explain) (f)	Total Distribution of Other Taxes (g)
1	**Total amount from last year for Acct.408.12**	66,163					
2	**Total amount from last year for Acct.408.20**						
3	**State & Local (Detail)**						
4	Current Year's Activities:						
5	N/A			-			-
6				-			-
7				-			-
8				-			-
9				-			-
10				-			-
11				-			-
12				-			-
13				-			-
14	**Federal (Detail)**						
15	Current Year's Activities:						
16	FICA	66,920		66,920			66,920
17				-			-
18				-			-
19				-			-
20				-			-
21				-			-
22				-			-
23				-			-
24				-			-
25				-			-
26				-			-
27				-			-
28	**Total Other Taxes**	**66,920**	**-**	**66,920**	**-**	**-**	**66,920**

300

UTILITY REGULATORY ASSESSMENT FEES (Account 408.10)
PROPERTY TAXES (408.11)
OTHER TAXES AND LICENSES (Account 408.13)

Line No.	Description (a)	EXPENSES INCURRED DURING YEAR CHARGED CURRENTLY TO Department (b)	Amount for this Year (c)	Total Amount from Preceding Year (d)
1	**Regulatory Assessment Fees (408.10)**			
	Public Service Commission's Assessment Fees		14,723	
	Permits/Certifications		11,913	38,461
	Total for Account 408.10		**26,636**	**38,461**
2	**Property Taxes (408.11)**			
	Total for Account 408.11		-	-
3	**Other Taxes and Licenses (408.13)**			
	Total for Account 408.13		-	-

DISTRIBUTION OF INCOME TAXES (Accounts 409-412)

Line No.	Particulars (a)	Amount for This Year (b)	Amount from Preceding Year (c)
1	**Utility Operating Income**		
	409.10 Federal Income Taxes		
	409.11 State Income Taxes		
	409.12 Local Income Taxes		
	412.10 Investment Tax Credits Deferred to Future Periods		
	412.11 Investment Tax Credits Restored to Operating Income		
	Total Charged Operations	-	-
2	**Other Income and Deductions**		
	409.20 Income Taxes		
	412.20 Investment Tax Credits-net-Nonutility Operations		
	412.30 Investment Tax Credits Restored to Nonoperating Income		
	Total Account	-	-
3	Extraordinary Items		
	409.30 Income Taxes		
	Total Extraordinary Items		
	Other Distributions (Specify)		
	Adjustment to Retained Earnings		
	Total	-	-

ACCUMULATED DEFERRED INCOME TAXES (Account 190)

	Particulars (a)	Balance Beginning of Year (b)	Debits (c)	Credit During the Year Charged to		Balance End of Year (f)
				Expense Account (d)	Expense Amount (e)	
1	410.10 Deferred Federal Income Taxes					-
2	410.11 Deferred State Income Taxes					-
3	410.12 Deferred Local Income Taxes					-
4	410.20 Provision for Def. Inc. Taxes, Other Income and Deductions					-
5	411.10 Deferred Income Taxes - cr. - Operating Income					-
6	411.20 Deferred Income Taxes - Cr.					-
7	**Total Distribution of Tax- Acct. 190**	-	-	xxxxx	-	-
8	Notes and Explanation Regarding Distribution of Taxes - Accounts 409-412					
9						
10	N/A					
11						
12						
13						
14						
15						
16						
17						
18						

RECONCILIATION OF REPORTED NET INCOME WITH TAXABLE INCOME

1. Report hereunder a reconciliation of reported net income for the year with taxable income used in computing Federal income tax accruals and show computation of such tax accruals. The reconciliation should include as far as practicable the same detail as furnished on Schedule M-1 of the tax return for the year. The reconciliation shall be submitted even though there is no taxable income for the year. Descriptions should clearly indicate the nature of each reconciling amount.

2. If the utility is a member of a group which files consolidated Federal tax return, reconcile reported net income with taxable net income as if a separate return were to be filed, indicating , however, inter-company amounts to be eliminated in such consolidated return. State names of group members, tax assigned to each group member, and basis of allocation, assignment, or sharing of the consolidated tax among the group members.

Line No.	Particulars (a)	Amount (b)
1		$
2	Net income for the year per page 100	1,022,173
3	Reconciling items for the year:	
4		
5	Taxable income not reported on books:	
6		
7		
8		
9		
10		
11	Deductions recorded on books not deducted for return:	
12		
13		
14		
15		
16	Income recorded on books not included in return:	
17		
18		
19		
20		
21	Deductions on return not charged against book income:	
22		
23		
24		
25		
26		
27	Federal tax net income	
28		
29	Computation of tax:	
30		
31		
32		
33		
34		
35		
36		
37		
38		

INCOME FROM UTILITY PLANT LEASED TO OTHERS (Account 413)

1. Report below the revenues, expenses, and net income for the year from utility property constituting a distinct operating unit or system leased to others.
2. Designate associated companies by placing an "x" in column (b) opposite the name of the lessee.

Line No.	Name of Lessee, Description and Location of Leased Property (a)	Assoc. Co. (b)	Amount ($) (c)	DEDUCTIONS				Net Income Before Taxes (h)
				Operation (d)	Maintenance (e)	Depreciation (f)	Amortization (g)	
1	**Total Previous Year Amount**							-
2	Current Year's Activities:							-
3	N/A							-
4								-
5								-
6								-
7								-
8								-
9								-
10	**Total Current Year Amount**		-	-	-	-	-	-

GAIN OR LOSS ON DISPOSITION OF PROPERTY (Account 414)

Give a brief description of property creating gain or loss. Include name of party acquiring the property (if another utility or associated company) and the date transaction was completed.

Line No.	Description of Property (a)	Commission Date Approved (When Required) (b)	Original Cost of Related Property (c)	Amount for this Year (d)	Amount from Preceding Year (e)
1	**Gains:**				
2	N/A				
3					
4					
5					
6					
7					
8					
9	**Losses:**				
10	N/A				
11					
12					
13					
14					
15					
16	**Net Gain on Disposition of Property (Account 414)**		-	-	-

INCOME FROM MERCHANDISING, JOBBING, AND CONTRACT WORK (Account 415-416)

Please Enter the Cost or Expenses or Deduction as Negative Number

Report by utility departments the revenues, costs, expenses and net income from merchandising, jobbing and contract work during year.

Line No.	Particulars (a)	Amount for this Year (b)	Amount from Preceding Year (c)
1	Account 415 - Revenues		
2	Gross Sales (detail)		
3	N/A		
4			
5			
6	**Deductions:**		
7	Discounts and Allowances		
8			
9			
10			
11	**Net Sales**	-	-
12	Account 416 - Costs and Expenses (List the Expenses by		
13	Major Classes)		
14	N/A		
15			
16			
17			
18			
19			
20	**Total Costs and Expenses**	-	-
21	**Total for Account 415 & 416**	-	-

INTEREST AND DIVIDEND INCOME (Account 419)

Line No.	Security or Account on Which Received (a)	Interest or Dividend Rate for current year (b)	Amount for This Year (c)	Total Amount from Preceding Year (d)
1	Interest Income	Various	47,503	41,790
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15	**Total for Account 419**		**47,503**	**41,790**

NONUTILITY INCOME (Account 421)

Line No.	Description of Nonutility Income (a)	Amount for this Year (b)	Amount from Preceding Year (c)
1	Income (Acct. 421, Minor Items May Be Grouped)		
2	Misc Sewer Revenue	38,869	24,249
3	CIF & CAC Revenues	245,465	167,687
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14	**Total for Account 421**	**284,333**	**191,936**

Allowance for Constructions, Misc. Nonutility Exp., and Amortization Exp. (Acct-420, 426, 428, & 429)

Line No.	Nature of Item (a)	Amount For this Year (c)	Amount from Preceding Year (b)
1	**Allowance for Funds Used During Constructions (acct.-420):**		
	N/A		
	Total for Account 420	**-**	**-**
2	**Miscellaneous Nonutility Expenses (acct.-426):**		
	N/A		
	Total for Account 426	**-**	**-**
3	**Amortization of Debt Discount and Expenses (acct.-428):**		
	Amort of Def Loss	17,432	17,432
	Amort of Debt Discount & Expense	4,975	4,975
	Amort of TUI Acquistion	27,855	27,855
	Total for Account 428	**50,262**	**50,262**
4	**Amortization of Premium on Debt (acct.-429):**		
	N/A		
	Total for Account 429	**-**	**-**

INTEREST EXPENSE (Account 427)

REPORT DETAILS OF ITEMS SEPARATELY BY ACCOUNTS

No.	Class of Debt on Which Payable (a)	INTEREST Rate (%) (b)	INTEREST Amount for this Year (c)	INTEREST Amount from Preceding Year (d)
1	Interest on Debt to Associated Companies (427.1):			
	N/A			
	Total Interest on Debt to Associated Companies		**-**	**-**
2	Interest on Short-Term Debt (427.2):			
	N/A			
	Total Interest on Short-Term Debt		**-**	**-**
3	Interest on Long-Term Debt (427.3):			
	Interest on Bonds		427,541	379,414
	Accrued Interest on Bonds		(1,723)	6,938
	Interest on BB&T Note		23	325
	Interest on Copier Lease		426	
	Total Interest on Long-Term Debt		**426,267**	**386,677**
4	Interest on Customer Deposits (427.4):			
	Total Interest on Customer Deposits		**-**	**-**
5	Interest- Other (427.5)			
	N/A			
	Total Interest- Other		**-**	**-**
	Total Interest Expense- Account 427		**426,267**	**386,677**

EXTRAORDINARY ITEMS (Accounts 433 and 434)

1. Give below a brief description of each item included in accounts 433, Extraordinary Income and 434, Extraordinary Deductions.

2. List date of Commission approval for extraordinary treatment of item (See General Instruction 7 of the Uniform System of Accounts).

3. Income tax effects relating to each extraordinary Item should be listed in Column (c).

4. For additional space use an additional page.

Line No.	Description of Items (a)	Amount for This Year (b)	Amount from Last Year (c)	Related Income Taxes (d)
1	**Extraordinary Income (Account 433):**			
2	N/A			
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20	**Total Extraordinary Income**	-	-	-
21	**Extraordinary Deductions (Account 434):**			
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40	**Total extraordinary deductions**	-	-	-
41	**Net extraordinary items**	-	-	-

WASTEWATER PLANT PER BALANCE SHEET

Line No.	Account (a)		Balance Beginning of Year (b)	Balance End of Year (c)
1				
2		**SUMMARY OF WASTEWATER PLANT**		
3				
4		Balance Sheet Sub accounts		
5	101	Utility Plant in Service (501A-501B)	65,982,639	64,370,242
6	102	Utility Plant Leased to Others (502)	-	-
7	103	Property Held for Future Use (502)	162,150	162,150
8	104	Utility Plant Purchased or Sold		
9	105	Construction Work in Progress (504A-504E)	231,390	6,985,599
10	106	Completed Construction not Classified- CLASS A ONLY!		
11	108 & 110	Accum. Depr. and Amort. of Utility Plant in Service (505A)	(19,812,080)	(19,555,661)
12		**Net Wastewater Plant**	**46,564,099**	**51,962,329**
13	114	Utility Plant Acquisition Adjustments (505A)	618,261	590,406
14	115	Accum. Amort. of Utility Plant Acquisition Adjustments (505A)	-	-
15	116	Other Utility Plant Adjustments (505A)	-	-
16		Net Other Plant	618,261	590,406
17		**Total Net Utility Plant**	**47,182,359**	**52,552,735**

Notes on Plant:

WASTEWATER PLANT IN SERVICE (Accounts 351-398)

1. Report by prescribed accounts the original cost of wastewater plant in service and the additions and retirements of such plant during the year.
2. State in footnote on 801A-801B the general character of any adjustments in column (e).

Line No.	Account (a)	Balance Beginning of Year (b)	(+) Additions (c)	(-) Retirements (d)	(+/-) Adjustments (e)	Balance End of Year (f)
1	**Intangible Plant**					
2						
3	351.1 Organization					-
4	352.1 Franchises					-
5	389.1 Other Plant and Miscellaneous Equipment					-
6	**Total Intangible Plant**	**-**	**-**	**-**	**-**	**-**
7	**Tangible Plant**					
8	**Collection Plant**					
9	353.2 Land and Land Rights	1,456,385				1,456,385
10	354.2 Structures and Improvements	3,043,209				3,043,209
11	355.2 Power Generation Equipment					-
12	360.2 Collection Sewers- Force	15,399,906				15,399,906
13	361.2 Collection Sewers- Gravity	1,319,821		(725,438)		594,383
14	362.2 Special Collecting Structures					-
15	363.2 Services to Customers	909,253		(901,693)		7,561
16	364.2 Flow Measuring Devices					-
17	365.2 Flow Measuring Installations					-
18	389.2 Other Plant and Miscellaneous Equipment	3,069,207	63,691	(279)		3,132,618
19	**Total Collection Plant**	**25,197,781**	**63,691**	**(1,627,410)**	**-**	**23,634,061**
20						
21	**System Pumping Plant**					
22	353.3 Land and Land Rights					-
23	354.3 Structures and Improvements	79,201	52,800	(730)		131,271
24	355.3 Power Generation Equipment					-
25	370.3 Receiving Wells					-
26	371.3 Pumping Equipment	5,560,363				5,560,363
27	389.3 Other Plant and Miscellaneous Equipment					-
28	**Total System Pumping Plant**	**5,639,563**	**52,800**	**(730)**	**-**	**5,691,633**

WASTEWATER PLANT IN SERVICE (Accounts 351-398) (Continued)

Line No.	Account (a)	Balance Beginning of Year (b)	(+) Additions (c)	(-) Retirements (d)	(+/-) Adjustments (e)	Balance End of Year (f)
1						
2	**Treatment and Disposal Plant**					
3	353.4 Land and Land Rights	23,784,912				23,784,912
4	354.4 Structures and Improvements	302,714				302,714
5	355.4 Power Generation Equipment	6,783,959		(157,812)		6,626,147
6	380.4 Treatment and Disposal Equipment					-
7	381.4 Plant Sewers					-
8	382.4 Outfall Sewer Lines					-
9	389.4 Other Plant and Miscellaneous Equipment					-
10	**Total Treatment and Disposal Plant**	**30,871,585**	**-**	**(157,812)**	**-**	**30,713,773**
11						
12						
13						
14	**General Plant**					
15	353.7 Land and Land Rights					-
16	354.7 Structures and Improvements	3,693,589				3,693,589
17	390.7 Office Furniture and Equipment	86,404	16,584			102,987
18	391.7 Transportation Equipment	268,244	32,969			301,213
19	392.7 Stores Equipment					-
20	393.7 Tools, Shop and Garage Equipment	9,674				9,674
21	394.7 Laboratory Equipment	11,480				11,480
22	395.7 Power Operated Equipment					-
23	396.7 Communication Equipment	21,913	7,512			29,424
24	397.7 Miscellaneous Equipment	182,406				182,406
25	398.7 Other Tangible Plant					-
26	**Total General Plant**	**4,273,710**	**57,064**	**-**	**-**	**4,330,774**
27						
28	**Total Wastewater Plant**	**65,982,639**	**173,555**	**(1,785,952)**	**-**	**64,370,242**

UTILITY PLANT LEASED TO OTHERS (Account 102)

1. Report below the information called for concerning wastewater plant leased to others.
2. In column (d) give the date of Commission authorization of the lease of wastewater plant to others.
3. Designate if lessee is an associated company by placing an "x" in column (b).

Line No.	Name of Lessee (a)	Assoc. Co. (b)	Description of Property Leased (c)	Comm. Auth. (d)	Expiration Date of Lease (e)	Total Amount (f)
1	**Balance Beginning of Year**					
2	N/A					
3						
4						
5						
6						
7						
8						
9	**End of Year Balance**					-

PROPERTY HELD FOR FUTURE USE (Account 103)

1. Report below the information called for concerning wastewater plant held for future use. Report data as of end of year.
2. Explain important items entered in column (g).

Line No.	Description and Location of Property (a)	Date Originally Included In This Account (b)	Date Expected to be used in Utility Service (c)	Original Cost (d)	Interest Capitalized (e)	Taxes Capitalized (f)	Other Expenditures Capitalized (g)	Amount ($) (h)
1	**Balance Beginning of Year**							**162,150**
2	Land held for future use - Evitts Run							-
3								-
4								-
5								-
6								-
7								-
8								-
9								-
10	**End of Year Balance**			**-**	**-**	**-**	**-**	**162,150**

City of Charles Town Sewer	10/30/2020	06/30/2020

WASTEWATER PLANT RETIREMENT AND REPLACEMENT

Report by prescribed accounts the average age and replacement cost

Total Wastewater Plant for columns (b) and (c) should equal page 501B column (f) Line 28 (Balance End of Year), less Land and Intangible Plant.

Replacement Cost (column d) is the cost of replacing each item in columns (b) and (c).

Line No.	Accounts (a)	Balance of Plant older than 15 years ($) (b)	Balance of Plant younger than 15 years ($) (c)	Replacement Cost ($) (d)	Amount To Be Replaced within 5 years ($) (e)
1	**Collection Plant**				
2	354.2 Structures and Improvements	69,700			
3	355.2 Power Generation Equipment				
4	360.2 Collection Sewers- Force	3,311,829	674,523		
5	361.2 Collection Sewers- Gravity	8,423,323	5,129,172		
6	363.2 Services to Customers	7,561	-		
7	364.2 Flow Measuring Devices				
8	365.2 Flow Measuring Installations				
9	389.2 Other Plant and Miscellaneous Equip.	17,626	1,664,491		
10	**Total Collection Plant**	**11,830,039**	**7,468,186**	**-**	**-**
11					
12	**System Pumping Plant**				
13	354.3 Structures and Improvements	-	131,271		
14	355.3 Power Generation Equipment				
15	370.3 Receiving Wells				
16	371.3 Pumping Equipment	1,946,560	6,493,254		
17	389.3 Other Plant and Miscellaneous Equip.				
18	**Total System Pumping Plant**	**1,946,560**	**6,624,525**	**-**	**-**
19					
20	**Treatment and Disposal Plant**				
21	354.4 Structures and Improvements	6,047,041	17,737,871		
22	355.4 Power Generation Equipment		302,714		
23	380.4 Treatment and Disposal Equipment	1,157,668	5,360,113		
24	381.4 Plant Sewers				
25	382.4 Outfall Sewer Lines				
26	389.4 Other Plant and Miscellaneous Equip.				
27	**Total Treatment and Disposal Plant**	**7,204,709**	**23,400,698**	**-**	**-**
28					
29	**General Plant**				
30	354.7 Structures and Improvements	9,938	3,683,651		
31	390.7 Office Furniture and Equipment		53,992		
32	391.7 Transportation Equipment	9,007	458,575		
33	392.7 Stores Equipment				
34	393.7 Tools, Shop and Garage Equipment		9,674		
35	394.7 Laboratory Equipment		11,480		
36	395.7 Power Operated Equipment				
37	396.7 Communication Equipment		29,424		
38	397.7 Miscellaneous Equipment	83,969	98,437		
39	398.7 Other Tangible Plant				
40	**Total General Plant**	**102,914**	**4,345,233**	**-**	**-**
41					
42	**Total Wastewater Plant**	**21,084,222**	**41,838,642**	**-**	**-**

503

CONSTRUCTION WORK IN PROGRESS (Account 105)

1. Report below the particulars called for concerning wastewater plant in process of construction but not ready for service at the date of the balance sheet.
2. Minor projects may be grouped by classes. Show the number of items in each group.

Line No.	Description of Project (a)	Amount (b)	Estimated Total Cost of Project (c)
1	**Balance Beginning of Year**	**231,390**	
2	**List the current year's Activities:**		
3			
4	Renewal and Replacement Project - TUI MBR	15,939	4,500,000
5	Route 9 Sewer Infrastructure Project	6,610,488	10,500,000
6	Forrest St Pump Station Improvements	11,947	1,000,000
7			
8			
9	Jefferson Heights	15,615	
10	Modified Flowing Springs Project	31,154	
11	Logical - Omni (Pump Stations)	51,006	
12	Sewer Model	3,505	
13	Park View	1,479	
14	Wilts	4,971	
15	Beallair	2,805	
16	Shenandoah Junction	5,299	
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48	Total for this Page	**6,985,599**	**16,000,000**

CONSTRUCTION WORK IN PROGRESS (Account 105)

1. Report below the particulars called for concerning wastewater plant in process of construction but not ready for service at the date of the balance sheet.
2. Minor projects may be grouped by classes. Show the number of items in each group.

Line No.	Description of Project (a)	Amount (b)	Estimated Total Cost of Project (c)
1	**Carried Over from Page 504A**	**6,985,599**	**16,000,000**
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48	**Total this Page**	**6,985,599**	**16,000,000**

CONSTRUCTION WORK IN PROGRESS (Account 105)

1. Report below the particulars called for concerning wastewater plant in process of construction but not ready for service at the date of the balance sheet.
2. Minor projects may be grouped by classes. Show the number of items in each group.

Line No.	Description of Project (a)	Amount (b)	Estimated Total Cost of Project (c)
1	**Carried Over from Page 504B**	**6,985,599**	**16,000,000**
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48	**Total this Page**	**6,985,599**	**16,000,000**

CONSTRUCTION WORK IN PROGRESS (Account 105)

1. Report below the particulars called for concerning wastewater plant in process of construction but not ready for service at the date of the balance sheet.
2. Minor projects may be grouped by classes. Show the number of items in each group.

Line No.	Description of Project (a)	Amount (b)	Estimated Total Cost of Project (c)
1	**Carried Over from Page 504C**	**6,985,599**	**16,000,000**
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48	**Total this Page**	**6,985,599**	**16,000,000**

CONSTRUCTION WORK IN PROGRESS (Account 105)

1. Report below the particulars called for concerning wastewater plant in process of construction but not ready for service at the date of the balance sheet.
2. Minor projects may be grouped by classes. Show the number of items in each group.

Line No.	Description of Project (a)	Amount (b)	Estimated Total Cost of Project (c)
1	**Carried Over from Page 504D**	**6,985,599**	**16,000,000**
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48	**Balance End of Year (Account 105)**	**6,985,599**	**16,000,000**

ACCUMULATED PROVISION FOR DEPRECIATION AND AMORTIZATION OF UTILITY PLANT (Account 108-110)

UTILITY PLANT ADJUSTMENTS(Account 114-116)

Line No.	Acct No.	Particulars (a)	Balance Beginning of Year (b)	Plant Retired (Net) And/OR Debits: Debits (c)	Plant Retired (Net) And/OR Debits: Expense Account Charged (d)	Depreciation and Amort. Expense Amount (e)	Credits: Other Accounts Charged (f)	Credits: Other Amount Charged (g)	Balance End of Year (h)
1	108.1	Accumulated Depreciation of Utility Plant in Service	19,812,080	(1,785,952)		1,529,533			19,555,661
	108.2	Accumulated Depreciation of Utility Plant Leased to Others							-
	108.3	Accumulated Depreciation or Property Held for Future Use							-
		Total for account 108	**19,812,080**	**(1,785,952)**	**xxxxxxxxxxx**	**1,529,533**	**xxxxxxxxxxx**	**-**	**19,555,661**
2	110.1	Accumulated Amortization of Utility Plant in Service							-
	110.2	Accumulated Amortization of Utility Plant Leased to Others							-
		Total for account 110	**-**	**-**	**xxxxxxxxxxx**	**-**	**xxxxxxxxxxx**	**-**	**-**
3	114	Utility Plant Acquisition Adjustments	618,261			(27,855)			590,406
		Total for account 114	**618,261**	**-**	**xxxxxxxxxxx**	**(27,855)**	**xxxxxxxxxxx**	**-**	**590,406**
4	115	Accumulated Amortization of Utility Plant Acquisition Adjustments							-
		Total for account 115	**-**	**-**	**xxxxxxxxxxx**	**-**	**xxxxxxxxxxx**	**-**	**-**
5	116	Other Utility Plant Adjustments							-
		Total for account 116	**-**	**-**	**xxxxxxxxxxx**	**-**	**xxxxxxxxxxx**	**-**	**-**

DEPRECIATION AND AMORTIZATION OF WASTEWATER PLANT (Accounts 403-407)

State below the rules by which the respondent determined the amounts of charges for the depreciation and amortization of wastewater plant. Show the rates used in computing the depreciation and amortization charges for the year, and state if any change has been made in the rates used or methods of determining depreciation and amortization charges from those used for the preceding year.

1 Donated Assets, principally sewer lines and land, are recorded at an amount which approximates the donor's costs and are recorded as capital contributions.
2 Depreciation is provided on the straight line method to allocate the costs of the respective items over their estimated useful lives ranging
3 from 5 to 50 years. Interest paid on loans obtained for construction of plant facilities is capitalized when material. When items of property or equipment are sold or retired, the related
4 cost and accumulated depreciation are removed from the accounts and any gain or loss is included in income.
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OPERATING REVENUES (Account 400)

1. Report below the amount of operating revenue for the year for each prescribed account and the amount from the preceding year
2. List the gallons sold for the current year and preceding year.
3. Number of customers should be reported on the basis of number of meters, plus number of flat rate accounts, except that where separate meter readings are added for billing purposes,one customer shall be counted for each group of meters so added. The average number of customers means the average of the figures at the close of each month or each billing period.
4. Where charges are not dependent on metered water consumption , flat rate revenue accounts apply.

Line No.	Amount (a)	Operating Revenues		Gallons (000 omitted)		Average Number of Customers	
		Amount for Year (b)	Amount from Last Year (c)	Of Water on which Billings Are Based for this Year (d)	Of Water on which Billing Are Based for Previous Year (e)	Number for Year (f)	Number from Last Year (g)
1	**SALES OF WASTEWATER**						
2	**521. Flat Rate Revenues**						
3	521.1 Residential Revenues	91,854	40,077	5,514	2,413	72	71
4	521.2 Commercial Revenues						
5	521.3 Industrial Revenues						
6	521.4 Revenues From Public Authorities						
7	521.5 Multiple Family Dwellings						
8	521.6 Other Revenues						
9	**Total Flat Rate Revenues**	**91,854**	**40,077**	**5,514**	**2,413**	**72**	**71**
10	**522. Measured Revenues**						
11	522.1 Residential Revenue	4,274,387	3,308,718	286,239	226,164	7,123	5,527
12	522.2 Commercial Revenues	1,536,782	1,206,730	117,354	97,920	664	654
13	522.3 Industrial Revenues	13,653	15,083	815	912	3	7
14	522.4 Revenues From Public Authorities	135,988	163,534	6,965	11,804	18	21
15	522.5 Multiple Family Dwelling Revenues						
16	**Total Measured Revenues**	**5,960,811**	**4,694,065**	**411,373**	**336,800**	**7,808**	**6,209**
17	523. Revenues From Public Authorities						
18	524. Revenues From Other Systems	-	485,105	-	77,365		
19	525. Interdepartmental Revenues	-	-				
20	**Total Sales of Wastewater**	**6,052,665**	**5,219,247**	**416,887**	**416,578**	**7,880**	**6,280**
21	**OTHER OPERATING REVENUES**						
22	530. Guaranteed Revenues	-	-				
23	531. Sale of Sludge	-	-				
24	532. Forfeited Discounts	80,864	80,251				
25	534. Rents From Wastewater Property	-	-				
26	535. Interdepartmental Rents	-	-				
27	536. Other Wastewater Revenues	-	-				
28	**Total Other Operating Revenues**	**80,864**	**80,251**				
29	**Total Wastewater Operating Revenues**	**6,133,529**	**5,299,498**				

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SALES OF WASTEWATER TO GENERAL CUSTOMERS - BY MONTHS (Accounts 521-522)

Line No.	Month (or Other Billing Period) (a)	Account 521 - Flat Rate Revenue (b)	Estimated Gallons Sold (000 Omitted) (c)	Number of Customers (d)	Account 522 - Measured Revenue (e)	Gallons Sold (000 Omitted) (f)	Number of Customers (g)
1	July	7,847	473	70	573,642	38,463	7,779
2	August	7,847	473	70	547,522	36,117	7,779
3	September	7,847	473	70	539,906	35,966	7,778
4	October	7,917	473	70	571,677	38,237	7,804
5	November	7,960	477	71	512,873	33,168	7,820
6	December	8,038	477	73	521,879	33,433	7,805
7	January	7,996	482	72	512,080	32,568	7,804
8	February	7,996	482	72	483,567	32,738	7,810
9	March	7,973	477	74	494,443	33,975	7,799
10	April	7,996	477	74	476,325	31,805	7,829
11	May	6,219	375	74	466,773	31,471	7,820
12	June	6,219	375	74	491,716	33,432	7,866
13	**Adjustments made for the year**				(231,590)		
14	**Total**	**91,854**	**5,514**	**72**	**5,960,811**	**411,373**	**7,808**

BILLING ACCURACY

1	Average number of customers during the reporting period.	7,880
2	Billing Cycle (monthly, quarterly, semiannually) during the reporting period.	12
	E.g. Monthly: enter 12, Quarterly enter 4, Semiannual: enter 2	
3	Total Number of Bills Generated during the reporting period.	74,508
4	Number of errors - driven billing adjustments during reporting period (# of bills adjusted)	31

Notes on Billing System:

COMMUNITIES SERVED

Line No.	Names of Cities, Towns, and Unincorporated Communities (a)	No. of Customers End of Year (b)	Population Served (c)	Gallons Sold (000 Omitted) (d)	Total Sales (e)
1	Charles Town (and adjacent Jefferson County)*	3112	7967	120492	1,607,692
2	Ranson (and adjacent Jefferson County)*	1883	4335	68575	956,840
3	Jefferson County (adjacent)*	2711	7157	119808	1,968,241
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601

WASTEWATER TREATMENT FOR RESALE (Account 524)- BY MONTHS

1. Report below the information specified concerning wastewater treated during the year for other wastewater utilities or public authorities.
2. The quantities reported should be those shown by the bills rendered to the purchasers.
3. The sales should be reported by months or other billing period for each utility.

Line No.	Name of Other Wastewater Utility (a)	Billing Period (b)	Gallons Billed (000) Omitted (c)	Revenue (d)
1	**Total Amount and Gallons Billed from Previous Year**		**77,365**	**485,105**
2	**List Nature of Revenue for current year by Months:**			
3	N/A			
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37	**Total for Account 524**		**-**	**-**

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INTERDEPARTMENTAL REVENUES (Account 525)

OTHER OPERATING REVENUES(Account 530, 531, 532 and 536)

Line No.	Nature of Revenue (a)	Amount for this Year	Amount from Preceding Year
1	**Interdepartmental Revenues (Account 525):**		
	Total for Account 525	-	-
2	**Guaranteed Revenues(Account 530):**		
	Total for Account 530	-	-
3	**Sale of Sludge (Account 531):**		
	Total for Account 531	-	-
4	**Forfeited Discounts (Account 532):**		
		80,864	80,251
	Total for Account 532	**80,864**	**80,251**
5	**Other Wastewater Revenues (Account 536):**		
	Total for Account 536	-	-

OTHER OPERATING REVENUES- CONTINUED

RENTS FROM WASTEWATER PROPERTY (Account 534)

INTERDEPARTMENTAL RENTS(Account 535)

1. Report below rents received during the year for the use by others of property devoted to water operations by the utility.

2. Minor Rents may be entered at the total amount for each class of such rents.

3. If rents are included which were arrived at under an arrangement for apportioning expenses of a joint facility, whereby the amount included in this account represents profit or return on property, depreciation, and taxes, give particulars and the basis of apportionment of such charges to this account.

Line No.	Name of Lessee (a)	Description of Property (b)	Amount for this Year (c)	Amount from Preceding Year (d)
1	**Rent Revenues (account - 534)**			
	N/A			
	Total for Account 534		-	-
2	**Interdepartmental Rent Revenues (account - 535)**			
	N/A			
	Total for Account 535		-	-

WASTEWATER OPERATION AND MAINTENANCE EXPENSES

Line No.	Account (a)	Schedule Page No. (b)	Amount for Year (c)	Amount from Preceding Year (d)
1	**COLLECTION EXPENSES**			
2	Operation			
3	701.1 Salaries and Wages - Employees	606A	-	15,000
4	703.1 Salaries and Wages - Officers, Directors and Majority Stockholders	606C	-	-
5	704.1 Employee Pensions and Benefits	607	-	731
6	715.1 Purchased Power	607B	56,307	48,657
7	716.1 Fuel for Power Productions	607B	-	-
8	718.1 Chemicals	607B	-	-
9	720.1 Materials and Supplies	607B	60,484	75,898
10	731.1-736.1 Contractual Services	608-608E	-	-
11	741.1 Rental of Building/Real Property	607	-	-
12	742.1 Rental of Equipment	607	-	-
13	750.1 Transportation Expenses	607	-	-
14	756.1-759.1 Insurance	607A	-	1,872
15	767.1 Regulatory Commission Expense - Other	605	-	-
16	775.1 Miscellaneous Expenses	605	-	-
17	**Total Operation**		**116,791**	**142,158**
18	Maintenance			
19	701.2 Salaries and Wages - Employees	606A	-	15,000
20	703.2 Salaries and Wages - Officers, Directors and Majority Stockholders	606C	-	-
21	704.2 Employee Pensions and Benefits	607	-	731
22	718.2 Chemicals	607B	-	-
23	720.2 Materials and Supplies	607B	295,240	148,712
24	731.2-736.2 Contractual Services	608 - 608E	-	-
25	741.2 Rental of Building/Real Property	607	-	-
26	742.2 Rental of Equipment	607	-	-
27	750.2 Transportation Expenses	607	-	-
28	756.2-759.2 Insurance	607A	-	1,872
29	767.2 Regulatory Commission Expense - Other	605	-	-
30	775.2 Miscellaneous Expense	605	-	-
31	**Total Maintenance**		**295,240**	**166,315**
32				
33	**Total Collection Expenses**		**412,032**	**308,473**
34	**PUMPING EXPENSES**			
35	Operation			
36	701.3 Salaries and Wages - Employees	606A	93,345	71,948
37	703.3 Salaries and Wages - Officers, Directors and Majority Stockholders	606C	-	-
38	704.3 Employee Pensions and Benefits	607	6,189	3,508
39	715.3 Purchased Power	607B	56,307	48,657
40	716.3 Fuel for Power Production	607B	-	-
41	718.3 Chemicals	607B	-	-
42	720.3 Materials and Supplies	607B	33,408	25,047
43	731.3-736.3 Contractual Services	608 - 608E	-	-
44	741.3 Rental of Building/Real Property	607	-	-
45	742.3 Rental of Equipment	607	-	-
46	750.3 Transportation Expenses	607	-	-
47	756.3-759.3 Insurance	607A	12,012	8,978
48	767.3 Regulatory Commission Expense - Other	605	-	-
49	775.3 Miscellaneous Expenses	605	-	-
50	**Total Operation**		**201,261**	**158,138**
51	Maintenance			
52	701.4 Salaries and Wages - Employees	606A	93,345	71,948
53	703.4 Salaries and Wages - Officers, Directors and Majority Stockholders	606C	-	-
54	704.4 Employee Pensions and Benefits	607	6,189	3,508
55	718.4 Chemicals	607B	-	-
56	720.4 Materials and Supplies	607B	245,032	110,339
57	731.4-736.4 Contractual Services	608 - 608E	-	-
58	741.4 Rental of Building/Real Property	607	-	-
59	742.4 Rental of Equipment	607	-	-
60	750.4 Transportation Expenses	607	-	-
61	756.4-759.4 Insurance	607A	12,012	8,978
62	767.4 Regulatory Commission Expense - Other	605	-	-
63	775.4 Miscellaneous Expenses	605	-	-
64	**Total Maintenance**		**356,577**	**194,774**
65	**Total Pumping Expenses**		**557,838**	**352,912**

WASTEWATER OPERATION AND MAINTENANCE EXPENSES (Continued)

Line No.	Account (a)	Schedule Page No. (b)	Amount for the Year (c)	Amount from Preceding Year (d)
1	**TREATMENT AND DISPOSAL EXPENSES**			
2	Operation			
3	701.5 Salaries and Wages - Employees	606A	131,002	173,872
4	703.5 Salaries and Wages - Officers, Directors and Majority Stockholders	606C	-	-
5	704.5 Employee Pensions and Benefits	607	8,685	8,478
6	710.5 Purchased Wastewater Treatment	604	-	-
7	711.5 Sludge Removal Expense	607B	60,147	60,831
8	715.5 Purchased Power	607B	209,668	255,316
9	716.5 Fuel for Power Production	607B	-	-
10	718.5 Chemicals	607B	84,285	103,973
11	720.5 Materials and Supplies	607B	172,789	260,545
12	731.5-736.5 Contractual Services	608 - 608E	-	-
13	741.5 Rental of Building/Real Property	607	-	-
14	742.5 Rental of Equipment	607	-	-
15	750.5 Transportation Expenses	607	-	-
16	756.5-759.5 Insurance	607A	16,858	21,698
17	767.5 Regulatory Commission Expense - Other	605	-	-
18	775.5 Miscellaneous Expenses	605	-	-
19	**Total Operation**		**683,435**	**884,712**
20	Maintenance			
21	701.6 Salaries and Wages - Employees	606A	131,002	173,872
22	703.6 Salaries and Wages - Officers, Directors and Majority Stockholders	606C	-	-
23	704.6 Employee Pensions and Benefits	607	8,685	8,478
24	711.6 Sludge Removal Expense	607B	60,147	60,831
25	718.6 Chemicals	607B	84,285	103,973
26	720.6 Materials and Supplies	607B	172,789	260,545
27	731.6-736.6 Contractual Services	608 - 608E	-	-
28	741.6 Rental of Building/Real Property	607	-	-
29	742.6 Rental of Equipment	607	-	-
30	750.6 Transportation Expenses	607	-	-
31	756.6-759.6 Insurance	607A	16,858	21,698
32	767.6 Regulatory Commission Expense - Other	605	-	-
33	775.6 Miscellaneous Expenses	605	-	-
34	**Total Maintenance**		**473,766**	**629,397**
35	**Total Treatment and Disposal Expenses**		**1,157,201**	**1,514,109**
36	**CUSTOMER ACCOUNTS EXPENSES**			
37	701.7 Salaries and Wages - Employees	606A	169,335	131,171
38	703.7 Salaries and Wages - Officers, Directors and Majority Stockholders	606C	-	-
39	704.7 Employee Pensions and Benefits	607	11,226	6,396
40	715.7 Purchased Power	607B	-	-
41	716.7 Fuel for Power Production	607B	-	-
42	720.7 Materials and Supplies	607B	109,893	76,346
43	731.7-736.7 Contractual Services	608 - 608E	-	-
44	741.7 Rental of Building/Real Property	607	-	-
45	742.7 Rental of Equipment	607	-	-
46	750.7 Transportation Expenses	607	-	-
47	756.7-759.7 Insurance	607A	21,791	16,369
48	767.7 Regulatory Commission Expense - Other	605	-	-
49	770.7 Bad Debt Expense	607	43,438	27,849
50	775.7 Miscellaneous Expense	605	-	-
51	**Total Customer Accounts Expenses**		**355,684**	**258,131**
52	**ADMINISTRATIVE AND GENERAL EXPENSES**			
53	701.8 Salaries and Wages - Employees	606A	212,172	195,039
54	703.8 Salaries and Wages - Officers, Directors and Majority Stockholders	606C	1,825	1,900
55	704.8 Employee Pensions and Benefits	607	14,187	20,416
56	715.8 Purchased Power	607B	-	-
57	716.8 Fuel for Power Production	607B	-	-
58	720.8 Materials and Supplies	607B	39,733	18,798
59	731.8-736.8 Contractual Services	608 - 608E	313,360	425,326
60	741.8 Rental of Building/Real Property	607	-	-
61	742.8 Rental of Equipment	607	-	-
62	750.8 Transportation Expenses	607	46,650	62,093
63	756.8-759.8 Insurance	607A	117,261	91,942
64	760.8 Advertising Expense	607	-	-
65	766.8 Regulatory Commission Expenses - Amortization of Rate Case Expense	605	-	-
66	767.8 Regulatory Commission Expenses - Other	605	-	-
67	775.8 Miscellaneous Expenses	605	115,631	114,741
68	**Total Administrative and General Expenses**		**860,820**	**930,255**
69	**TOTAL OPERATING EXPENSES**		**3,343,575**	**3,363,879**

PURCHASED WASTEWATER TREATMENT (Account 710.5)

1. Report below the information concerning wastewater treatment purchased during the year.
2. The quantities reported should be those shown by the bills rendered by the vendor.
3. The purchases should be reported by months or other billing period for each vendor.
4. Attach continuation sheets as necessary.
5. **Report the amount (Cost) for the previous year.**

Line No.	Name of Vendor (a)	Billing Period (b)	Gallons Purchased (000 Omitted) (c)	Amount (d)
1	Total Amount from Previous Year			
2	**List current year's activities by Months**			
3	N/A			
4				
5				
6				
7				
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41				
42	**Total Current Amount for Account 710.5**		-	-

REGULATORY COMMISSION EXPENSES (Account 766.8 and 767.1-767.8)

Line No.	Description of Case (a)	Amortization of Rate Case Expense (Admin. & General Expenses) 766.8 (b) $	Other (Collection Expenses-Operations) 767.1 (c) $	Other (Collection Expenses-Maintenance) 767.2 (d) $	Other (Pumping Expenses-Operations) 767.3 (e) $	Other (Pumping Expenses-Maintenance) 767.4 (f) $	Other (Treat. & Disp. Expenses - Operations) 767.5 (g) $	Other (Treat. & Disp. Expenses - Maintenance) 767.6 (h) $	Other (Customer Accounts Expenses) 767.7 (b) $	Other (Admin. & General Expenses) 767.8 (c) $
1	**Amount from Previous Year**									
2	**List current year's activities:**									
3	N/A									
4										
5										
6										
7										
8										
9										
10										
	Total Amount for Year	-	-	-	-	-	-	-	-	-

MISCELLANEOUS EXPENSES (Account 775)

Line No.	Description (a)	Collection Expenses-Operations 775.1 (b) $	Collection Expenses-Maint. 775.2 (c) $	Pumping Expenses-Operations 775.3 (d) $	Pumping Expenses-Maint. 775.4 (e) $	Treat. & Disp. Expenses-Operations 775.5 (f) $	Treat. & Disp. Expenses-Maint. 775.6 (g) $	Customer Accounts Expenses-Operations 775.7 (b) $	Admin. & General Expenses-Maint. 775.8 (c) $
1	**Amount from Previous Year**								114,741
2	**List current year's activities:**								
3	Bond Admin Fees								70,774
4	General Maintenance								44,857
5									
6									
7									
8									
9									
10									
	Total Amount for Year	-	-	-	-	-	-	-	**115,631**

SALARIES & WAGES - EMPLOYEES (Account 701.1-701.8)

Line No.	Account	Salaries for this Year	Salaries for Preceding Year
1	701.1 Collection Expenses - Operations		15,000
2	701.2 Collection Expenses - Maint.		15,000
3	701.3 Pumping Expenses - Operations	93,345	71,948
4	701.4 Pumping Expenses - Maint.	93,345	71,948
5	701.5 Treat. & Disp. Expenses - Operations	131,002	173,872
6	701.6 Treat. & Disp. Expenses - Maint.	131,002	173,872
7	701.7 Customer Accounts Expenses	169,335	131,171
8	701.8 Admin. & General Expenses	212,172	195,039
9	**Total Employees**	**830,202**	**847,850**

Number of Employees
Note: One full time equivalent employee = 2080 hours of work per year

	Account	Full Time	Contract
1	**Total number of Operation and maintenance employees**	8.00	
2	**Total number of employees engaged in customer billing and collection**	2.00	
3	**Total number of employees engaged in administrative function**	2.00	
4	**Total**	**12.00**	**-**

DISTRIBUTION OF SALARIES AND WAGES

Amounts originally charged to clearing accounts should be distributed to final classifications in column (c). Estimates may be used in such distribution provided that a reasonable approximation of final classification is obtained.

Line No.	Particulars (a)	Direct Payroll Distributions (b)	Allocation of Amounts Charged Clearing Accounts (c)	Total (d)
1	Wastewater Operation & Maintenance Expense	448,695		448,695
2	Total Merchandise and Jobbing			-
3	Total Utility Plant Construction			-
4	Total Utility Plant Retirements			-
5	Total All Other Accounts	381,507		381,507
6	Clearing Accounts			-
7	**TOTAL SALARIES & WAGES**	**830,202**		**830,202**

8 Describe here under the general bases used in allocating to utility departments the several classes of expenses and salaries:

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SALARIES & WAGES - OFFICERS, DIRECTORS AND MAJORITY STOCKHOLDERS (Account 703.1-703.8)

Line No.	Particulars	703.1 Collection Expenses - Operations $	703.2 Collection Expenses - Maint. $	703.3 Pumping Expenses - Operations $	703.4 Pumping Expenses - Maint. $	703.5 Treat. & Disp. Expenses - Operations $	703.6 Treat. & Disp. Expenses - Maint. $	703.7 Customer Accounts Expenses $	703.8 Admin. & General Expenses $
	Grand Total Compensation from Preceding Year:								1,900
	List the Current year's Activities:								
1	**Name:** Daryl Hennessy								
	Title:								
	Address: Charles Town, WV								
	Term: Required as Chair								
	Total Compensation for current Year.:								450
2	**Name:** Pete Kubic								
	Title:								
	Address: Charles Town, WV								
	Term: Required as PE								
	Total Compensation for current Year.:								-
3	**Name:** Kevin Tester								
	Title:								
	Address: Charles Town, WV								
	Term: 2/20/18 to 5/27/20								
	Total Compensation for current Year.:								475
4	**Name:** Keith Pierson								
	Title:								
	Address: Ranson, WV								
	Term: 8/1/18 to 5/31/22								
	Total Compensation for current Year.:								400
5	**Name:** Jacquelyn Milliron								
	Title:								
	Address: Charles Town, WV								
	Term: 6/13/19-6/1/23								
	Total Compensation for current Year.:								500
6	**Name:**								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
7	**Name:**								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
	Total current year's Compensation for Schedule 606B .	-	-	-	-	-	-	-	1,825

SALARIES & WAGES - OFFICERS, DIRECTORS AND MAJORITY STOCKHOLDERS (Account 703.1-703.8) - Continued

Line No.	Particulars	703.1 Collection Expenses - Operations $	703.2 Collection Expenses - Maint. $	703.3 Pumping Expenses - Operations $	703.4 Pumping Expenses - Maint. $	703.5 Treat. & Disp. Expenses - Operations $	703.6 Treat. & Disp. Expenses - Maint. $	703.7 Customer Accounts Expenses $	703.8 Admin. & General Expenses $
	Balance Carried over from Page 606B	-	-	-	-	-	-	-	1,825
8	Name:								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
9	Name:								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
10	Name:								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
11	Name:								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
12	Name:								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
13	Name:								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
14	Name:								
	Title:								
	Address:								
	Term:								
	Total Compensation for current Year.:								
	Final Total Compensation for the Current Year (schedule 606B and 606C)	-	-	-	-	-	-	-	1,825

EMPLOYEE HEALTH, SAFETY, AND TRAINING HOURS

Report Total hours worked, total hours away from work due to work related injury and total hours of qualified formal training hours for all employees. Excludes contract workers.

Line no.			
1	1	**Employee Health and Safety Severity Rate**	
2		**Description:**	
3		Quantifies the rate of employee days lost from work due to work related illness or injury.	
4			
5	a	Total hours away from work by all employees due to work related injury	0.00
6	b	Total hours worked by all employees during the reporting period	32,365.12
7			
8	2	**Training Hours Per Employee**	
9			
10		*Qualified training is training that has been approved by the WV BPH, is documented by the utility	
11		outline, attendance roster and a qualified instructor, professional licensing certification	
12		requirements, through a training professional or is from an accredited institution development	
13		courses where a certificate is obtained upon the successful completion of the course	
14		or is from an accredited institution	
15			
16	a	Total of qualified * formal training hours for all employees	118.00
17	b	Total hours worked by employees during the reporting period	32,365.12
18			
19		Notes: Employee Health, Safety, and Training	
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Employee Pension, Rental of Building, Real Property, and Equipment, Transportation Exp., Bad Debt Expense, Advertising Expense

1. List the Preceding year's amount for SubAccounts 704-760.
2. List the Current Year's Activities for SubAccounts 704-760
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description	SubAcct. .1 Collection Expenses - Operations $	SubAcct. .2 Collection Expenses - Maint. $	SubAcct. .3 Pumping Expenses - Operations $	SubAcct. .4 Pumping Expenses - Maint. $	SubAcct. .5 Treat. & Dist. Expenses - Operations $	SubAcct. .6 Treat. & Dist. Expenses - Maint. $	SubAcct. .7 Customer Accounts Expenses $	SubAcct. 8 Admin. & General Expenses $
1	**Employee Pensions and Benefits(acct.-704)**								
	Total amount from Preceding Year	731	731	3508	3508	8478	8478	6396	20416
	Current Year's Activities:								
				6189	6189	8685	8685	11226	14187
	Total Current Balance for Year for SubAcct -704	-	-	6,189	6,189	8,685	8,685	11,226	14,187
2	**Rental of Building/Real Property-acct.-741 (provide Lessor's name and description)**								
	Total amount from Preceding Year								
	Current Year's Activities:								
	Total Current Balance for Year for SubAcct -741	-	-	-	-	-	-	-	-
3	**Rental Equipment(acct.-742)**								
	Total amount from Preceding Year								
	Current Year's Activities:								
	Total Current Balance for Year for SubAcct 742	-	-	-	-	-	-	-	-
4	**Transportation Expenses(acct.-750)**								
	Total amount from Preceding Year								62093
	Current Year's Activities:								
									46650
	Total Current Balance for Year for SubAcct -750	-	-	-	-	-	-	-	**46,650**
5	**Advertising Expense(acct.-760)**								
	Total amount from Preceding Year								
	Current Year's Activities:								
	Total Current Balance for Year for SubAcct -760								-
6	**Bad Debt Expense(acct.-770)**								
	Total amount from Preceding Year							27849	
	Current Year's Activities:								
								43438	
	Total Current Balance for Year for SubAcct -770							**43,438**	

INSURANCE (Accounts: (756.1-756.8), (757.1-757.8), (758.1-758.8), (759.1-759.8))

1. List the Preceding year's amount for SubAccounts 756-759.
2. List the Current Year's amount for SubAccounts -756-759.
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description	SubAcct. .1 Collection Expenses - Operations $	SubAcct. .2 Collection Expenses - Maint. $	SubAcct. .3 Pumping Expenses - Operations $	SubAcct. .4 Pumping Expenses - Maint. $	SubAcct. .5 Treat. & Disp. Expenses - Operations $	SubAcct. .6 Treat. & Disp. Expenses - Maint. $	SubAcct. .7 Customer Accounts Expenses $	SubAcct. .8 Admin. & General Expenses $
1	**Insurance - Vehicle acct. 756 (give description):**								
	Total Amount from Previous Year:								
	Current Year's Activities:								
	Total for Current Year for SubAcct -756	-	-	-	-	-	-	-	-
2	**Insurance -acct. 757- General Liability (give description):**								
	Total Amount from Previous Year:								56,258
	Current Year's Activities:								
									76,934
	Total Current Balance for Year for SubAcct -757	-	-	-	-	-	-	-	**76,934**
3	**Insurance - Workman's Comp. acct. 758 (give description):**								
	Total Amount from Previous Year:								11,109
	Current Year's Activities:								
	Brickstreet								12,790
	Total Current Balance for Year for SubAcct -758	-	-	-	-	-	-	-	**12,790**
4	**Insurance - Other -acct. 759 (give description):**								
	Total Amount from Previous Year:	1,872	1,872	8,978	8,978	21,698	21,698	16,369	24,576
	Current Year's Activities:								
	PEIA (employees health)			12,012	12,012	16,858	16,858	21,791	27,538
	Total Current Balance for Year for SubAcct -759	-	-	**12,012**	**12,012**	**16,858**	**16,858**	**21,791**	**27,538**
	Total Current Balance of All Accounts	-	-	**12,012**	**12,012**	**16,858**	**16,858**	**21,791**	**117,261**

OPERATING AND MAINTENANCE EXPENSES
PURCHASED POWER , FUEL FOR POWER PRODUCTION, CHEMICALS, AND MATERIAL & SUPPLIES

1. List the Preceding year's amount for SubAccounts - 711-720.
2. List the Current Year's amount for SubAccounts - 711-720.
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description	.1 Collection Expenses - Operations $	.2 Collection Expenses - Maint. $	.3 Pumping Expenses - Operations $	.4 Pumping Expenses - Maint. $	.5 Treat. & Disp. Expenses - Operations $	.6 Treat. & Disp. Expenses - Maint. $	.7 Customer Accounts Expenses $	.8 Admin. & General Expenses $
2	**711 Sludge Removal Expense**								
	Total amount from Preceding Year					60,831	60,831		
	Current Year's Activities:								
						60,147	60,147		
	Total for Current Year for SubAcct-711					**60,147**	**60,147**		
3	**715 Purchased Power**								
	Total amount from Preceding Year	48,657		48,657		255,316			
	Current Year's Activities:								
		56,307		56,307		209,668			
	Total for Current Year for SubAcct-715	**56,307**		**56,307**		**209,668**		**-**	**-**
4	**716 Fuel for Power Production**								
	Total amount from Preceding Year								
	Current Year's Activities:								
	Total for Current Year for SubAcct-716	**-**		**-**		**-**		**-**	**-**
5	**718 Chemicals**								
	Total amount from Preceding Year					103,973	103,973		
	Current Year's Activities:								
						84,285	84,285		
	Total for Current Year for SubAcct-718	**-**	**-**	**-**	**-**	**84,285**	**84,285**		
6	**720 Material and Supplies**								
	Total amount from Preceding Year	75,898	148,712	25,047	110,339	260,545	260,545	76,346	18,798
	Current Year's Activities:								
		60,484	295,240	33,408	245,032	172,789	172,789	109,893	39,733
	Total for Current Year for SubAcct-720	**60,484**	**295,240**	**33,408**	**245,032**	**172,789**	**172,789**	**109,893**	**39,733**

CONTRACTUAL SERVICES - ENGINEERING (Account 731)

1. List the Preceding year's amount for SubAccounts 731.
2. List the Current Year's amount for SubAccounts - 731.
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description		.1 Collection Expenses - Operations $	.2 Collection Expenses - Maint. $	.3 Pumping Expenses - Operations $	.4 Pumping Expenses - Maint. $	.5 Treat. & Disp. Expenses - Operations $	.6 Treat. & Disp. Expenses - Maint. $	.7 Customer Accounts Expenses $	.8 Admin. & General Expenses $
1	**Contractual Services- Engineering**									
	Total amount from Preceding Year									28,041
	Current Year's Activities:									
	Company:	Hatch, Gwin, RK&K								
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount ($)									52,326
2	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
3	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
4	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
5	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
	Final Total for Account 731		-	-	-	-	-	-	-	52,326

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CONTRACTUAL SERVICES - ACCOUNTING (Account 732)

1. List the Preceding year's amount for SubAccounts 732.
2. List the Current Year's amount for SubAccounts 732.
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description		.1 Collection Expenses - Operations $	.2 Collection Expenses - Maint. $	.3 Pumping Expenses - Operations $	.4 Pumping Expenses - Maint. $	.5 Treat. & Disp. Expenses - Operations $	.6 Treat. & Disp. Expenses - Maint. $	.7 Customer Accounts Expenses $	.8 Admin. & General Expenses $
1	**Contractual Services - Accounting**									
	Total amount from Preceding Year									53,581
	Current Year's Activities:									
	Company:	Cox, Perry, Decker, Kunkle, State Auditor								
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									31,446
2	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
3	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
4	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
5	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
	Final Total for Account 732		-	-	-	-	-	-	-	31,446

CONTRACTUAL SERVICES - LEGAL (Account 733)

1.List the Preceding year's amount for SubAccounts 733.
2. List the Current Year's amount for SubAccounts 733.
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description	.1 Collection Expenses - Operations $	.2 Collection Expenses - Maint. $	.3 Pumping Expenses - Operations $	.4 Pumping Expenses - Maint. $	.5 Treat. & Disp. Expenses - Operations $	.6 Treat. & Disp. Expenses - Maint. $	.7 Customer Accounts Expenses $	.8 Admin. & General Expenses $
1	**Contractual Services- Legal**								
	Total amount from Preceding Year								281,449
	Current Year's Activities:								
	Company: Shingleton & Steptoe								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								122,741
2	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
3	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
4	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
5	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
	Final Total for Account 733	-	-	-	-	-	-	-	122,741

CONTRACTUAL SERVICES - MANAGEMENT FEES (Account 734)

1.List the Preceding year's amount for SubAccounts 734.
2. List the Current Year's amount for SubAccounts 734.
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description	.1 Collection Expenses - Operations $	.2 Collection Expenses - Maint. $	.3 Pumping Expenses - Operations $	.4 Pumping Expenses - Maint. $	.5 Treat. & Disp. Expenses - Operations $	.6 Treat. & Disp. Expenses - Maint. $	.7 Customer Accounts Expenses $	.8 Admin. & General Expenses $
1	**Contractual Services- Management Fees**								
	Total amount from Preceding Year								
	Current Year's Activities:								
	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
2	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
3	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
4	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
5	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
	Final total for Account 734	-	-	-	-	-	-	-	-

CONTRACTUAL SERVICES - TESTING (Account 735)

1. List the Preceding year's amount for SubAccounts 735.
2. List the Current Year's amount for SubAccounts 735.
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description	.1 Collection Expenses - Operations $	.2 Collection Expenses - Maint. $	.3 Pumping Expenses - Operations $	.4 Pumping Expenses - Maint. $	.5 Treat. & Disp. Expenses - Operations $	.6 Treat. & Disp. Expenses - Maint. $	.7 Customer Accounts Expenses $	.8 Admin. & General Expenses $
1	**Contractual Services- Testing**								
	Total amount from Preceding Year								
	Current Year's Activities:								
	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
2	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
3	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
4	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
5	Company:								
	Service:								
	Charge Basis:								
	Contract Date:								
	Contract Term:								
	Total Amount($)								
	Final Total for Account 735	-	-	-	-	-	-	-	-

CONTRACTUAL SERVICES - OTHER (Account 736)

1.List the Preceding year's amount for SubAccounts 736.
2. List the Current Year's amount for SubAccounts 736.
3. Provide additional note on Schedule 801A-801B, if any.

Line No.	Accounts- Description		.1 Collection Expenses - Operations $	.2 Collection Expenses - Maint. $	.3 Pumping Expenses - Operations $	.4 Pumping Expenses - Maint. $	.5 Treat. & Disp. Expenses - Operations $	.6 Treat. & Disp. Expenses - Maint. $	.7 Customer Accounts Expenses $	.8 Admin. & General Expenses $
1	**Contractual Services- Other**									
	Total amount from Preceding Year									62,255
	Current Year's Activities:									
	Company:	Tyler (Incode), City National, & JUI								
	Service:	Billing Fees								
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									106,848
2	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
3	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
4	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
5	Company:									
	Service:									
	Charge Basis:									
	Contract Date:									
	Contract Term:									
	Total Amount($)									
	Final Total for Account 736		-	-	-	-	-	-	-	106,848

CONSTRUCTION CLEARANCES

Line No.	Name of Overhead (a)	Undistributed Overheads Beginning of Year (b)	Overheads for Year (c)	Undistributed Overheads End of Year (d)	Overheads Cleared During Year: Total Clearances (b+c-d) (e)	Overheads Cleared During Year: To Construction (f)	Overheads Cleared During Year: To Other Accounts (g)
1	Direct Charges:						
2	Company Labor				-		
3							
4	Company Materials				-		
5							
6	Contractor Payments				-		
7							
8	Other (specify)						
9					-		
10					-		
11					-		
12					-		
13					-		
14	**Total Direct Charges**	**-**	**-**	**-**	**-**	**-**	**-**
15	Overheads:						
16	Engineering and Supervision				-		
17							
18	Administrative and General				-		
19							
20	Taxes				-		
21							
22	Allowance for Funds Used				-		
23							
24	Other (specify)						
25					-		
26					-		
27					-		
28					-		
29	**Total Overheads**	**-**	**-**	**-**	**-**	**-**	**-**
30	**Total Construction Clearances**	**-**	**-**	**-**	**-**	**-**	**-**

IMPORTANT PHYSICAL CHANGES DURING THE YEAR

Every item must be fully answered and if there have been no changes, that fact should be stated.

1. Important pumping station equipment installed.

No changes.

2. Important pumping station equipment retired.

Euclid Avenue Pump Station decommissioned. (2) 10.33 HP HOMA Pumps

3. Other important improvements.

No changes.

4. All other important physical changes.

No changes.

NOTES TO POWER, PUMPING AND PURCHASED WATER STATISTICS

Pumping Station Equipment? X YES _____ NO

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	SAMUEL STREET	BELVEDERE	WILLOW SPRINGS	CLARENCE DRIVE
3	Identification number, description, etc. of each pump	20 HP		9100-4153	9100-412.3 SV
4	Type (displacement, centrifugal, air lift, ejector, etc.)	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL
5	Purpose of pump (collection, plant, etc.)	COLLECTION	COLLECTION	COLLECTION	COLLECTION
6	Manufacturer	FLYGT	FLYGT	YEOMANS	YEOMANS
7	Rated capacity - gallons per minute		25	370	425
8	Discharge head - in feet		30	157	79
9	Revolutions or strokes per minute			1750	1750
10	Type station (dry well, wet well, other)	WET WELL	WET WELL	WET WELL	WET WELL
11	Wet well dimensions (depth and length x width or diameter)	12' X 20'	4' X 15'	12' X 27'	12' X 21'
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC
17	Manufacturer	FLYGT	WEG	YEOMANS	YEOMANS
18	Rated horsepower	20	3	60	25
19	Electric generators or Emergency pumping units:				
20	Identification number or description	45ML32674R		QSB7-G5-NR3	C6006
21	Manufacturer	ONAN		CUMMINS	CUMMINS
22	Motive power (steam, internal comb. engine, hydraulic)	LP GAS		DIESEL	DIESEL
23	Rated capacity in Kilowatt or KVA	45 KW/54.45 KVW		40	60
24	Rated capacity in GPM				
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	YES	NO	YES	YES
32	Emergency pumping connection (yes / no)	NO	NO	YES	YES
33	Wet well aeration (yes / no)	NO	NO	NO	NO
34	Other (yes / no)				

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	HUNTFIELD	MOUNTAINEER	TH PARK	CRAIGHILL
3	Identification number, description, etc. of each pump	6-3152	T4A71S-B	T4AS-B	1 HP
4	Type (displacement, centrifugal, air lift, ejector, etc.)	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL
5	Purpose of pump (collection, plant, etc.)	COLLECTION	COLLECTION	COLLECTION	COLLECTION
6	Manufacturer	FLYGT	GORMAN-RUPP	GORMAN-RUPP	EBARA
7	Rated capacity - gallons per minute		120	120	55
8	Discharge head - in feet		22'	22'	20'
9	Revolutions or strokes per minute		1765	1765	
10	Type station (dry well, wet well, other)	WET WELL	WET WELL	WET WELL	WET WELL
11	Wet well dimensions (depth and length x width or diameter)	41' X 12' X 30'	5' X 8'	5' X 11'	6' X 25'
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC
17	Manufacturer	FLYGT	WEG	WEG	EBARA
18	Rated horsepower	20	3	3	1
19	Electric generators or Emergency pumping units:				
20	Identification number or description	250REQZD	N/A	N/A	50DGFU6225
21	Manufacturer	KOHLER	N/A	N/A	KOHLER
22	Motive power (steam, internal comb. engine, hydraulic)	DIESEL	N/A	N/A	LP
23	Rated capacity in Kilowatt or KVA	265/331	N/A	N/A	35 KW
24	Rated capacity in GPM	N/A	N/A	N/A	N/A
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	YES	YES	YES	YES
32	Emergency pumping connection (yes / no)	NO	NO	NO	NO
33	Wet well aeration (yes / no)	YES	YES	YES	YES
34	Other (yes / no)				

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	WEIRICK STREET	HUNTFIELD 2	DEMORY FARM	DRISWOOD
3	Identification number, description, etc. of each pump	9100-4133SV	9100-4153	9100-412.3 SV	10 HP
4	Type (displacement, centrifugal, air lift, ejector, etc.)	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	Centrifugal/Grinded
5	Purpose of pump (collection, plant, etc.)	COLLECTION	COLLECTION	COLLECTION	Collect WW from school
6	Manufacturer	YEOMANS	YEOMANS	YEOMANS	HOMA
7	Rated capacity - gallons per minute	250	400	335	25 GPM
8	Discharge head - in feet	117	172	118	137 FT TOH
9	Revolutions or strokes per minute	1750	1750	1750	3450 RPM
10	Type station (dry well, wet well, other)	WET WELL	WET WELL	WET WELL	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	8' X 12' X 14'	41' X 12' X 30'	12' X 26'	7.167' x 21.5'
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	ELECTRIC	ELECTRIC	ELECTRIC	Electric Motor
17	Manufacturer	YEOMANS	YEOMANS	YEOMANS	HOMA
18	Rated horsepower	30	60	40	10 HP
19	Electric generators or Emergency pumping units:				
20	Identification number or description	N/A	250 REOZD	C6006	CD 103 Godwin Self Prime Pump
21	Manufacturer	N/A	KOHLER	CUMMINS	Godwin
22	Motive power (steam, internal comb. engine, hydraulic)	N/A	DIESEL	DIESEL	Internal Comb
23	Rated capacity in Kilowatt or KVA	N/A	265/331	60	N/A
24	Rated capacity in GPM				350GPM
25	Air compressors:				
26	Identification number or description	NO	NO	YES	N/A
27	Manufacturer	NO	NO	YES	N/A
28	Bore and stroke or rated delivery (CFM)	NO	NO	NO	N/A
29	Submergence of air lift in feet, static	2 HP MYERS MIXERS	NO	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	N/A	N/A	N/A	N/A
32	Emergency pumping connection (yes / no)	N/A	N/A	N/A	N/A
33	Wet well aeration (yes / no)	N/A	N/A	N/A	N/A
34	Other (yes / no)	N/A	N/A	N/A	No

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	JETTS FARM	WOODLAWN MHP	LLOYDS FLAT	PARKVIEW MHP
3	Identification number, description, etc. of each pump	25 HP NON CLOG	10.33 HP GRINDER	25 HP NON CLOG	2 HP Grinder
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal	Centrifugal	Centrifugal	Centrifugal
5	Purpose of pump (collection, plant, etc.)	Collection	Collection	Collection	Collection
6	Manufacturer	FE MYERS	FE MYERS	FE MYERS	KEEN
7	Rated capacity - gallons per minute	297	64	296	13
8	Discharge head - in feet	12' 8"	10' 4"	13' 4"	7' 10"
9	Revolutions or strokes per minute	1750	3500	1750	3450
10	Type station (dry well, wet well, other)	Wet Well	Wet Well	Wet Well	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	6' x 12' 8"	5' X 10' 4"	6' x 13' 4"	3' x 7' 10"
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	Electric	Electric	Electric	Electric
17	Manufacturer	FE MYERS	FE MYERS	FE MYERS	KEEN
18	Rated horsepower	25	5	25	2
19	Electric generators or Emergency pumping units:				
20	Identification number or description	Onan 45	Onan 30	Onan 45	N/A
21	Manufacturer	Onan	Onan	Onan	N/A
22	Motive power (steam, internal comb. engine, hydraulic)	Internal Comb	Internal Comb	Internal Comb	N/A
23	Rated capacity in Kilowatt or KVA	45 KVA	30 KVA	45 KVA	N/A
24	Rated capacity in GPM				N/A
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	No	No	No	No
32	Emergency pumping connection (yes / no)	No	No	Yes	No
33	Wet well aeration (yes / no)	No	No	No	No
34	Other (yes / no)	No	No	No	No

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	ORCHARD HILLS	CRANES LANE	JOB CORP	JEFFERSON HIGH SCHOOL
3	Identification number, description, etc. of each pump	5 HP Grinder	5 HP Grinder	23 HP 99440369	20 HP
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal	Centrifugal	Centrifugal	Centrifugal
5	Purpose of pump (collection, plant, etc.)	Collection	Collection	Collection	Collection
6	Manufacturer	FE Myers	FE Myers	ITT FLYGT	ITT FLYGT
7	Rated capacity - gallons per minute	100	100	80	180
8	Discharge head - in feet	9' 8"	12' 6"	117'	103'
9	Revolutions or strokes per minute	3450	3450	1750	1750
10	Type station (dry well, wet well, other)	Wet Well	Wet Well	Wet Well	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	4' x 9' 8"	4' x 12' 6"	6'x 11' 5"	6' x 18' 5"
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	Electric	Electric	Electric	Electric
17	Manufacturer	FE MYERS	FE MYERS	ITT FLYGT	ITT FLYGT
18	Rated horsepower	5	5	23	20
19	Electric generators or Emergency pumping units:				
20	Identification number or description	Onan 30	Onan 20	Kohler 50	Kohler 60
21	Manufacturer	Onan	Onan	Kohler	Kohler
22	Motive power (steam, internal comb. engine, hydraulic)	Internal Comb	Internal Comb	Propane	Propane
23	Rated capacity in Kilowatt or KVA	30 KVA	20 KVA	50 KW	60 KW
24	Rated capacity in GPM	N/A	N/A		
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	No	No	No	No
32	Emergency pumping connection (yes / no)	No	No	No	No
33	Wet well aeration (yes / no)	No	No	No	No
34	Other (yes / no)	No	No	No	No

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	BRECKENRIDGE	RACETRACK	WENDY'S	BELVEDERE HEIGHTS
3	Identification number, description, etc. of each pump	30 HP	15 HP	30 HP	10.33 HP Grinder
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal	Centrifugal	Centrifugal	Centrifugal
5	Purpose of pump (collection, plant, etc.)	Collection	Collection	Collection	Collection
6	Manufacturer	DACO	FE MYERS	FE MYERS	HOMA
7	Rated capacity - gallons per minute	460	250	410	140
8	Discharge head - in feet	167'	67'	99'	59'
9	Revolutions or strokes per minute	1750	1750	1750	1750
10	Type station (dry well, wet well, other)	Wet Well	Wet Well	Wet Well	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	8' x 22' 4"	6' x 16'	6' x 24'	5' x 9' 5"
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	Electric	Electric	Electric	Electric
17	Manufacturer	DACO	FE MYERS	FE MYERS	HOMA
18	Rated horsepower	30	15	30	10.33
19	Electric generators or Emergency pumping units:				
20	Identification number or description	Godwin	Onan 30	Onan 60	Onan 20
21	Manufacturer	Godwin	Onan	Onan	Onan
22	Motive power (steam, internal comb. engine, hydraulic)	Diesel	N/A	Combustion	Combustion
23	Rated capacity in Kilowatt or KVA	35 KW	30 KW	60 KW	20 KW
24	Rated capacity in GPM			N/A	N/A
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	No	No	No	No
32	Emergency pumping connection (yes / no)	Yes	No	Yes	Yes
33	Wet well aeration (yes / no)	No	No	No	No
34	Other (yes / no)	No	No	No	No

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	GREENFIELD	WILTS MHP	BURR PARK EAST	BURR WEST
3	Identification number, description, etc. of each pump	7.5 HP Grinder	2 HP Grinder	25 HP	3 HP
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal	Centrifugal	Centrifugal	Centrifugal
5	Purpose of pump (collection, plant, etc.)	Collection	Collection	Collection	Collection
6	Manufacturer	FE MYERS	KEEN	FE MYERS	FE MYERS
7	Rated capacity - gallons per minute	103	12	188	244
8	Discharge head - in feet	91'	26'	98'	22'
9	Revolutions or strokes per minute	1750	1750	1750	1750
10	Type station (dry well, wet well, other)	Wet Well	Wet Well	Wet Well	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	5' x 9' 5"	3' x 7' 9"	8' x 18' 6"	6' x 15' 9"
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	Electric	Electric	Electric	Electric
17	Manufacturer	FE MYERS	KEEN	FE MYERS	FE MYERS
18	Rated horsepower	7.5	2	25	3
19	Electric generators or Emergency pumping units:				
20	Identification number or description	DRI PRIME	N/A	Onan 45	N/A
21	Manufacturer	FE Myers	N/A	Onan	N/A
22	Motive power (steam, internal comb. engine, hydraulic)	Diesel	N/A	Combustion	N/A
23	Rated capacity in Kilowatt or KVA	100 HP	N/A	45 KW	N/A
24	Rated capacity in GPM	N/A	N/A	N/A	N/A
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	No	N/A	N/A	N/A
32	Emergency pumping connection (yes / no)	Yes	N/A	N/A	N/A
33	Wet well aeration (yes / no)	No	N/A	N/A	N/A
34	Other (yes / no)	No	N/A	N/A	N/A

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	BURR, ROYAL	BEALLAIR	SPRUCE HILL NORTH 1	COUNTY GREEN
3	Identification number, description, etc. of each pump	10.5 HP	15 HP Grinder	7.5 HP Grinder	8.9 HP Grinder
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal Non Clog	Centrifugal	Centrifugal	Centrifugal
5	Purpose of pump (collection, plant, etc.)	Collection	Collection	Collection	Collection
6	Manufacturer	HOMA	FE MYERS	FE MYERS	HOMA
7	Rated capacity - gallons per minute	200	204	88	250
8	Discharge head - in feet	68'	102'	82.8'	74'
9	Revolutions or strokes per minute	1750	1750	1750	1750
10	Type station (dry well, wet well, other)	Wet Well	Wet Well	Wet Well	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	8' x 14'	6' x 24'	6' x 24'	6' x 24'
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	Electric	Electric	Electric	Electric
17	Manufacturer	HOMA	FE MYERS	FE MYERS	HOMA
18	Rated horsepower	10.5	15	7.5	8.9
19	Electric generators or Emergency pumping units:				
20	Identification number or description	N/A	Onan 35	Kohler 35	Kohler 100
21	Manufacturer	N/A	Onan	Kohler	Kohler
22	Motive power (steam, internal comb. engine, hydraulic)	N/A	35 KW	35 KW	100 KW
23	Rated capacity in Kilowatt or KVA	N/A	N/A	N/A	N/A
24	Rated capacity in GPM	N/A	N/A	N/A	N/A
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	N/A	N/A	N/A	N/A
32	Emergency pumping connection (yes / no)	N/A	N/A	N/A	Yes
33	Wet well aeration (yes / no)	N/A	N/A	N/A	N/A
34	Other (yes / no)	N/A	N/A	N/A	N/A

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	HILLSIDE	BRIAR RUN 1	BRIAR RUN 2	DEERFIELD PS
3	Identification number, description, etc. of each pump	3 HP Grinder	3 HP Grinder	3 HP Grinder	1.5 HP Grinder
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal	Centrifugal	Centrifugal	Centrifugal
5	Purpose of pump (collection, plant, etc.)	Collection	Collection	Collection	Collection
6	Manufacturer	FE MYERS	FE MYERS	FE MYERS	ZOELLER
7	Rated capacity - gallons per minute	102	78	78	80
8	Discharge head - in feet	28'	28'	32'	44'
9	Revolutions or strokes per minute	1750	1750	1750	1750
10	Type station (dry well, wet well, other)	Wet Well	Wet Well	Wet Well	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	6' x 18'	5' x 16'	5' x 16'	3' X 10'
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	Electric	Electric	Electric	Electric
17	Manufacturer	FE MYERS	FE MYERS	FE MYERS	ZOELLER
18	Rated horsepower	3	3	3	1.5
19	Electric generators or Emergency pumping units:				
20	Identification number or description	N/A	N/A	N/A	General 20
21	Manufacturer	N/A	N/A	N/A	General
22	Motive power (steam, internal comb. engine, hydraulic)	N/A	N/A	N/A	Combustion
23	Rated capacity in Kilowatt or KVA	N/A	N/A	N/A	20 KW
24	Rated capacity in GPM	N/A	N/A	N/A	N/A
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	N/A	N/A	N/A	N/A
32	Emergency pumping connection (yes / no)	N/A	N/A	N/A	N/A
33	Wet well aeration (yes / no)	N/A	N/A	N/A	N/A
34	Other (yes / no)	N/A	N/A	N/A	N/A

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	MOOSE LODGE	SPRUCE HILL NORTH 2	FLOWING SPRINGS	4TH AVENUE
3	Identification number, description, etc. of each pump	7.5 HP Non-clog	7.5 HP Grinder	70 HP HOMA	25 HP
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal	Centrifugal	Ejector	Centrifugal
5	Purpose of pump (collection, plant, etc.)	Collection	Collection	Collection	Collection
6	Manufacturer	KEEN	FE MYERS	HOMA	Gorman-Rupp
7	Rated capacity - gallons per minute	310	35.5	1030	300
8	Discharge head - in feet	15' 8"	73"	130	96
9	Revolutions or strokes per minute	1750	1750	1750	1830
10	Type station (dry well, wet well, other)	Wet Well	Wet Well	Wet Well	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	6' X 15' 8"	6' X 24'	10' x 27'	6' x 20'
12	Number of hours operated during year			1900	1100
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	Electric	Electric	Electric	Electric Motor
17	Manufacturer	KEEN	FE MYERS	HOMA	Gorman-Rupp
18	Rated horsepower	7.5	7.5	70	25
19	Electric generators or Emergency pumping units:				
20	Identification number or description	Onan 30	Kohler 35	FS-PS-E6	FA-PS-EG
21	Manufacturer	Onan	Kohler	Cummins	Kohler
22	Motive power (steam, internal comb. engine, hydraulic)	Internal Comb	Internal Comb	I.C.E.	I.C.E.
23	Rated capacity in Kilowatt or KVA	30 KVA	35 KV	230KW	KW 170
24	Rated capacity in GPM	N/A	N/A	N/A	N/A
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	No	No	Yes	No
32	Emergency pumping connection (yes / no)	Yes	No	Yes	Yes
33	Wet well aeration (yes / no)	No	No	No	No
34	Other (yes / no)	No	No	No	N/A

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	11TH AVENUE	ASHLEY BRIN	FORREST STREET	DEMORY (LITTLE)
3	Identification number, description, etc. of each pump	2 HP	2.4 HP	2 HP	2 HP
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal	Centrifugal	Centrifugal	Centrifugal
5	Purpose of pump (collection, plant, etc.)	Collection	Collection	Collection	Collection
6	Manufacturer	HYDROMATIC	ABS	HYDROMATIC	EBARA
7	Rated capacity - gallons per minute	40	42	38	30
8	Discharge head - in feet	105	105	40	10'
9	Revolutions or strokes per minute	3450	3450	3450	
10	Type station (dry well, wet well, other)	Wet Well	Wet Well	Wet Well	Wet Well
11	Wet well dimensions (depth and length x width or diameter)	4' x 10'	4' x 12'	4' x 10'	4' x 8'
12	Number of hours operated during year	600	750	750	
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	Electric Motor	Electric Motor	Electric Motor	N/A
17	Manufacturer	MYERS	ABS	HYDROMATIC	N/A
18	Rated horsepower	2	2.4	2	N/A
19	Electric generators or Emergency pumping units:				
20	Identification number or description	N/A	N/A	N/A	N/A
21	Manufacturer	N/A	N/A	N/A	N/A
22	Motive power (steam, internal comb. engine, hydraulic)	N/A	N/A	N/A	N/A
23	Rated capacity in Kilowatt or KVA	N/A	N/A	N/A	N/A
24	Rated capacity in GPM	N/A	N/A	N/A	N/A
25	Air compressors:				
26	Identification number or description	N/A	N/A	N/A	N/A
27	Manufacturer	N/A	N/A	N/A	N/A
28	Bore and stroke or rated delivery (CFM)	N/A	N/A	N/A	N/A
29	Submergence of air lift in feet, static	N/A	N/A	N/A	N/A
30	Miscellaneous:				
31	Odor control equipment (yes / no)	N/A	N/A	N/A	No
32	Emergency pumping connection (yes / no)	N/A	N/A	N/A	No
33	Wet well aeration (yes / no)	N/A	N/A	N/A	No
34	Other (yes / no)	N/A	N/A	N/A	No

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station	TRACTOR SUPPLY			
3	Identification number, description, etc. of each pump	20 HP			
4	Type (displacement, centrifugal, air lift, ejector, etc.)	Centrifugal			
5	Purpose of pump (collection, plant, etc.)	Collection			
6	Manufacturer	EBARA			
7	Rated capacity - gallons per minute	100			
8	Discharge head - in feet	25'			
9	Revolutions or strokes per minute	0			
10	Type station (dry well, wet well, other)	Wet Well			
11	Wet well dimensions (depth and length x width or diameter)	6' x 20'			
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type	N/A			
17	Manufacturer	N/A			
18	Rated horsepower	N/A			
19	Electric generators or Emergency pumping units:				
20	Identification number or description	N/A			
21	Manufacturer	N/A			
22	Motive power (steam, internal comb. engine, hydraulic)	N/A			
23	Rated capacity in Kilowatt or KVA	N/A			
24	Rated capacity in GPM	N/A			
25	Air compressors:				
26	Identification number or description	N/A			
27	Manufacturer	N/A			
28	Bore and stroke or rated delivery (CFM)	N/A			
29	Submergence of air lift in feet, static	N/A			
30	Miscellaneous:				
31	Odor control equipment (yes / no)	No			
32	Emergency pumping connection (yes / no)	Yes			
33	Wet well aeration (yes / no)	No			
34	Other (yes / no)	No			

PUMPING STATION EQUIPMENT

Use separate columns for each pump associated power equipment. Use insert sheets if necessary. For pumps, use only those lines applicable to the unit.

	PARTICULARS (a)	(b)	(c)	(d)	(e)
1	**PUMPING EQUIPMENT**				
2	Identification number or description of pump station				
3	Identification number, description, etc. of each pump				
4	Type (displacement, centrifugal, air lift, ejector, etc.)				
5	Purpose of pump (collection, plant, etc.)				
6	Manufacturer				
7	Rated capacity - gallons per minute				
8	Discharge head - in feet				
9	Revolutions or strokes per minute				
10	Type station (dry well, wet well, other)				
11	Wet well dimensions (depth and length x width or diameter)				
12	Number of hours operated during year				
13	**POWER EQUIPMENT**				
14	Motive power for pump (steam, internal comb. engine,				
15	electric motor, or water turbine):				
16	Type				
17	Manufacturer				
18	Rated horsepower				
19	Electric generators or Emergency pumping units:				
20	Identification number or description				
21	Manufacturer				
22	Motive power (steam, internal comb. engine, hydraulic)				
23	Rated capacity in Kilowatt or KVA				
24	Rated capacity in GPM				
25	Air compressors:				
26	Identification number or description				
27	Manufacturer				
28	Bore and stroke or rated delivery (CFM)				
29	Submergence of air lift in feet, static				
30	Miscellaneous:				
31	Odor control equipment (yes / no)				
32	Emergency pumping connection (yes / no)				
33	Wet well aeration (yes / no)				
34	Other (yes / no)				

WASTEWATER MAINS

Report collection, transmission, and force mains under separate captions and report number of feet at end of year for each wastewater system .

	Size and Kind of Pipe (a)	Beginning (b)	Ending (c)
1	Gravity Sewer		
2	4" AC, PVC, CLAY OR DUCTILE OR CAST	-	24,479
3	6" AC, PVC, CLAY OR DUCTILE OR CAST	45,425	69,696
4	8" AC, PVC, CLAY OR DUCTILE OR CAST	73,390	356,417
5	10" AC, PVC, CLAY OR DUCTILE OR CAST	35,100	52,838
6	12" AC, PVC, CLAY OR DUCTILE OR CAST	7,259	14,411
7	15" AC, PVC, CLAY OR DUCTILE OR CAST	-	8,964
8	18" AC, PVC, CLAY OR DUCTILE OR CAST	3,500	8,413
9	24" AC, PVC, CLAY OR DUCTILE OR CAST	2,800	2,800
10			
11			
12	Force Mains		
13	1.5" PVC FORCE MAIN	-	1,090
14	2" PVC FORCE MAIN	220	6,166
15	3" PVC FORCE MAIN	-	6,751
16	4" PVC FORCE MAIN	3,400	24,730
17	6" PVC FORCE MAIN	10,834	61,411
18	8" PVC FORCE MAIN	14,500	20,052
19	10" PVC FORCE MAIN	1,476	1,476
20	12" PVC FORCE MAIN	-	11,661
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
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39			
40			
41			
42			
43			
44			
45		197,904	671,355

PUMPING AND PURCHASED WASTEWATER TREATMENT STATISTICS

Omit 000's in reporting gallons of wastewater.

Line No.	Particulars (a)	Gallons of Purchased Waste-Water Treatment (b)	Gallons of Wastewater Treated Per Month Treatment Plant (c)	Total all Methods (e)
1	July 2019		43,290	43,290
2	August 2019		37,080	37,080
3	September 2019		34,540	34,540
4	October 2019		36,830	36,830
5	November 2019		31,340	31,340
6	December 2019		36,900	36,900
7	January 2020		39,050	39,050
8	February 2020		36,740	36,740
9	March 2020		36,760	36,760
10	April 2020		33,320	33,320
11	May 2020		35,500	35,500
12	June 2020		33,440	33,440
13	Total for year	-	434,790	434,790
14				
15	Total Gallons Treated			434,790
16	Less Gallons Billed (From page 600)	416,887		
17	Inflow and Infiltration			4.12%
18	Maximum gallons treated at the plant in any one day	2.29	Date:	7/9/19
19	Minimum gallons treated at the plant in any one day	0.01	Date:	12/4/19
20	Average gallons treated per day	1,191	(Line22 / 365)	
21	If wastewater treatment sold to other wastewater utilities, list names of such utilities below:			
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33	State what action has been taken to reduce Inflow & Infiltration:			
34				
35				
36				
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				

MAIN BLOCKAGES, TREATMENT RATE, SYSTEM INTEGRITY, CUSTOMER SATISFACTION, OVERFLOW RATE, AND MAINTENANCE RATIO

1	**Main Blockages (Wastewater)**		1
			2
a	Wastewater Main Blockages	2.00	3
b	Main Blockages Repaired	2.00	4
			5
2	**For Privates Only!**		6
	Rate of Return : Authorized (from last Rate Study)		7
			8
3	**Planned Maintenance Ratio: Wastewater (Hours)**		9
	Description:		10
	This indicator is a measure of the investment in planned maintenance.		11
			12
a	Planned maintenance hours	2,700.00	13
b	Corrective maintenance hours	1,450.00	14
			15
c	Planned budgeted maintenance cost	100,000.00	16
d	Corrective(experienced) maintenance cost	58,800.00	17
			18
4	**Sewer Overflow Rate**		19
a	Total number of dry weather wastewater overflows	2.00	20
b	Total number of wet weather wastewater overflows	0.00	21
c	Number of Wastewater Overflow Points	0.00	22
			23
5	**Wastewater System Collection System Integrity Rate**		24
a	Total number of collection system failures	0.00	25
b	Total miles of wastewater collection main	127.00	26
			27
6	**Wastewater Treatment Effectiveness Rate**		28
			29
a	Number of standard non compliance months	5.00	30
b	Number of months in reporting period	12.00	31
			32
			33
7	**Customer Service**		34
	Customer satisfaction (surveys/focus groups, etc.)		35
			36
	Please indicate all efforts at determining customer satisfaction during the reporting		37
	period including, but not limited to, surveys, focus groups, customer meetings,		38
	and the results of those efforts.		39
			40

PROPOSED SUMMARY BUDGET

Line No.		Revenue Requirement ($)	Revenue Sources ($)
1			
2	Available cash:		
3	Operating income		6,116,000
4	Other Income / Interest		129,000
5	Total Income		6,245,000
6			
7	Cash Disbursements:		
8	Operating expenses	3,899,600	
9	Other taxes	72,500	
10	Debt service requirements:		
11	Principal & Interest Requirement	1,880,000	
12			
13			
14			
15			
16	Bond Reserve Requirement		
17			
18			
19			
20			
21	Repair and Replacement Reserve Requirement	152,900	
22			
23			
24			
25			
26	Contingencies		
27			
28			
29			
30			
31	Plant Additions		
32			
33	Remaining Surplus		240,000
34			
35			
36			
37			
38			
39			

EXPLANATION NOTES

Please include additional explanation on the pages provided with page number and description for the clarification.

Schedule (Page No And Line No)	Description

EXPLANATION NOTES

Please include additional explanation on the pages provided with page number and description for the clarification.

Schedule (Page No And Line No)	Description

City of Charles Town Sewer	01/00/1900	06/30/2020

03:48 PM SEP 30 2020 EXEC SEC DIV

ORIGINAL

SEWER VERIFICATION

The foregoing report must be verified by the oath of the officer, or person duly designated having control of the books and records of account of the utility. The oath required may be taken before any person authorized to administer an oath by the laws of the State in which same is taken.

OATH

State of West Virginia)
) SS:
County of Jefferson)

April Shultz makes oath and says that

he/she is Assistant Utility Manager
(insert here the official title of the affiant)

of Charles Town Utility Board
(Insert here the exact legal title or name of the utility)

that he/she has examined the foregoing report; that to the best of his/her knowledge, information, and belief,all statements of fact contained in said report are true and that said report is a correct statement of the business and affairs of the above named utility in respect to each and every matter set forth therein during the period from and including---

July 1, 2019 to and including June 30, 2020

April Shultz
(Signature of Affiant)

Subscribed and sworn to before me, a Notary Public in and for the State and County above named, this 30th day of September

My commission expires August 13, 2025

ASHLEY N. STOTTLEMYER
Notary Public Official Seal
State of West Virginia
My Comm. Expires Aug 13, 2025
6615. George Street Charles Town WV 25414

Ashley Stottlemyer
(Signature of officer authorized to administer oaths)



CHARLES TOWN UTILITY BOARD
Component Unit of the
Municipality of Charles Town
JEFFERSON COUNTY
Regular Audit
For the Year Ended June 30, 2020

RFP# 20-146

313 Second St.
Marietta, OH 45750
740 373 0056

1907 Grand Central Ave.
Vienna, WV 26105
304 422 2203

150 W. Main St., #A
St. Clairsville, OH 43950
740 695 1569

1310 Market St., #300
Wheeling, WV 26003
304 232 1358

749 Wheeling Ave., #300
Cambridge, OH 43725
740 435 3417

www.perrycpas.com

CHARLES TOWN UTILITY BOARD
JEFFERSON COUNTY

FOR THE YEAR ENDED JUNE 30, 2020

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Charles Town Utility Board
SCHEDULE OF FUNDS INCLUDED IN REPORT
June 30, 2020

BUSINESS-TYPE FUNDS

Major Funds

Water Fund

Sewer Fund

Charles Town Utility Board
BOARD OFFICIALS AND MANAGEMENT
June 30, 2020

Chairman	Daryl Hennessy	
Vice Chairman	Pete Kubic	06/01/19-12/31/21
Secretary/Treasurer	Kevin Tester	02/20/18-12/31/20
Board Member	Jacqueline Milliron	06/01/19-06/30/23
Board Member	Mayor Keith Pierson	06/01/18-05/31/22
Utility Manager	Kristen Stolipher	
Assistant Utility Manager	April Shultz	
Board Attorney	Hoy Shingleton, Jr.	

PERRY & Associates
Certified Public Accountants, A.C.

313 Second St.
Marietta, OH 45750
740.373.0056

1907 Grand Central Ave.
Vienna, WV 26105
304.422.2203

150 West Main St.
St. Clairsville, OH 43950
740.695.1569

1310 Market Street, Suite 300
Wheeling, WV 26003
304.232.1358

749 Wheeling Ave., Suite 300
Cambridge, OH 43725
740.435.3417

INDEPENDENT AUDITOR'S REPORT

January 20, 2021

Charles Town Utility Board
Jefferson County
661 South George Street, Suite 101
Charles Town, WV 25414

To the Board of Directors:

Report on the Financial Statements

We have audited the accompanying financial statements of the **Charles Town Utility Board**, a component unit of the Municipality of Charles Town, Jefferson County, West Virginia (the Utility Board), as of and for the year ended June 30, 2020, and the related notes to the financial statements, which collectively comprise the Utility Board's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for preparing and fairly presenting these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes designing, implementing, and maintaining internal control relevant to preparing and fairly presenting financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to opine on these financial statements based on our audit. We audited in accordance with auditing standards generally accepted in the United States of America and the financial audit standards in the Comptroller General of the United States' *Government Auditing Standards*. Those standards require us to plan and perform the audit to reasonably assure the financial statements are free from material misstatement.

An audit requires obtaining evidence about financial statement amounts and disclosures. The procedures selected depend on our judgment, including assessing the risks of material financial statement misstatement, whether due to fraud or error. In assessing those risks, we consider internal control relevant to the Utility Board's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not to the extent needed to opine on the effectiveness of the Utility Board's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of management's accounting policies and the reasonableness of their significant accounting estimates, as well as our evaluation of the overall financial statement presentation.

We believe the audit evidence we obtained is sufficient and appropriate to support our opinion.

Tax - Accounting – Audit – Review – Compilation – Agreed Upon Procedure – Consultation – Bookkeeping – Payroll – Litigation Support – Financial Investigations
Members: American Institute of Certified Public Accountants
• Ohio Society of CPAs • West Virginia Society of CPAs • Association of Certified Fraud Examiners • Association of Certified Anti-Money Laudering Specialists •

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Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Utility Board, as of June 30, 2020, and the changes in its financial position and its cash flows for the year then ended in accordance with the accounting principles generally accepted in the United States of America.

Emphasis of Matter

As discussed in Note 16 to the financial statements, the financial impact of COVID-19 and the ensuing emergency measures will impact subsequent periods of the Utility Board. We did not modify our opinion regarding this matter.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require this presentation to include *Management's discussion and analysis and schedules of net pension and OPEB liabilities and pension and OPEB contributions*, listed in the table of contents, to supplement the basic financial statements. Although this information is not part of the basic financial statements, the Governmental Accounting Standards Board considers it essential for placing the basic financial statements in an appropriate operational, economic, or historical context. We applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, consisting of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, to the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not opine or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to opine or provide any other assurance.

Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we have also issued our report dated January 20, 2021 on our consideration of the Utility Board's internal control over financial reporting and our tests of its compliance with certain provisions of laws, regulations, contracts and grant agreements and other matters. That report describes the scope of our internal control testing over financial reporting and compliance, and the results of that testing, and does not opine on internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Utility Board's internal control over financial reporting and compliance.



Perry and Associates
Certified Public Accountants, A.C.
Marietta, Ohio

The discussion and analysis of the Charles Town Utility Board's (Utility Board) financial performance provides an overview of the Utility Board's financial activities for the fiscal year ended June 30, 2020. Please read it in conjunction with the Utility Board's financial statements.

FINANCIAL HIGHLIGHTS

The Utility Board's net position increased $1.1 million as a result of this year's operations. Net position of the water fund increased $0.1 million compared to the previous year, or 1.7 percent. Net position of the sewer fund increased by $1.0 million, or 3.8 percent compared to the previous year. The sewer fund increase is primarily the result of a full year of operations of the former Jefferson County PSD territory compared to six months of operations in 2019.

The Utility Board's operating revenues increased by $1.0 million and operating expenses increased by $0.4 million compared to the previous year. Water fund operating revenues increased $0.1 million to $4.0 million and water fund operating expenses increased by $0.1 million to $3.9 million. Sewer operating revenues increased $0.9 million to $6.2 million and operating expenses increased by $0.3 million to $4.9 million. The sewer fund increases result primarily from a full year of operations of the former Jefferson County PSD territory in 2020 compared to six months in 2019.

The Utility Board had no significant changes in rates and charges during 2020.

Operating income remained constant at $0.1 million for the water fund and increased by $0.6 million for the sewer fund compared to the previous year.

The Utility Board placed in service approximately $0.4 million in utility plant assets during 2020. The Utility Board had construction of a major sewer line extension in progress during 2020 incurring $6.6 million in costs during the year. The construction is being funded by a customer who will be provided sewer service as a result of the extension.

The COVID-19 pandemic had no significant financial impact on the Utility Board for 2020.

The Utility Board refunded its outstanding Series 2013B, 2014C, 2014D, and 2014E revenue bonds on July 14, 2020. The refunding will significantly lower annual bond debt service costs in future years.

USING THIS ANNUAL REPORT

1. Management's Discussion and Analysis

   The Management's Discussion and Analysis is intended to serve as an introduction to the Utility Board's financial statements. The Utility Board's financial statements and Notes to the Financial Statements included in this report were prepared in accordance with GAAP applicable to governmental entities in the United States of America for proprietary fund types.

2. Financial Statements

   The financial statements are designed to provide readers with a broad overview of the Utility Board's finances, in a manner similar to private-sector business. They consist of the Statement of Net Position, Statement of Revenues, Expenses and Changes in Net Position, and Statement of Cash Flows.

   The Statement of Net Position presents information on all the Utility Board's assets/deferred outflows and liabilities/deferred inflows with the difference between the two reported as net position. Increases or decreases in net position will serve as a useful indicator of whether the financial position of the Utility Board is improving or deteriorating.

   The Statement of Revenues, Expenses and Changes in Net Position presents information showing how the Utility Board's net position changed during the most recent fiscal year. All changes in net position are reported as soon as the underlying event giving rise to the change occurs, regardless of the timing of related cash flows. Thus, revenues and expenses are reported in this statement for some items that will result in cash flows in different fiscal periods (e.g., depreciation and earned but unused vacation leave).

   The Statement of Cash Flows presents the Utility Board's sources and uses of cash and changes in cash balances between the current and prior year.

   The basic financial statements report all Utility Board financial activities. The activities are primarily supported by water and sewer user fees. The Utility Board's mission is furthering the preservation of public health, comfort and convenience by providing water and sewer services to the residents of Charles Town, Ranson, territories formerly served by the Jefferson County Public Service District, and other areas in Jefferson County.

3. Notes to Financial Statements

   The Notes to Financial Statements provide additional information that is essential to a full understanding of the data provided in the basic financial statements. The Notes to Financial Statements can be found in the financial statements mentioned at #2 above.

REPORTING THE UTILITY BOARD AS A WHOLE

The analysis below focuses on net position (Table 1) and changes in net position (Table 2) of the Utility Board's financial activities.

Table 1 - Net Position (in Millions)

	Water		Sewer		Total	
	2020	2019	2020	2019	2020	2019
Current and other assets	$ 4.3	$ 4.1	$ 10.0	$ 5.2	$ 14.3	$ 9.3
Capital assets	20.6	21.7	52.6	47.2	73.2	68.9
Total assets	24.9	25.8	62.6	52.4	87.5	78.2
Deferred outflows of resources	0.6	0.6	0.3	0.2	0.9	0.8
Total assets and deferred outflows of resources	$ 25.5	$ 26.4	$ 62.9	$ 52.6	$ 88.4	$ 79.0
Long-term debt outstanding	$ 18.5	$ 19.5	$ 24.3	$ 25.5	$ 42.8	$ 45.0
Other liabilities	0.8	0.9	11.3	0.8	12.1	1.7
Total liabilities	19.3	20.4	35.6	26.3	54.9	46.7
Deferred inflows of resources	0.2	0.1	0.2	0.2	0.4	0.3
Net position:						
Net investment in capital assets	2.1	2.2	21.5	22.5	23.6	24.7
Restricted	2.9	2.8	3.4	2.2	6.3	5.0
Unrestricted	1.0	0.9	2.2	1.4	3.2	2.3
Total net position	6.0	5.9	27.1	26.1	33.1	32.0
Total liabilities, deferred inflows, and net position	$ 25.5	$ 26.4	$ 62.9	$ 52.6	$ 88.4	$ 79.0

The net position of the Utility Board as a whole increased by 3.4 percent ($1.1 million). Unrestricted net position - the part of net position that can be used to finance day-to-day operations without constraints established by debt covenants, enabling legislation, or other legal requirements, increased from $2.3 million at June 30, 2019, to $3.2 million at the end of this year, a 39.1 percent increase.

Water net position increased by $0.1 million or 1.7 percent and sewer net position increased by $1.0 million or 3.8 percent.

A full year of operations of the former Jefferson County PSD territory compared to six months in the previous year is the primary reason for the Utility Board's increase in total net position and unrestricted net position for 2020.

By far, the largest portion of the Utility Board's assets reflects its investment in capital assets. The Utility Board uses these capital assets to provide water and sewer services to its customers; consequently, these assets are not available for future spending.

Table 2 - Changes in Net Position (in Millions)

	Water		Sewer		Total	
	2020	2019	2020	2019	2020	2019
Operating revenues	$ 4.0	$ 3.9	$ 6.2	$ 5.3	$ 10.2	$ 9.2
Operating expenses	3.9	3.8	4.9	4.6	8.8	8.4
Operating income	0.1	0.1	1.3	0.7	1.4	0.8
Non-operating revenues (expenses)	-	-	(0.5)	(0.4)	(0.5)	(0.4)
Changes in net position before capital contributions	0.1	0.1	0.8	0.3	0.9	0.4
Capital contributions	-	1.2	0.2	9.3	0.2	10.5
Change in net position	$ 0.1	$ 1.3	$ 1.0	$ 9.6	$ 1.1	$ 10.9

The Utility Board's operating revenues increased by $1.0 million or 10.9 percent. Operating expenses increased by $0.4 million or 4.8 percent. A full year of operations of the former Jefferson County PSD territory compared to six months in the previous year is the primary reason for the Utility Board's increase in total revenues and operating expenses for 2020. The analysis separately considers the operations of the water and sewer funds.

BUDGETARY HIGHLIGHTS

For the year ended June 30, 2020, budgets were prepared by the Utility Board's management and were approved by the Utility Board of Directors. The budgets were primarily used as a management tool and have no legal stature. The budgets were prepared in accordance with principles used in the preparation of the basic financial statements.

CAPITAL ASSET AND DEBT ADMINISTRATION

Capital Assets

At June 30, 2020, the Utility Board had $73.2 million invested in a broad range of capital assets, including land, structures, machinery and equipment, and water and sewer lines (see Table 3 below). This amount represents a net increase (including additions and disposals) of $4.3 million compared to the previous year.

Table 3 - Capital Assets at Year-End (Net of Depreciation, in Millions)

	2020	2019
Capital assets not depreciated - utility plant	$ 8.7	$ 2.0
Capital assets depreciated - utility plant	101.3	103.0
Totals	110.0	105.0
Accumulated depreciation	(36.8)	(36.1)
Capital assets, net of depreciation	$ 73.2	$ 68.9

Current Year Capital Additions and Retirements

Water (at cost excluding accumulated depreciation)	
Treatment plant improvements	$ 0.046
Meters	0.016
Pumping equipment	0.017
Furniture	0.012
Mapping	0.066
Communications equipment	0.030
	0.187
Sewer (at cost excluding depreciation)	
Collecting equipment	0.064
Pumping equipment	0.053
Furniture	0.017
Transportation equipment	0.033
Communications equipment	0.007
	0.174
Total 2020 additions to utility plant in service	0.361
2020 utility plant retirements	
Water	(0.290)
Sewer	(1.786)
Total 2020 utility plant retirements	(2.076)
Net reduction in utility plant in service (cost) for 2020	$ (1.715)

Debt

At year-end, the Utility Board had $42.8 million in long-term debt outstanding compared to $45.0 million in the previous year.

Table 4 - Outstanding Debt at Year-End (in Millions)

	2020	2019
Leases	$ 0.1	$ 0.1
Loans (Municipality of Charles Town)	0.5	0.5
Bonds	42.2	44.4
Total	$ 42.8	$ 45.0

The Utility Board had no significant debt issuances during 2020.

The bond debt resulted from issuing revenue bonds for the construction of water and sewer utility plant improvements and acquisition of JCPSD net assets. These bonds are secured by revenues derived from the combined water and sewer system. Other debt obligations include loans and obligations under capital leases. More detailed information about the Utility Board's long-term liabilities is presented in the notes to the financial statements.

ECONOMIC FACTORS

The Utility Board's management considered many factors when setting the fiscal-year 2021 budget. One of those factors was the economy. The County's population has a direct impact on the Utility Board's economic growth.

The Utility Board is optimistic about its potential for economic growth in the future. The increasing population, infrastructure improvements, annexation, acquisition of other utilities, and procurement of grants and other funding sources are all positive indicators for continued economic growth of the Utility Board.

CONTACTING THE UTILITY BOARD'S FINANCIAL MANAGEMENT

This financial report is designed to provide citizens, customers, and investors and creditors with a general overview of the Utility Board's finances and to show the Utility Board's accountability for the money it receives. If you have questions about this report or need additional financial information, contact the Utility Manager at 661 South George Street, Suite 101, Charles Town, WV 25414.

Charles Town Utility Board
STATEMENT OF NET POSITION
June 30, 2020

ASSETS AND DEFERRED OUTFLOWS

	Water Fund	Sewer Fund	Totals
ASSETS			
CURRENT ASSETS			
Cash	$ 682,297	$ 2,097,422	$ 2,779,719
Customer accounts receivable, net of allowances	83,001	237,958	320,959
Inventory, at cost	94,603	1,768	96,371
Accrued utility revenue	345,817	547,606	893,423
Total current assets	1,205,718	2,884,754	4,090,472
RESTRICTED ASSETS			
Debt service and debt service reserve funds	1,171,236	1,304,816	2,476,052
Construction funds	-	3,664,429	3,664,429
Capacity improvement funds	1,387,776	1,893,381	3,281,157
Repair and replacement funds	479,417	263,470	742,887
Total restricted assets	3,038,429	7,126,096	10,164,525
CAPITAL ASSETS			
Utility plant in service	37,502,224	65,485,117	102,987,341
Less: accumulated depreciation and amortization	16,885,497	19,917,980	36,803,477
Net utility plant in service	20,616,727	45,567,137	66,183,864
Construction in progress	8,049	6,985,599	6,993,648
Total capital assets	20,624,776	52,552,736	73,177,512
OTHER ASSETS			
Prepaid bond insurance	98,606	69,597	168,203
Total assets	24,967,529	62,633,183	87,600,712
DEFERRED OUTFLOWS OF RESOURCES			
Unamortized amounts from refunding of debt	333,433	77,798	411,231
Defined benefit pension plan contribution	89,942	86,984	176,926
Other post employment plan contribution	28,461	27,300	55,761
Collective deferred outflows related to pension plan	37,435	20,232	57,667
Collective deferred outflows related to post employment plan	66,017	58,502	124,519
Total deferred outflows	555,288	270,816	826,104
Total assets and deferred outflows	$ 25,522,817	$ 62,903,999	$ 88,426,816

See accompanying notes to financial statements.

Charles Town Utility Board
STATEMENT OF NET POSITION (CONTINUED)
June 30, 2020

LIABILITIES, DEFERRED INFLOWS AND NET POSITION

	Water Fund	Sewer Fund	Totals
CURRENT LIABILITIES (PAYABLE FROM CURRENT ASSETS)			
Accounts payable	$ 99,658	$ 176,009	$ 275,667
Accrued expenses	21,416	18,791	40,207
Customer deposits	102,264	145,325	247,589
Capital leases payable (current portion)	42,105	2,726	44,831
Total current liabilities (payable from current assets)	265,443	342,851	608,294
CURRENT LIABILITIES (PAYABLE FROM RESTRICTED ASSETS)			
Revenue bonds payable	953,043	1,276,171	2,229,214
Accrued revenue bond interest payable	138,177	50,667	188,844
Customer advances for construction	-	10,500,000	10,500,000
Total current liabilities (payable from restricted assets)	1,091,220	11,826,838	12,918,058
LONG-TERM LIABILITIES (NET OF CURRENT PORTION)			
Revenue bonds payable	17,047,624	22,873,772	39,921,396
Capital leases payable	48,267	9,604	57,871
Accrued expenses	70,634	58,058	128,692
Loan from Charles Town	414,380	111,071	525,451
Net other post employment benefit liability	259,682	251,688	511,370
Collective net pension liability	146,894	113,446	260,340
Total long-term liabilities	17,987,481	23,417,639	41,405,120
Total liabilities	19,344,144	35,587,328	54,931,472
DEFERRED INFLOWS OF RESOURCES			
Collective deferred inflows related to other post employment benefit plan	151,334	140,936	292,270
Collective deferred inflows related to pension plan	84,620	145,554	230,174
Total deferred inflows of resources	235,954	286,490	522,444
Total liabilities and deferred inflows	19,580,098	35,873,818	55,453,916
NET POSITION			
Net investment in capital assets	2,119,357	21,443,821	23,563,178
Restricted	2,900,252	3,411,000	6,311,252
Unrestricted	923,110	2,175,360	3,098,470
Total net position	5,942,719	27,030,181	32,972,900
Total liabilities, deferred inflows and net position	$ 25,522,817	$ 62,903,999	$ 88,426,816

See accompanying notes to financial statements.

Charles Town Utility Board

STATEMENT OF REVENUES, EXPENSES, AND CHANGES IN NET POSITION

For the year ended June 30, 2020

	Water Fund	Sewer Fund	Totals
OPERATING REVENUES			
Sales and services to customers	$ 3,957,691	$ 6,168,748	$ 10,126,439
Total operating revenues	3,957,691	6,168,748	10,126,439
OPERATING EXPENSES			
Personal services	1,199,876	1,087,918	2,287,794
Contractual services	74,982	273,803	348,785
Administrative and general	200,736	281,467	482,203
Materials and supplies	299,733	399,142	698,875
Utilities	130,145	322,282	452,427
Maintenance	758,668	1,001,745	1,760,413
Depreciation and amortization	1,159,387	1,557,388	2,716,775
Total operating expenses	3,823,527	4,923,745	8,747,272
Operating income	134,164	1,245,003	1,379,167
NONOPERATING REVENUES (EXPENSES)			
Interest revenue	44,947	47,503	92,450
Interest and fiscal charges	(623,016)	(519,449)	(1,142,465)
Rental income	456,903	-	456,903
Miscellaneous revenues	87,827	-	87,827
Total nonoperating revenues (expenses)	(33,339)	(471,946)	(505,285)
Income before contributed capital	100,825	773,057	873,882
CONTRIBUTED CAPITAL	35,512	249,115	284,627
Change in net position	136,337	1,022,172	1,158,509
Total net position at beginning of year	5,806,382	26,008,009	31,814,391
Total net position at end of year	$ 5,942,719	$ 27,030,181	$ 32,972,900

See accompanying notes to financial statements.

Charles Town Utility Board
STATEMENT OF CASH FLOWS
For the year ended June 30, 2020

	Water Fund	Sewer Fund	Totals
CASH FLOWS FROM OPERATING ACTIVITIES:			
Cash received from customers	$ 3,940,593	$ 6,207,490	$ 10,148,083
Cash paid for operation and maintenance expenses	(2,611,826)	(3,322,179)	(5,934,005)
Net cash provided by operations	1,328,767	2,885,311	4,214,078
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES:			
Acquisition and construction of capital assets	(149,686)	(6,927,762)	(7,077,448)
Proceeds from revenue bonds and long-term debt	11,190	16,584	27,774
Principal paid on revenue bonds and long-term debt	(977,501)	(1,268,370)	(2,245,871)
Interest paid on bonds, notes and leases payable	(556,411)	(427,990)	(984,401)
Bond administration fees paid	(5,526)	(70,774)	(76,300)
Customer advances for construction	-	10,500,000	10,500,000
Decrease (increase) in restricted assets, net	(142,995)	(4,112,524)	(4,255,519)
Contributed capital	35,512	249,115	284,627
Net cash used in capital and related financing activities	(1,785,417)	(2,041,721)	(3,827,138)
CASH FLOWS FROM INVESTING ACTIVITIES:			
Interest and miscellaneous non-operating income received	132,774	47,503	180,277
Rental income received	456,903	-	456,903
Repayment of City of Charles Town general fund advances	(10,180)	(2,636)	(12,816)
Net cash provided by investing activities	579,497	44,867	624,364
Net increase in cash and cash equivalents	122,847	888,457	1,011,304
CASH AND CASH EQUIVALENTS AT BEGINNING OF YEAR	559,450	1,208,965	1,768,415
CASH AND CASH EQUIVALENTS AT END OF YEAR	$ 682,297	$ 2,097,422	$ 2,779,719

See accompanying notes to financial statements.

Charles Town Utility Board
STATEMENT OF CASH FLOWS (CONTINUED)
For the year ended June 30, 2020

	Water Fund	Sewer Fund	Totals
Operating income	$ 134,164	$ 1,245,003	$ 1,379,167
Adjustments to reconcile operating income to net cash provided by operating activities:			
Depreciation and amortization expense	1,159,387	1,557,388	2,716,775
Capital asset disposition (expensed)	35,610	-	35,610
Decrease (increase) in receivables	46,514	76,151	122,665
Decrease (increase) in accrued revenues	(1,203)	17,431	16,228
Decrease (increase) in inventory	(4,257)	-	(4,257)
Decrease (increase) in deferred outflows	(75,753)	(36,036)	(111,789)
Increase (decrease) in accounts payable	9,263	37,967	47,230
Increase (decrease) in customer deposits	(123)	(11,401)	(11,524)
Increase (decrease) in accrued expenses	5,140	17,090	22,230
Increase (decrease) in collective net pension liability	(8,697)	(46,083)	(54,780)
Increase (decrease) in net OPEB liability	(52,113)	(49,755)	(101,868)
Increase (decrease) in deferred inflows	80,835	77,556	158,391
Net cash provided by operating activities	$ 1,328,767	$ 2,885,311	$ 4,214,078

SUPPLEMENTAL DISCLOSURES OF CASH FLOW INFORMATION

Noncash investing, capital, and financing transactions:
None

RECONCILIATION OF CASH

Cash per statement of net position	$ 682,297	$ 2,097,422	$ 2,779,719
Cash per statement of cash flows	$ 682,297	$ 2,097,422	$ 2,779,719

See accompanying notes to financial statements.

NOTE 1 - NATURE OF BUSINESS AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

NATURE OF BUSINESS

The Charles Town Utility Board (the "Utility Board") is a component unit of the Municipality of Charles Town, West Virginia. The Utility Board's purpose is furthering the preservation of the public health, comfort, and convenience of the residents of Charles Town, Ranson, and other franchised areas of Jefferson County, West Virginia, by providing water and sewer services to customers in its franchise area.

The Utility Board is governed by a board of directors who are appointed by the Municipality of Charles Town (3 appointments), the Jefferson County Commission (1 appointment), and the City of Ranson (1 appointment).

The Utility Board serves 6,292 water customers and 7,866 sewer customers. During the year ended June 30, 2020, the Utility Board's water customers increased by 83 and sewer customers increased by 1,586.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The Governmental Accounting Standards Board is the accepted standard setting body for establishing governmental accounting and financial reporting principles. Significant accounting policies of the Utility Board are described below.

Reporting Entity

For financial reporting purposes, the Utility Board is considered a component unit of the Municipality of Charles Town. The basic criteria for defining the Utility Board as a component unit of the Municipality of Charles Town is the financial interdependence, accountability for fiscal matters, significant influence on operations and ability to designate management.

The Utility Board is a combined water and sewer utility. For purposes of establishing user rates and charges and as required by its revenue bond issues, water and sewer are maintained as separate funds with separate books of account.

Basis of Presentation

The accounting policies of the Utility Board conform to accounting principles generally accepted in the United States of America as applicable to enterprise funds of governmental units. The Utility Board accounts for its operations in a manner similar to those often found in the private sector. The measurement focus is based upon the determination of net income. The costs (including depreciation) of providing utility services to customers on a continuing basis are recovered primarily through user charges. Periodic determination of revenues earned, expenses incurred and/or net income is appropriate for capital maintenance, public policy, management control and accountability.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

Basis of Accounting

Basis of accounting refers to when revenues and expenses are recognized in the accounts and reported in the financial statements. Revenues and expenses of the Utility Board are accounted for within two funds, both of which are enterprise funds. The Utility Board uses the accrual basis of accounting for its enterprise funds, under which revenues are recognized when they are earned and expenses are recognized when they are incurred.

Operating revenues and expenses consist of those revenues and expenses that result from the ongoing principal operations of the Utility Board. Operating revenues consist primarily of charges for services. Non-operating revenues and expenses consist of those revenues and expenses that are related to financing and investing types of activities and result from nonexchange or ancillary activities.

When both restricted and unrestricted resources are available for use, it is the Utility Board's policy to use restricted resources first, and then the unrestricted resources as needed. See Note 1 for information describing restricted assets.

Utility Plant

Utility plant purchased or acquired under capital leases by the Utility Board is stated at cost and utility plant contributed to the Utility Board by developers and customers is stated at acquisition value at the time received. Depreciation is provided on all utility plant in service based on the estimated useful lives, which range from 5 to 50 years, using the straight-line method.

The Utility Board's policy for capitalization of property, plant, and equipment is as follows:

Equipment	$ 15,000
Real Property	
Land	$ 1
Land improvements	$ 15,000
Buildings (Structures)	$ 1
Construction in Progress	$ 15,000

Expenditures for repairs and upgrading which materially add to the value or life of an asset are capitalized. Other maintenance and repair costs are expensed as incurred.

Interest cost incurred before the end of a construction period is recognized as an expense in the period in which the cost is incurred. No interest was capitalized during the year ended June 30,2020.

The depreciation expense on assets acquired under capital leases is included with deprecation expense on owned assets.

Cash and Cash Equivalents

For purposes of reporting the statement of cash flows, the Utility Board considers all cash accounts and all highly liquid debt instruments purchased with an original maturity of three months or less, to be cash equivalents.

Cash and cash equivalents at June 30, 2020 includes deposits of $10,145,038 at four banks. Deposits are FDIC insured and deposits in excess of FDIC limits are 100% collateralized with securities held by the financial institution in the name of the Utility Board.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

Restricted Assets

Assets whose use is limited include:

Debt service and debt service reserve funds represent funds required by debt covenants under the various debt ordinances. These funds are to be used to pay bond interest and principal.

Construction funds represent funds held by banks as trustees under bond ordinances or under developer contractual arrangements. These funds are to be used solely for payment of costs associated with the Utility Board's ongoing construction projects.

Capacity improvement funds are established by ordinance. Capacity improvement funds are kept apart from all other funds. Withdrawals and disbursements are made for improvements and upgrades to the system that maintain or increase capacity to service customers.

The repair and replacement funds represents funds held by a bank under the Utility Board's bond ordinances. Withdrawals may be made for replacement and emergency repairs.

Accounts Receivable and Bad Debts

The Utility Board's management periodically analyzes delinquent accounts of the water and sewer funds and uses the allowance method for accounting for bad debts. No allowance for doubtful accounts was deemed necessary by management at June 30, 2020. At June 30, 2020, accounts receivable for the water and sewer funds were $83,001 and $237,958, respectively, net of the allowance for doubtful accounts.

Revenue Recognition and Customer Rates and Charges

The Utility Board's policy is to recognize revenue on the accrual basis. The Utility Board accrues revenue earned but not billed. Revenue accrued but not billed for the water and sewer funds at June 30, 2020 were $345,817 and $547,606, respectively.

The Utility Board has adopted customer rates and charges established by the former Ranson Sewer Department and former Jefferson County Public Service District for their former respective franchise territories. Management is in the process of customer rate equalization for the Utility Board's total franchise territory and expects to accomplish full equalization in approximately a ten year period.

Deferred Outflows and Inflows of Resources

A deferred outflow of resources represents a consumption of net assets applicable to a future reporting period and will not be recognized as an expense until then. Deferred outflows from the refunding of debt will be recognized as interest expense in the appropriate reporting period. Deferred outflows related to the Utility Board's defined benefit pension and OPEB plans will be recognized based on actuarial determinations.

A deferred inflow of resources represents an acquisition of net assets applicable to a future reporting period and will not be recognized as revenue until then. Deferred inflows related to the Utility Board's defined benefit pension and OPEB plans will be recognized based on actuarial determinations.

Advance Refunding of Debt

Deferred amounts resulting from advance refunding of debt are being amortized by the straight-line method over the life of the new debt.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

Income Taxes

The Utility Board is exempt from federal and state income taxes as a subdivision of the Municipality of Charles Town.

Inventories

Inventories consist of expendable supplies and are accounted for on a first-in first-out basis. Inventories approximate fair market value at June 30, 2020.

Compensated Absences

The Utility Board's policy is to permit employees to accumulate earned but unused vacation benefits. The Utility Board fully recognizes the liability related to compensated absences in the funds. For the water and sewer funds, compensated absences at June 30, 2020, amounted to $70,634 and $58,058, respectively.

Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect certain reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Nonexchange Transactions

The Utility Board follows GASB Statement No. 33, *Accounting and Financial Reporting for Nonexchange Transactions* (Statement 33), which establishes accounting and reporting guidelines for government entities that gives (or receives) value without directly receiving (or giving) equal value in return. The Utility Board receives voluntary nonexchange transactions from donations of cash, property, lines and improvements. In addition, the Utility Board receives various capital grants from federal and state agencies. These donations are considered capital contributions in the Statement of Revenues, Expenses and Changes in Net Position.

Customer Deposits

Customer deposits are refunded after bills for service have been paid on time for twelve consecutive months.

Net Position

Net position presents the difference between assets/deferred outflows and liabilities/deferred inflows in the statement of net position. Net investment in capital assets is reduced by the outstanding balances of any borrowing used for the acquisition, construction, or improvement of those assets. Net position is reported as restricted when legal limitations are imposed on its use by legislation or external restrictions by creditors, grantors, laws or regulations of other governments. Unrestricted net position is net position that does not meet the definition of "net investment in capital assets, or restricted net position."

Interfund Transactions

Interfund transactions are reflected in the financial statements, as applicable, and recorded through "due to/due from" asset and liability accounts.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)

Pension

For purposes of measuring the net pension liability and deferred outflows/inflows of the resources related to the pension, and pension expense, information about the fiduciary net position of the Utility Board's Public Retirement System (PERS) and additions to/deduction from the Plan's fiduciary net position have been determined on the same basis as they are reported by the PERS. For this purpose, benefit payments (including refunds of employee contributions) are recognized when due and payable in accordance with benefit terms. Investments are reported at fair value.

Postemployment Benefits Other Than Pensions (OPEB)

For purposes of measuring the net OPEB liability and deferred outflows/inflows of the resources related to OPEB, and OPEB expense, information about the fiduciary net position of the West Virginia Retiree Health Benefits Trust (RHBT) and additions to/deductions from the RHBT's fiduciary net position have been determined on the same basis as they are reported by the RHBT. RHBT recognizes benefit payments when due and payable in accordance with the benefit terms. Investments are reported at fair value.

NOTE 2 - NEW ACCOUNTING PRONOUNCEMENTS

GASB Statement No. 87, *Leases*, aims to better meet the information needs of financial statement users by improving accounting and financial reporting for leases by governments. This Statement increases the usefulness of governments' financial statements by requiring recognition of certain lease assets and liabilities for leases that previously were classified as operating leases and recognized as inflows of resources or outflows of resources based on the payment provisions of the contract. It establishes a single model for lease accounting based on the foundational principle that leases are financings of the right to use an underlying asset. Statement 87 will be effective for the fiscal year ending June 30, 2022.

GASB Statement No. 91, *Conduit Debt Obligations* seeks to provide a single method of reporting conduit debt obligations by issuers and eliminate diversity in practice associated with (1) commitments extended by issuers, (2) arrangements associated with conduit debt obligations, and (3) related note disclosures. Statement 91 will be effective for fiscal year ending June 30, 2023.

GASB Statement No. 92, *Omnibus 2020*, enhances comparability in accounting and financial reporting and to improve the consistency of authoritative literature by addressing practice issues that have been identified during implementation and application of certain GASB pronouncements. The effective date for Statement No. 92 ranges from fiscal year ending June 30, 2021 to fiscal year ending June 30, 2023, depending upon the effective date of the specific GASB pronouncement being addressed.

GASB Statement No. 94, *Public-Private and Public-Public Partnerships and Availability Payment Arrangements* aims to improve financial reporting by addressing issues related to public-private and financial reporting for availability payment arrangements. Statement 94 will be effective for fiscal year ending June 30, 2023.

The Utility Board has not yet determined the effect these Statements will have on its financial statements.

NOTE 3 - FAIR VALUE OF FINANCIAL INSTRUMENTS

The Utility Board holds no investments and does not have an investment policy. The carrying amounts of the Utility Board's financial assets and liabilities approximate their fair value.

NOTE 4 - CASH

Cash consists of the following accounts and amounts at June 30, 2020:

	Water	Sewer	Total
Petty cash	$ 175	$ 125	$ 300
Operations and maintenance accounts	311,982	1,245,335	1,557,317
Security deposit accounts	93,132	149,346	242,478
Working capital reserve accounts	277,008	702,616	979,624
	$ 682,297	$ 2,097,422	$ 2,779,719

NOTE 5 - CAPITAL ASSETS

	Balance at June 30, 2019	Other Additions	Reductions	Balance at June 30, 2020
Capital Assets Not Depreciated				
Land and land rights	$ 1,691,721	$ -	$ -	$ 1,691,721
Construction in progress	312,984	6,843,538	(162,874)	6,993,648
Total Capital Assets Not Depreciated	2,004,705	6,843,538	(162,874)	8,685,369
Capital Assets Depreciated				
Utility plant in service	103,009,952	361,176	(2,075,508)	101,295,620
Less accumulated depreciation	(36,162,210)	(2,716,775)	2,075,508	(36,803,477)
Net Capital Assets Depreciated	66,847,742	(2,355,599)	-	64,492,143
Total Capital Assets	$68,852,447	$4,487,939	$ (162,874)	$73,177,512
Depreciation Expense	$ 2,716,775			

NOTE 6 - LONG-TERM DEBT

The following is a summary of bonds payable at June 30, 2020:

Bonds Payable - Water Fund

Issue	Maturity Date	Interest Rates	Balance June 30, 2019	Additions	Payments	Balance June 30, 2020	Due Within One Year
1987B	2026	0.00%	$ 87,080	$ -	$ 10,885	$ 76,195	$ 10,885
1988B	2028	0.00%	143,068	-	14,308	128,760	14,308
1989B	2029	0.00%	33,136	-	3,012	30,124	3,012
2002A	2039	5.80%	871,564	-	22,295	849,269	23,588
2002B	2042	0.00%	2,150,650	-	93,507	2,057,143	93,507
2010A	2031	2.00%	579,533	-	44,206	535,327	45,097
2010B	2031	2.00%	63,513	-	4,844	58,669	4,942
2013B	2043	4.70%	1,022,200	-	22,800	999,400	24,700
2014C	2033	2.50%-4.75%	685,000	-	40,000	645,000	40,000
2014E	2026	1.50%-3.40%	920,000	-	120,000	800,000	125,000
2015A	2030	1.50%-3.50%	1,477,350	-	88,200	1,389,150	91,350
2015B	2029	1.50%-4.00%	2,762,100	-	271,350	2,490,750	275,400
2016A	2046	1.60%-4.50%	7,230,000	-	170,000	7,060,000	170,000
2018A-7	2046	0.50%	870,106	-	31,098	839,008	31,254
Total Bonds Payable			$ 18,895,300	$ -	$ 936,505	17,958,795	$ 953,043
				Unamortized Premiums/ Discounts, Net		41,872	
						$ 18,000,667	

Maturities of water bonds payable for years succeeding June 30, 2020, are as follows:

Year	Principal	Interest	Total
2021	$ 953,043	$ 534,105	$ 1,487,148
2022	964,627	515,170	1,479,797
2023	996,360	493,187	1,489,547
2024	1,014,399	468,105	1,482,504
2025	1,030,398	440,131	1,470,529
2026-2030	4,369,298	1,782,440	6,151,738
2031-2035	2,948,105	1,206,860	4,154,965
2036-2040	2,770,792	740,197	3,510,989
2041-2045	2,487,935	313,239	2,801,174
2046	423,838	15,054	438,892
	$ 17,958,795	$ 6,508,488	$ 24,467,283

NOTE 6 - LONG-TERM DEBT (continued)

Bonds Payable - Sewer Fund

Issue	Maturity Date	Interest Rates	Balance June 30, 2019	Additions	Payments	Balance June 30, 2020	Due Within One Year
1988B	2028	0.00%	$ 75,864	$ -	$ 7,588	$ 68,276	$ 7,588
1998 Design	2019	2.00%	6,617	-	6,617	-	-
2000A	2021	2.00%	467,839	-	184,340	283,499	188,054
2010C	2041	0.00%	916,656	-	41,668	874,988	41,668
2010D	2041	0.00%	366,656	-	16,668	349,988	16,668
2011A	2041	0.00%	5,508,201	-	250,373	5,257,828	250,373
2013A	2044	0.50%	504,057	-	18,776	485,281	18,872
2013B	2043	4.70%	1,667,800	-	37,200	1,630,600	40,300
2014A	2046	0.50%	3,647,993	-	127,780	3,520,213	128,421
2014D	2028	3.00%-5.00%	1,040,000	-	95,000	945,000	100,000
2015A	2030	1.50%-3.50%	867,650	-	51,800	815,850	53,650
2015B	2030	1.50%-4.00%	647,900	-	63,650	584,250	64,600
2016B	2046	1.50%-4.00%	3,895,000	-	25,000	3,870,000	30,000
2018A-1	2029	0.00%	109,174	-	10,917	98,257	10,917
2018A-3	2038	1.00%	662,039	-	31,801	630,238	32,120
2018A-4	2030	0.00%	135,579	-	12,612	122,967	12,612
2018A-5	2032	0.00%	481,200	-	38,496	442,704	38,496
2018A-6	2039	0.00%	1,303,224	-	66,832	1,236,392	66,832
2018B	2033	2.25%-3.50%	3,065,000	-	175,000	2,890,000	175,000
Total Bonds Payable			$ 25,368,449	$ -	$ 1,262,118	$ 24,106,331	$ 1,276,171
				Unamortized Premiums/ Discounts, Net		43,612	
						$ 24,149,943	

Maturities of sewer bonds payable for years succeeding June 30, 2020, are as follows:

Year	Principal	Interest	Total
2021	$ 1,276,171	$ 411,320	$ 1,687,491
2022	1,295,572	393,691	1,689,263
2023	1,137,094	375,553	1,512,647
2024	1,152,868	358,137	1,511,005
2025	1,170,799	339,305	1,510,104
2026-2030	5,931,544	1,375,572	7,307,116
2031-2035	5,102,275	849,079	5,951,354
2036-2040	4,052,757	493,780	4,546,537
2041-2045	2,638,187	196,197	2,834,384
2046	349,064	7,473	356,537
	$ 24,106,331	$ 4,800,107	$ 28,906,438

NOTE 6 - LONG-TERM DEBT (continued)

Bonds Payable (continued)

Certain of the water and sewer revenue bonds require administrative fees to be paid to the governmental issuers. Administrative fees amounted to $2,545 and $67,260 for the water and sewer funds, respectively, for the year ended June 30, 2020. Administrative fees are not considered interest expense for rate establishment purposes and are not included in the above maturity schedules.

The water and sewer bond issues are secured by a lien on the revenues derived from the system and a statutory mortgage lien on the system.

The covenants contained in the water and sewer bond issues include a required debt service coverage ratio of 115%. The Utility Board met the required coverage for the year ended June 30, 2020.

The water and sewer bond issues require monthly deposits to the renewal and replacement fund equal to 2-1/2% of monthly gross revenues. The Utility Board's deposits, including necessary expenditures for renewals and replacements, exceeded this requirement for the year ended June 30, 2020.

NOTE 7 - LEASE AGREEMENTS

Capital Leases

The Charles Town Utility Board is the lessor of various equipment and vehicles under capital leases expiring at various times. The assets and liabilities under the capital leases are recorded at their present value of the minimum lease payments.

The lease obligations are secured by the leased equipment and vehicles. Depreciation of assets under capital leases is included in depreciation expense for the year ended June 30, 2020.

		Water Fund	Sewer Fund	
		Remaining Minimum (net of interest)	Remaining Minimum (net of interest)	
Leased Equipment	Expiration	Lease Payments	Lease Payments	Total
Various utility improvements, equipment, and vehicles	2021-2024			
Total capital leases payable at June 30, 2020		$ 90,372	$ 12,330	$ 102,702
Less: Current portion due in upcoming year		(42,105)	(2,726)	(44,831)
Long-term capital leases payable at June 30, 2020 (net of current portion)		$ 48,267	$ 9,604	$ 57,871

NOTE 7 - LEASE AGREEMENTS (continued)

Capital Leases (continued)

Estimated minimum future lease payments under the water capital leases as of June 30, 2020 are as follows:

Year	Principal	Interest	Total
2021	$ 42,105	$ 3,646	$ 45,751
2022	43,819	1,933	45,752
2023	2,192	148	2,340
2024	2,256	83	2,339
	$ 90,372	$ 5,810	$ 96,182

Estimated minimum future lease payments under the sewer capital lease as of June 30, 2020 is as follows:

Year	Principal	Interest	Total
2021	$ 2,726	$ 1,018	$ 3,744
2022	2,951	793	3,744
2023	3,195	549	3,744
2024	3,458	286	3,744
	$ 12,330	$ 2,646	$ 14,976

NOTE 8 - CHANGES IN LONG-TERM LIABILITIES OTHER THAN BONDS

	Balance June 30, 2019	Additions	Reductions	Balance June 30, 2020
Note payable	$ 1,997	$ -	$ 1,997	$ -
Capital leases payable	120,178	27,774	45,250	102,702
Loan from Charles Town	538,267	-	12,816	525,451
Accrued compensated absences	107,815	20,877	-	128,692
Collective net pension liability	315,120	234,197	288,977	260,340
Net other post employment benefit liability	613,238	124,532	226,400	511,370
Total	$ 1,696,615	$ 407,380	$ 575,440	$ 1,528,555

NOTE 9 - EMPLOYEE RETIREMENT SYSTEM AND PLAN

Plan Description, Contribution Information, and Funding Policies

The Utility Board participates in the West Virginia Public Employees Retirement System (PERS), a state-wide, cost-sharing, multiple-employer defined benefit plan on behalf of Utility Board employees. The system is administered by agencies of the State of West Virginia and funded by contributions from participants, employers, and State appropriations, as necessary.

PERS is administered by the Consolidated Public Retirement Board (CPRB), which acts as a common investment and administrative agent for all of the participating employers. CPRB issues publicly available reports that include a full description of the pension plan regarding benefit provisions, assumptions and membership information that can be found on the CPRB website at www.wvretirement.com.

The following is a summary of eligibility factors, contribution methods, and benefit provisions:

Eligibility to participate:	All Utility Board full-time employees, except those covered by other pension plans
Authority establishing contribution obligations and benefit provisions:	West Virginia State Code Section 5-10d
Tier 1 Plan member's contribution rate:	4.50% (Employees hired before July 1, 2015)
Tier 2 Plan member's contribution rate:	6.00% (Employees hired after July 1, 2015)
Utility Board's contribution rate:	10.00% for fiscal year 2020
Period required to vest:	5 years for Tier 1 and 10 years for Tier 2
Benefits and eligibility for distribution:	
	Tier 1 A member who has attained age 60 and has earned 5 years or more of contributing service or age 55 if the sum of his/her age plus years of credited service is equal to or greater than 80. The final average salary (three highest consecutive years in the last 15) times the years of service times 2% equals the annual retirement benefit.
	Tier 2 Qualification for normal retirement is age 62 with 10 years of service or at least age 55 plus service years equal to 80 or greater. The final average salary is the average of the five consecutive highest annual earnings years out of the last fifteen years. The final average salary times the years of service times 2% equals the annual retirement benefit.
Deferred retirement portion:	No
Provisions for:	
Cost of living	No
Death benefits	Yes

NOTE 9 - EMPLOYEE RETIREMENT SYSTEM AND PLAN (continued)

Trend Information

Fiscal Year	Annual Pension Cost	Percentage Contributed
2020	$176,926	100%
2019	$155,564	100%
2018	$137,439	100%

PERS issues a publicly available financial report that includes financial statements and required supplementary information. That information may be obtained by writing to the Public Employees' Retirement System, 4101 MacCorkle Avenue, SE, Charleston, WV 25304.

Pension Liability, Pension Expense, Deferred Outflows of Resources, and Deferred Inflows of Resources Related to Pension

At June 30, 2020, the Utility Board reported the following liability for its proportionate share of the net pension liability. The net pension liability was measured as of June 30, 2019, and the total pension liability used to calculate the net pension liability was determined by an actuarial valuation as of that date. The Utility Board's proportion of the net pension liability was based on a projection of the Utility Board's long-term share of contributions to the pension plan relative to the projected contributions of all participating governments, actuarially determined. At June 30, 2020, the Utility Board reported the following proportion:

Amount for proportionate share of net pension liability	$260,340
Percentage for proportionate share of net pension liability	0.121081%
Increase/(decrease) % from prior proportion measured	(0.00094)%

For the year ended June 30, 2020, the Utility Board recognized the following pension expense:

	Water	Sewer	Total
Pension expense	$57,341	$55,161	$112,502

NOTE 9 - EMPLOYEE RETIREMENT SYSTEM AND PLAN (continued)

Pension Liability, Pension Expense, Deferred Outflows of Resources, and Deferred Inflows of Resources Related to Pension (continued)

The Utility Board reported deferred outflows of resources and deferred inflows of resources related to the pension plan from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Net difference between projected and actual earnings on pension plan investments	$ -	$ 94,100
Difference between expected and actual experience	10,076	22,738
Changes in proportion and differences between Utility Board contributions and proportionate share of contributions	47,591	65,543
Change in assumptions	-	47,793
Utility Board contributions subsequent to the measurement date	176,926	-
	$ 234,593	$ 230,174

The amount reported as deferred outflows of resources related to the pension plan resulting from Utility Board contributions subsequent to the measurement date will be recognized as a reduction of the net pension liability in the year ended June 30, 2021. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to the pension plan will be recognized in pension expense as follows:

Year ended June 30	
2021	$ (40,538)
2022	(146,423)
2023	(12,924)
2024	27,378
Total	$ (172,507)

NOTE 9 - EMPLOYEE RETIREMENT SYSTEM AND PLAN (continued)

Actuarial Assumptions

The total pension liability was determined by an actuarial valuation as of July 1, 2018, and rolled forward to June 30, 2019, which is the measurement date, using the following actuarial assumptions, applied to all periods included in the measurement.

Actuarial cost method	Individual entry age normal cost with level percentage of payroll
Asset valuation method	Fair value
Amortization method	Level dollar, fixed period
Amortization period	Through Fiscal Year 2035
Actuarial assumptions:	
Investment rate of return	7.50%
Projected salary increases	3.35-6.0%%, including inflation
Inflation rate	3.00%
Discount rate	7.50%
Mortality rates	Active-100% of Pub-2010 General Employees table, below-median, headcount weighted, projected with scale MP-2018 Retired healthy males - 108% of Pub-2010 General Retiree Male table, below-median, headcount weighted, projected with scale MP-2018 Retired healthy females - 122% of Pub-2010 General Retiree Male table, below-median, headcount weighted, projected with scale MP-2018 Disabled males - 118% of Pub 2010 General/ Teachers Disabled Male table, below-median headcount weighted, projected with scale MP-2018 Disabled females - 118% of Pub 2010 General/ Teachers Disabled Male table, below-median headcount weighted, projected with scale MP-2018
Withdrawal rates	
State	2.28-45.63%%
Non-state	2.50-35.88%%
Disability rates	0.005-0.054%%
Retirement rates	12 - 100%%
Date range in most recent experience study	2013-2018

NOTE 9 - EMPLOYEE RETIREMENT SYSTEM AND PLAN (continued)

Actuarial Assumptions (continued)

The long-term expected rate of return on pension plan investments was determined using a building-block method in which estimates of expected real rates of returns (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Rates summarized in the following table as of June 30, 2019, include the inflation component and were used for the defined benefit plan:

Asset Class	Long-Term Expected Rate of Return	PERS Target Asset Allocation
US Equity	5.80%	27.50%
International Equity	7.70%	27.50%
Private Equity	8.80%	10.00%
Fixed Income	3.30%	15.00%
Real Estate	6.10%	10.00%
Hedge Funds	4.40%	10.00%
		100.00%

Discount Rate

The discount rate used to measure the total pension liability was 7.5 percent for the defined benefit plan. The projection of cash flows used to determine the discount rate assumed that employer contributions will continue to follow the current funding policies. Based on those assumptions, the fiduciary net position for the defined benefit pension plan was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rates of return on pension plan investments were applied to all periods of projected benefit payments to determine the total pension liability of the plan.

The following chart presents the sensitivity of the net pension liability to changes in the discount rate, calculated using the discount rates as used in the actuarial evaluation, and what the net pension liability would be if it were calculated using a discount rate that is 1 percentage point lower or 1 percentage point higher than the current rate:

	1% Decrease 6.50%	Current Discount Rate 7.50%	1% Increase 8.50%
Utility Board's proportionate share of net pension liability	$ 1,212,684	$ 260,340	$ (545,284)

Detailed information about the pension plan's fiduciary net position is available in the separately issued financial report available at the Consolidated Public Retirement Board's website at www.wvretirement.com. That information can also be obtained by writing to the West Virginia Consolidated Public Retirement Board, 4101 MacCorkle Avenue SE, Charleston, WV 25304.

NOTE 9 - EMPLOYEE RETIREMENT SYSTEM AND PLAN (continued)

Summary of Deferred Outflow/Inflow Balances

	Total	Water	Sewer
Difference between expected and actual experience	$ (12,662)	$ (2,840)	$ (9,822)
Net difference between projected and actual earnings on pension plan investments	(94,100)	(24,415)	(69,685)
Changes in proportion and differences between Utility Board contributions and proportionate share of contributions	(17,952)	4,430	(22,382)
Change in assumptions	(47,793)	(24,360)	(23,433)
Utility Board contributions subsequent to the measurement date	176,926	89,942	86,984
	$ 4,419	$ 42,757	$ (38,338)

NOTE 10 - POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS (OPEB)

General Information about the OPEB Plan

Plan Description

The Utility Board contributes to the West Virginia Other Postemployment Benefit Plan (The Plan), a cost-sharing, multiple-employer defined benefit postemployment healthcare plan. The financial activities of the Plan are accounted for in the West Virginia Retiree Health Benefit Trust Fund (RHBT), a fiduciary fund of the State of West Virginia. The Plan is administered by a combination of the West Virginia Public Employees Insurance Agency (PEIA) and the RHBT staff. Plan benefits are established and revised by PEIA and the RHBT management with approval of the Finance Board. The Finance Board is comprised of nine members. Finance Board members are appointed by the Governor, serve a term of four years and are eligible for reappointment. The State Department of Administration cabinet secretary serves as Chairman of the Board. Four members represent labor, education, public employees and public retirees. The four remaining members represent the public at large. The Plan had approximately 43,000 policyholders and 95,000 covered lives at June 30, 2019. The RHBT audited financial statements and actuarial reports can be found on the PEIA website at www.peia.wv.gov. You can also submit your questions in writing to the West Virginia Public Employees Insurance Agency, 601 57th Street, SE, Suite 2, Charleston WV 25304.

Benefits Provided

The Plan provides medical and prescription drug insurance and life insurance. The medical and prescription drug insurance is provided through two options: 1) Self-Insured Preferred Provider Benefit Plan (primarily for non-Medicare-eligible retirees and spouses) and 2) External Managed Care Organizations (primarily for Medicare-eligible retirees and spouses).

NOTE 10 - POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS (OPEB) (continued)

Contributions

Paygo premiums are established by the Finance Board annually. All participating employers are required by statute to contribute this premium to the RHBT at the established rate for every active policyholder per month. The active premiums subsidized the retirees' health care by approximately $152 million for the fiscal year ended June 30, 2019. Contributions to the OPEB plan from the Utility Board were as follows:

Year	Water	Sewer	Total
2020	$ 28,461	$ 27,300	$ 55,761
2019	$ 32,849	$ 30,971	$ 63,820
2018	$ 32,037	$ 9,735	$ 41,772

OPEB Liabilities, OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB

At June 30, 2020, the Utility Board reported a liability of $259,682 and $251,688 for the water and sewer funds, respectively, for its proportionate share of the net OPEB liability. The net OPEB liability, deferred inflows and outflows of resources, and OPEB expense were determined by an actuarial valuation date as of June 30, 2018, rolled forward to June 30, 2019, which is the measurement date. The Utility Board's proportion of the net OPEB liability was based on a projection of the Utility Board's long-term share of contributions to the OPEB plan relative to the projected contributions of all participating governments, actuarially determined. At June 30, 2019, the Utility Board's proportionate share was 0.030821508%, which was an increase of 0.002238111% from its proportion measured as of June 30, 2018.

For the year ended June 30, 2020, the Utility Board recognized OPEB expense of $7,822 and $7,503 for the water and sewer funds, respectively.

The Utility Board reported deferred outflows of resources and deferred inflows of resources related to OPEB from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Changes in proportion and differences between Utility Board contributions and proportionate share of contributions	$ 121,486	$ 106,738
Change in assumptions	-	103,710
Net difference between projected and actual investment earnings on OPEB plan investments	2,907	8,424
Difference between expected and actual experience	-	59,640
Reallocation of opt-out employer change in proportionate share	126	13,758
District contributions subsequent to the measurement date	55,761	-
	$ 180,280	$ 292,270

NOTE 10 - POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS (OPEB) (continued)

***OPEB Liabilities, OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB* (continued)**

The amount reported as deferred outflows of resources related to OPEB resulting from Utility Board contributions subsequent to the measurement date will be recognized as a reduction of the net OPEB liability in the year ending June 30, 2020. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized in OPEB expense as follows:

Year Ended June 30:	
2021	$ (67,461)
2022	(61,241)
2023	(33,837)
2024	(5,212)
Total	$ (167,751)

Actuarial Assumptions

The total OPEB liability was determined by an actuarial valuation as of June 30, 2018, using the following actuarial assumptions, applied to all periods included in the measurement, unless otherwise specified.

Inflation rate	2.75%
Wage inflation	4.00%
Salary increases	Dependent upon pension system, ranging from 3.0% to 6.5%, including inflation.
Investment rate of return	7.15%, net of OPEB plan investment expense, including inflation.
Healthcare cost trend rates	Actual trend used for fiscal year 2019. For fiscal years on and after 2020, trend starts at 8.00% and 10.00% for pre and post-Medicare, respectively, and gradually decreases to an ultimate trend of 4.50%. Excess trend rate of 0.13% and 0.00% for pre and post-Medicare, respectively, is added to healthcare trend rates pertaining to per capita claims beginning in 2022 to account for the excise tax.
Actuarial Cost Method	Entry age normal

NOTE 10 - POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS (OPEB) (continued)

***OPEB Liabilities, OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB* (continued)**

Actuarial Assumptions (continued)

Amortization Method	Level percentage of payroll, closed
Remaining Amortization Period	20 year closed period as of June 30, 2017
Mortality Rates	Active - 100% of RP-2000 Non-Annuitant, Scale AA fully generational Retired healthy males - 110% of RP-2000 Healthy Annuitant, Scale AA fully generational Retired healthy females - 101% of RP-2000 Healthy Annuitant, Scale AA fully generational Disabled males - 96% of RP-2000 Disabled Annuitant, Scale AA fully generational Disabled females - 107% of RP-2000 Disabled Annuitant, Scale AA fully generational

The actual assumptions used in the valuation were based on the results of an actuarial experience study for the period July 1, 2010 through June 30, 2015.

The long-term rates of return on OPEB plan investments are determined using a building-block method in which estimates of future real rates of returns (expected returns, net of OPEB plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentages and by adding expected inflation. The strategic asset allocation consists of 55% equity, 15% fixed income, 10% private equity, 10% hedge fund and 10% real estate invested. Short-term assets used to pay current year benefits and expenses are invested with the WVBTI. Best estimates of long-term geometric rates are summarized in the following table:

Asset Class	Long-Term Expected Real Rate of Return
Large Cap Domestic	17.0%
Non-Large Cap Domestic	22.0%
International Qualified	22.6%
International Non-Qualified	24.3%
International Equity	26.2%
Short-Term Fixed	0.5%
Total Return Fixed Income	6.7%
Core Fixed Income	0.1%
Hedge Fund	5.7%
Private Equity	19.6%
Real Estate	8.3%
Opportunistic Income	4.8%
Cash	0.0%

NOTE 10 - POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS (OPEB) (continued)

***OPEB Liabilities, OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB* (continued)**

Discount Rate

The discount rate used to measure the OPEB liability was 7.15%. The projection of cash flows used to determine the discount rate assumed that contributions would be made at rates equal to the actuarially determined contribution rates, in accordance with prefunding and investment policies. The OPEB plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on OPEB plan investments was applied to all periods of projected benefit payments to determine the total OPEB liability. Discount rates are subject to change between measurement dates.

Sensitivity of the Utility Board's Proportionate Share of the Net OPEB Liability to Changes in the Discount Rate

The following chart presents the Utility Board's proportionate share of the net OPEB liability, as well as what the proportionate share of the net OPEB liability would be if it were calculated using a discount rate that is 1 percentage point lower or 1 percentage point higher than the current discount rate:

	1% Decrease 6.15%	Discount Rate 7.15%	1% Increase 8.15%
Net OPEB Liability	$ 610,305	$ 511,370	$ 428,578

Sensitivity of the Utility Board's Proportionate Share of the Net OPEB Liability to Changes in the Healthcare Cost Trend Rates

The following chart presents the Utility Board's proportionate share of the net OPEB liability, as well as what the proportionate share of the net OPEB liability would be if it were calculated using healthcare cost trend rates that are 1 percentage point lower or 1 percentage point higher than the current healthcare cost trend rates described in the actuarial assumptions:

	1% Decrease	Healthcare Cost Trend Rates	1% Increase
Net OPEB Liability	$ 412,346	$ 511,370	$ 631,536

OPEB Plan Fiduciary Net Position

Detailed information about the OPEB plan's fiduciary net position is available in the separately issued financial report available at the West Virginia Public Employee Insurance Agency's website at peia.wv.gov. That information can also be obtained by writing to the West Virginia Public Employee Insurance Agency, 601 57th Street, Suite 2, Charleston, WV 25304.

NOTE 10 - POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS (OPEB) (continued)

***OPEB Liabilities, OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB* (continued)**

Summary of Deferred Outflow/Inflow Balances

	Total	Water	Sewer
Difference between expected and actual experience	$ (59,640)	$ (29,872)	$ (29,768)
Net difference between projected and actual earnings on OPEB plan investments	(5,517)	(2,779)	(2,738)
Changes in proportion and differences between Utility Board contributions and proportionate share of contributions	14,748	2,087	12,661
Change in assumptions	(103,710)	(47,795)	(55,915)
Reallocation of opt-out employer change in proportionate share	(13,632)	(6,958)	(6,674)
Utility Board contributions subsequent to the measurement date	55,761	28,461	27,300
	$(111,990)	$ (56,856)	$ (55,134)

NOTE 11 - RISK MANAGEMENT

The Utility Board is exposed to various risks of loss related to torts, theft of, damage to, and destruction of assets; errors and omissions; injuries to employees; and natural disasters. The Utility Board participates in several risk management programs administered by the State of West Virginia.

NOTE 12 - LOAN FROM MUNICIPALITY OF CHARLES TOWN

The Municipality of Charles Town loaned the Utility Board $640,795 to finance certain water and sewer construction projects. The loans bear no interest and are generally being repaid over a 50 year term. Annual required loan payments amount to $12,816. The loan balances are $414,380 and $111,071 for the water and sewer departments, respectively, at June 30, 2020.

NOTE 13 - RESTRICTED NET ASSETS

Restricted net assets reflect that portion of total net assets legally or contractually segregated for a specific future use. The following amounts represent restricted net assets at June 30, 2020:

Cash and temporary investments	
Debt service and debt service reserve funds	$ 2,476,052
Repair and replacement funds	742,887
Capacity improvement funds	3,281,157
Accrued interest	(188,844)
Total	$ 6,311,252

NOTE 14 - COMMITMENTS AND CONTINGENCIES

Alternate Mainline Extension Agreement

On February 21, 2020, the Utility Board entered into an alternate mainline extension agreement with a customer to construct certain sewer improvements (primarily a sewer line extension) to provide sewer service to the customer.

The customer agreed to pay the costs of the sewer improvements and the Utility Board agreed to construct the improvements.

The customer deposited $10,500,000 with the Utility Board to fund the construction of the sewer improvements (customer advances for construction).

Construction of the sewer improvements is in progress with $6,756,000 of costs incurred as of June 30, 2020. Construction is expected to be completed in the fiscal year ending June 30, 2021.

The customer will be reimbursed for the initial advance to the extent of net revenues derived from future customer connections to the sewer extension for a 25 year period. Any unreimbursed advance thereafter will convert to contributed capital.

NOTE 15 - CONTRIBUTED CAPITAL

A summary of contributed capital for the year ended June 30, 2020 is as follows:

	Water	Sewer	Total
Capacity improvement fees received from customers and developers	$ 30,912	$ 245,465	$ 276,377
Tap fees received from customers and developers	4,600	3,650	8,250
Total	$ 35,512	$ 249,115	$ 284,627

NOTE 16 - UNCERTAINTIES RELATED TO THE GLOBAL PANDEMIC

During the year ended June 30, 2020, local, U.S. and world governments encouraged self-isolation to curtail the spread of the global pandemic, coronavirus disease (COVID-19), by mandating temporary work stoppage in many sectors and imposing limitations on travel, size and duration of group meetings. Most industries have, and continue to, experience disruption to business operations and the impact of reduced consumer spending, including the Utility Board. There is unprecedented uncertainty surrounding the duration of the pandemic, its potential economic ramifications, and any government actions to mitigate them. Accordingly, while it is difficult to quantify the effects on the Utility Board, it is reasonably possible there will be an effect on the Utility Board's operations in fiscal year 2021 and beyond.

NOTE 17 - SUBSEQUENT EVENTS

The Utility Board has evaluated all subsequent events through January 20, 2021, the date the financial statements were available to be issued.

On July 14, 2020, the Utility Board issued Series 2020A Refunding Revenue Bonds in the amount of $4,575,000 to refund the outstanding Series 2013B, 2014C, 2014D, and 2014E Revenue Bonds. The refunding will significantly lower annual bond debt service costs and slightly reduce the term of the 2020A bonds compared to the average remaining terms of the refunded bonds.

REQUIRED SUPPLEMENTARY INFORMATION

Charles Town Utility Board
SCHEDULE OF THE UTILITY BOARD'S PROPORTIONATE SHARE OF THE COLLECTIVE NET PENSION LIABILITY
June 30, 2020

Public Employees Retirement System
Last 10 Fiscal Years

	2020	2019	2018	2017	2016	2015
Utility Board's proportionate share of the net pension liability (%)	0.121081%	0.122021%	0.091775%	0.09351%	0.0858%	0.0802%
Utility Board's proportionate share of the net pension liability ($)	$ 260,340	$ 315,120	$ 396,145	$ 859,464	$ 479,022	$ 295,926
Utility Board's covered payroll	$ 1,764,571	$ 1,777,610	$ 1,249,466	$ 1,244,131	$ 1,289,097	$ 1,163,400
Utility Board's proportionate share of net pension liability as a % of its covered payroll	14.75%	17.73%	31.71%	69.08%	37.16%	25.44%
Plan fiduciary net position as a percentage of the total pension liability	96.99%	96.33%	99.56%	86.11%	91.29%	93.98%

Note: This data will be presented prospectively until ten years is accumulated.
The amounts presented for each fiscal year were determined as of June 30th.

Charles Town Utility Board
SCHEDULE OF THE UTILITY BOARD'S PENSION PLAN CONTRIBUTIONS
June 30, 2020

Public Employees Retirement System
Last 10 Fiscal Years

	2020	2019	2018	2017	2016	2015
Contractually required contribution	$ 176,926	$ 155,565	$ 137,439	$ 149,296	$ 174,028	$ 162,876
Contributions in relation to the contractually required contribution	(176,926)	(155,565)	(137,439)	(149,296)	(174,028)	(162,876)
Contribution deficiency (excess)	$ -	$ -	$ -	$ -	$ -	$ -
Utility Board's covered payroll	$ 1,764,571	$ 1,555,646	$ 1,249,446	$ 1,244,131	$ 1,289,097	$ 1,163,400
Contributions as a percentage of covered payroll	10.0%	10.0%	11.0%	12.0%	13.5%	14.0%

Note: This data will be presented prospectively until ten years is accumulated.
The amounts presented for each fiscal year were determined as of June 30th.

Charles Town Utility Board
SCHEDULE OF THE UTILITY BOARD'S PROPORTIONATE SHARE OF THE NET OPEB LIABILITY
For the year ended June 30, 2020

Public Employees Insurance Agency

	2020	2019	2018	2017
Utility Board's proportion of the net OPEB liability	0.030821508%	0.028583397%	0.018956336%	0.022773022%
Utility Board's proportionate share of the net OPEB liability	$ 511,370	$ 613,238	$ 466,134	$ 565,528
Utility Board's covered-employee payroll	$ 1,764,571	$ 1,777,610	$ 1,248,678	$ 1,173,454
Utility Board's proportionate share of the net OPEB liability as a percentage of its covered-employee payroll	28.98%	34.50%	37.33%	48.19%
Plan fiduciary net position as a percentage of the total OPEB liability	39.69%	30.98%	25.10%	21.64%

Note - This data will be presented prospectively until ten years is accumulated.
The amounts presented for each fiscal year were determined as of June 30th.

Charles Town Utility Board
SCHEDULE OF THE UTILITY BOARD'S OPEB PLAN CONTRIBUTIONS
For the year ended June 30, 2020

Public Employees Insurance Agency

	2020	2019	2018	2017
Contractually required contribution	$ 55,761	$ 63,820	$ 41,772	$ 38,936
Contributions in relation to the contractually required contribution	(55,761)	(63,820)	(41,772)	(38,936)
Contribution deficiency (excess)	$ -	$ -	$ -	$ -
Utility Board's covered-employee payroll	$ 1,764,571	$ 1,555,565	$ 1,248,678	$ 1,173,454
Contributions as a percentage of covered-employee payroll	3.16%	4.10%	3.35%	3.32%

Note - This data will be presented prospectively until ten years is accumulated.
The amounts presented for each fiscal year were determined as of June 30th.

PERS

Mortality tables were updated during the measurement year ended June 30, 2019.

OPEB

No significant changes during the year.

PERRY & Associates
Certified Public Accountants, A.C.

313 Second St.
Marietta, OH 45750
740.373.0056

1907 Grand Central Ave.
Vienna, WV 26105
304.422.2203

150 West Main St.
St. Clairsville, OH 43950
740.695.1569

1310 Market Street, Suite 300
Wheeling, WV 26003
304.232.1358

749 Wheeling Ave., Suite 300
Cambridge, OH 43725
740.435.3417

INDEPENDENT AUDITOR'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING AND ON COMPLIANCE AND OTHER MATTERS REQUIRED BY *GOVERNMENT AUDITING STANDARDS*

January 20, 2021

Charles Town Utility Board
Jefferson County
661 South George Street, Suite 101
Charles Town, West Virginia 25414

To the Board of Directors:

We have audited in accordance with auditing standards generally accepted in the United States and the Comptroller General of the United States' *Government Auditing Standards*, the financial statements of the Charles Town Utility Board, a component unit of the Municipality of Charles Town, Jefferson County, West Virginia, (the Utility Board) as of and for the year ended June 30, 2020, and the related notes to the financial statements, which collectively comprise the Utility Board's basic financial statements and have issued our report thereon dated January 20, 2021, wherein we noted the financial impact of COVID-19 and the ensuing emergency measures will impact subsequent periods of the Utility Board.

Internal Control Over Financial Reporting

As part of our financial statement audit, we considered the Utility Board's internal control over financial reporting (internal control) as a basis for designing audit procedures appropriate in the circumstances to the extent necessary to support our opinions on the financial statements, but not to the extent necessary to opine on the effectiveness of the Utility Board's internal control. Accordingly, we have not opined on it.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, when performing their assigned functions, to prevent, or detect and timely correct misstatements. A *material weakness* is a deficiency, or a combination of internal control deficiencies resulting in a reasonable possibility that internal control will not prevent or detect and timely correct a material misstatement of the Utility Board's financial statements. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all internal control deficiencies that might be material weaknesses or significant deficiencies. Given these limitations, we did not identify any deficiencies in internal control that we consider material weaknesses. However, unidentified material weaknesses may exist.

Tax - Accounting – Audit – Review – Compilation – Agreed Upon Procedure – Consultation – Bookkeeping – Payroll – Litigation Support – Financial Investigations
Members: American Institute of Certified Public Accountants
• Ohio Society of CPAs • West Virginia Society of CPAs • Association of Certified Fraud Examiners • Association of Certified Anti-Money Laudering Specialists •

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Compliance and Other Matters

As part of reasonably assuring whether the Utility Board's financial statements are free of material misstatement, we tested its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could directly and materially affect the financial statements. However, opining on compliance with those provisions was not an objective of our audit and accordingly, we do not express an opinion. The results of our tests disclosed no instances of noncompliance or other matters we must report under *Government Auditing Standards.*

Purpose of this Report

This report only describes the scope of our internal control and compliance testing and our testing results, and does not opine on the effectiveness of the Utility Board's internal control or on compliance. This report is an integral part of an audit performed under *Government Auditing Standards* in considering the Utility Board's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.



Perry and Associates
Certified Public Accountants, A.C.
Marietta, Ohio

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX G
PARKVIEW WOODLAWN REPORT

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

June 3, 2020

Ms. Jane Arnett, Utility Manager
Charles Town Utility Board
661 S. George Street
Charles Town, WV 25414

Re: Charles Town Utility Board
Parkview - Woodlawn Project
Top Level Budget

Ms. Arnett,

At the request of the Board, RK&K reviewed the available information on the existing sewer collection system and prepared a "top level" budget for decommissioning the Parkview MHP Pump Station and redirecting flow into the new Route 9 Sewer Project. The "top level" budget also included evaluating the Jett's Farm Pump Station and decommissioning of the Lloyd's Flatt and Moose Lodge Pump Stations.

Enclosed with this letter is a drawing identifying the proposed modifications to redirect sewage into the new Route 9 Sewer Project and to decommission the two pump stations, as well as probable construction cost.

Below is a summary of RK&K's findings:

SEWER SERVICE

As shown on the enclosed documents, options were considered for each component of the conveyance system between the Parkview MHP Pump Station and the Moose Lodge Pump Station. Brief descriptions for each of the various options are as follows:

Parkview MHP Pump Station Decommission

This option consists of the demolition of the Parkview MHP Pump Station and the construction of approximately 840 LF of 6" gravity sewer line and 4 manholes from the Parkview MHP Pump Station location to the Woodlawn Pump Station. The cost for this option is $190,000, as identified within the enclosed cost estimate.

Jett's Farm Option 1: Pump Station and Force Main Modifications

The Modified Flowing Spring Project includes redirecting flow from the northern pump stations (Burr East, Burr Royal, Burr West, Driswood, Job Corps, Jefferson High School) to the new War Admiral Pump Station instead of continuing towards the Jett's Farm Pump Station. This will greatly reduce the flow at the Jett's Farm Pump Station, and therefore, modifications to the pump station and force main must be made.

This option consists of replacing the pumps, controls, piping, and valve vault at the Jett's Farm Pump Station. This option also includes the installation of approximately 4,300 LF of 3" HDPE force main inserted inside the existing 6" force main from the Jett's Farm Pump Station to the discharge manhole (MH 37) on War Admiral Boulevard. Pump and haul will be utilized while the existing 6" force main is slip lined with the new 3" force main. Also included with this option is connecting the single residential grinder unit at 2466 North Mildred Street into the new 3" HDPE force main. The cost for this option is $560,000, as identified within the enclosed cost estimate.

Jett's Farm Option 2: Pump Station and Force Main Modifications

The Modified Flowing Spring Project includes redirecting flow from the northern pump stations (Burr East, Burr Royal, Burr West, Driswood, Job Corps, Jefferson High School) to the new War Admiral Pump Station instead of continuing towards the Jett's Farm Pump Station. This will greatly reduce the flow at the Jett's Farm Pump Station, and therefore, modifications to the pump station and force main must be made.

This option consists of replacing the pumps, controls, piping, and valve vault at the Jett's Farm Pump Station and installation of approximately 2,200 LF of 3" force main from the Jett's Farm Pump Station through a casing under Route 9 to the new Route 9 force main. There is an old existing casing that was abandoned under Charles Town Road South of Jett's Farm Pump Station, but no existing casings are present under Route 9.

This option also includes abandoning the existing 6" force main from the Jett's Farm Pump Station to the residence at 2466 North Mildred Street and installing a grinder pump and 870 LF of 1.5" force main from the residence to MH 37. The cost for this option is $580,000, as identified within the enclosed cost estimate.

Lloyd's Flat Pump Station Decommission

This component is integral to each of the options previously discussed and consists of the demolition of the Lloyd's Flat Pump Station and the construction of approximately 90 LF of 8" gravity sewer line from the existing manhole MH 45 beside the Lloyd's Flat Pump Station to the new Route 9 manhole SMH CH-06. This option also includes abandoning the existing 6" force main to MH 45A. The cost for this option is $100,000, as identified within the enclosed cost estimate.

Moose Lodge Option 1: Pump Station Decommission and Gravity Installation

The Lloyd's Flat Pump Station Decommission redirects flow into the new Route 9 Sewer Project, so that the Moose Lodge Pump Station will only serve 1 industrial and 4 commercial customers. This option consists of the demolition of the Moose Lodge Pump Station and the construction of approximately 1,820 LF of 8" gravity sewer line and 6 manholes from MH 45B beside the Moose Lodge Pump Station to MH R3. This option also includes abandoning approximately 1,390 LF of the existing 6" force main from the Moose Lodge Pump Station to MH R3. The cost for this option is $560,000, as identified within the enclosed cost estimate.

Moose Lodge Option 2: Force Main and Pump Station Modifications

The Lloyd's Flat Pump Station Decommission redirects flow into the new Route 9 Sewer Project, so that the Moose Lodge Pump Station will only serve 1 industrial and 4 commercial customers. Therefore, the pump station and the force main will experience far less flow and will require modifications. This option consists of the demolition of the existing pump station, installation of a new package pump station, and installation of approximately 1,390 LF of 1.5" force main inside of the existing 6" force main. The cost for this option is $310,000, as identified within the enclosed cost estimate.

Flowing Springs Pump Station Evaluation

The Flowing Springs Pump Station receives flow from the west from a 15-inch gravity sewer that serves various subdivisions and the new Rt 9 Project, from the east from an 8-inch force-main from the Breckenridge Pump Station, and from the south from an 8-inch gravity sewer that serves the Shenandoah Springs subdivision.

The pumps at the Flowing Springs Pump Station are rated at 900 GPM according to the 2018 Hatch Route 9 Sewer Project Design Report and currently pump between 600 and 800 GPM according to flow data on the OmniSite from February 29, 2020 to May 20, 2020. The wet well is 27' deep with a diameter of 10'. The force main leaving the pump station is initially 12" and transitions to an 18" and 24" gravity sewer that flows to the WWTP.

Once the Modified Flowing Spring Project, the Route 9 Project, and the Parkview-Woodlawn Project are completed, all flow from the northern area will be directed to the Flowing Springs Pump Station. Based on predicted changes in flow from these projects, the pumps at the Flowing Springs Pump Station may be at or over the current capacity. The RK&K Sewer Model Task 05 will evaluate the Flowing Springs Pump Station, the Flowing Springs force main, and the gravity sewer to the Wastewater Treatment Plant. It is recommended that evaluation of these system components is completed prior to sending additional flow to the Flowing Springs Pump Station.

RECOMMENDATION

RK&K's recommendation is that the Parkview MHP Pump Station Decommission, Jett's Farm Option 2: Pump Station and Force Main Modifications, Lloyd's Flat Pump Station Decommission, and Moose Lodge Option 1: Pump Station Decommission and Gravity Installation are constructed. The cost for this recommendation is $1,420,000 as identified within the enclosed cost estimate.

Jett's Farm Option 2 is recommended over Jett's Farm Option 1 because CTUB's Godwin Pumps can be utilized to bypass pump with Option 2, but Option 1 will require pump and haul. Installing a new 3" force main, rather than inserting a 3" force main in the existing 6" force main will allow the existing 6" force main to be used during construction. Moose Lodge Option 1 is recommended over Moose Lodge Option 2 due to the long-term savings associated with maintenance costs. Although the initial construction cost is higher to install a gravity line, a gravity line is much more cost effective to maintain than a pump station.

RK&K also recommends that the RK&K Sewer Model Task 05 is completed prior to construction of the Parkview-Woodlawn Project to ensure that the Flowing Springs Pump Station and downstream infrastructure can handle the additional flow from the interception at the Lloyd's Flat Pump Station area.

During the Board's review, should you have any questions or require additional information, please do not hesitate to contact me at 304.788.3370 or rdodge@rkk.com.

Very truly yours,
RUMMEL. KLEPPER & KAHL. LLP

Rhiannon A. Dodge, EIT
Associate Engineer

John W. Cole, PE
Manager, Municipal Engineering

Enc.

CITY OF CHARLES TOWN
CHARLES TOWN UTILITY BOARD
Parkview-Woodlawn

CONCEPTUAL LEVEL COST ESTIMATE
June 3, 2020

No.	Description	Quantity	Unit	Unit Price	Total Price
	PARKVIEW OPTION 1				
	Mobilization	1	LS	$ 2,000	$ 2,000
	Erosion & Sediment Control	1	LS	$ 2,000	$ 2,000
	6" SDR 35 PVC Gravity Sewer	840	LF	$ 45	$ 37,800
	Manhole	4	EA	$ 7,500	$ 30,000
	Demo Existing Parkview Pump Station	1	LS	$ 25,000	$ 25,000
	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 5,000	$ 5,000
				Construction Subtotal	**$ 116,800**
	Contingency	20%		$	23,360
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**140,160**
	Soft Costs (Design, Permitting, Surveying, etc.)	30%		**$**	**42,000**
	Easements and Acquisition ($5/LF)			**$**	**4,200**
				Say	**$ 190,000**

CONCEPTUAL LEVEL COST ESTIMATE
June 3, 2020

No.	Description	Quantity	Unit	Unit Price	Total Price
	JETT'S FARM OPTION 1				
	Mobilization	1	LS	$ 9,000	$ 9,000
	Erosion & Sediment Control	1	LS	$ 7,000	$ 7,000
	3" DR 21 HDPE Force Main	4,300	LF	$ 30	$ 129,000
	Air Release Valve Assembly	2	EA	$ 3,500	$ 7,000
	Flushing Valve	4	EA	$ 3,500	$ 14,000
	Pump Station Modifications	1	LS	$ 122,000	$ 122,000
	Pump and Haul	1	LS	$ 25,000	$ 25,000
	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
	Traffic Control	1	LS	$ 5,000	$ 5,000
	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 22,000	$ 22,000
				Construction Subtotal	**$ 355,000**
	Contingency	20%		$	71,000
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**426,000**
	Soft Costs (Design, Permitting, Surveying, etc.)	30%		**$**	**127,800**
				Say	**$ 560,000**

CONCEPTUAL LEVEL COST ESTIMATE
June 3, 2020

No.	Description	Quantity	Unit	Unit Price	Total Price
	JETT'S FARM OPTION 2				
	Mobilization	1	LS	$ 5,000	$ 5,000
	Erosion & Sediment Control	1	LS	$ 4,000	$ 4,000
	3" DR 21 HDPE Force Main	2,200	LF	$ 30	$ 66,000
	6" Steel Casing (Bore & Jack)	390	LF	$ 250	$ 97,500
	Flushing Valve	2	EA	$ 3,500	$ 7,000
	Pump Station Modifications	1	LS	$ 122,000	$ 122,000
	1.5" SDR 21 PVC Force Main	870	LF	$ 25	$ 21,750
	Grinder Pump	1	LS	$ 8,000	$ 8,000
	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
	Traffic Control	1	LS	$ 5,000	$ 5,000
	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 11,000	$ 11,000
				Construction Subtotal	**$ 362,300**
	Contingency	20%		$	72,460
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**434,760**
	Soft Costs (Design, Permitting, Surveying, etc.)	30%		**$**	**130,400**
	Easements and Acquisiton ($5/LF)			**$**	**11,000**
				Say	**$ 580,000**

CONCEPTUAL LEVEL COST ESTIMATE
June 3, 2020

No.	Description	Quantity	Unit	Unit Price	Total Price
	LLOYD'S FLAT OPTION 1				
	Mobilization	1	LS	$ 1,000	$ 1,000
	Erosion & Sediment Control	1	LS	$ 1,000	$ 1,000
	8" SDR 35 PVC Gravity Sewer	90	LF	$ 125	$ 11,250
	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
	Demo Existing Lloyd's Flat Pump Station	1	LS	$ 25,000	$ 25,000
	Traffic Control	1	LS	$ 5,000	$ 5,000
	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 1,000	$ 1,000
				Construction Subtotal	**$ 59,300**
	Contingency	20%		$	11,860
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**71,160**
	Soft Costs (Design, Permitting, Surveying, etc.)	30%		**$**	**21,300**
	Easements and Acquisition ($5/LF)			**$**	**500**
				Say	**$ 100,000**

CONCEPTUAL LEVEL COST ESTIMATE
June 3, 2020

No.	Description	Quantity	Unit	Unit Price	Total Price
	MOOSE LODGE OPTION 1				
	Mobilization	1	LS	$ 4,000	$ 4,000
	Erosion & Sediment Control	1	LS	$ 3,000	$ 3,000
	Demo Existing Moose Lodge Pump Station	1	LS	$ 25,000	$ 25,000
	8" SDR 35 PVC Gravity Sewer	1,820	LF	$ 125	$ 227,500
	Manhole	6	EA	$ 7,500	$ 45,000
	Manhole Extension	14	LF	$ 175	$ 2,450
	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
	16" Steel Casing (Bore & Jack)	40	LF	$ 350	$ 14,000
	Traffic Control	1	LS	$ 5,000	$ 5,000
	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 10,000	$ 10,000
				Construction Subtotal	**$ 351,000**
	Contingency	20%		$	70,200
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**421,200**
	Soft Costs (Design, Permitting, Surveying, etc.)	30%		**$**	**126,300**
	Easements and Acquisition			**$**	**9,200**
				Say	**$ 560,000**

CONCEPTUAL LEVEL COST ESTIMATE
June 3, 2020

No.	Description	Quantity	Unit	Unit Price	Total Price
	MOOSE LODGE OPTION 2				
	Mobilization	1	LS	$ 3,000	$ 3,000
	Erosion & Sediment Control	1	LS	$ 3,000	$ 3,000
	1.5" SDR 21 PVC Force Main	1,390	LF	$ 25	$ 34,750
	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
	Package Pump Station	1	LS	$ 126,400	$ 126,400
	Traffic Control	1	LS	$ 5,000	$ 5,000
	Miscellaneous Items (Asphalt, etc.)	1	LS	$ 7,000	$ 7,000
				Construction Subtotal	**$ 194,200**
	Contingency	20%		$	38,840
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**233,040**
	Soft Costs (Design, Permitting, Surveying, etc.)	30%		**$**	**69,900**
				Say	**$ 310,000**

CONCEPTUAL LEVEL COST ESTIMATE
June 3, 2020

No.	Description	Quantity	Unit	Unit Price	Total Price
	OVERALL RECOMMENDATION				
	Parkview	1	LS	$ 116,800	$ 116,800
	Jett's Farm Option 2	1	LS	$ 362,300	$ 362,300
	Lloyd's Flat	1	LS	$ 59,300	$ 59,300
	Moose Lodge Option 1	1	LS	$ 351,000	$ 351,000
				Construction Subtotal	**$ 889,400**
	Contingency	20%		$	177,880
	TOTAL ESTIMATED CONSTRUCTION COST*			**$**	**1,067,280**
	Soft Costs (Design, Permitting, Surveying, etc.)	30%		**$**	**320,000**
	Easements and Acquisition			**$**	**24,900**
				Say	**$ 1,420,000**


WOODLAWN PUMP STATION
PARKVIEW PUMP STATION
PARKVIEW OPTION:
INSTALL GRAVITY LINE FROM PARKVIEW PUMP STATION TO WOODLAWN GRAVITY LINE, ABANDON FORCEMAIN AND DEMOLISH PUMP STATION
JETTS FARM PUMP STATION
JETTS FARM OPTION 1:
JETTS FARM OPTION 2:
MODIFICATIONS TO PUMPS, CONTROLS, PIPING AND VALVE VAULT
JETTS FARM OPTION 2:
330 LF CASING BORE & JACK - (CHARLES TOWN RD., BIKE PATH AND WV 9)
JETTS FARM OPTION 2:
60 LF CASING BORE & JACK - (CURRIE RD.)
CONNECT TO EXIST. FORCEMAIN
JETTS FARM OPTION 1:
REPLACE EXISTING
6" FORCEMAIN FROM
JETTS FARM PUMP STATION
TO DISCHARGE MANHOLE
WITH 3" FORCEMAIN
JETTS FARM OPTION 2:
2200 LF 3" FORCEMAIN
JETTS FARM OPTION 2:
GRINDER PUMP &
870 LF 1 1/2" FORCEMAIN
LLOYDS FLATS PUMP STATION
LLOYDS FLAT OPTION:
ABANDON EXISITING FORCEMAIN
LLOYDS FLAT OPTION:
TIE EXISTING GRAVITY INTO NEW RT. 9 GRAVITY LINE AND DEMOLISH PUMP STATION
MOOSE LODGE OPTION 2:
REPLACE EXISTING 4" FORCEMAIN WITH SMALLER SIZE FORCEMAIN
MOOSE LODGE OPTION 1:
REPLACE EXISTING FORCEMAIN WITH GRAVITY SEWER AND MANHOLES
MOOSE LODGE OPTION 2:
PUMP STATION MODIFICATIONS DUE TO REDUCTION IN FLOW
MOOSE LODGE OPTION 1:
CONVERT TO GRAVITY AND DEMOLISH PUMP STATION
MOOSE LODGE PUMP STATION
WV 9
S.R. 340
WV 115
16th St.
Charles Town Rd.
War Admiral Blvd.
Currie Rd.
Old Leetown Pike
PS

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX H
FLOWING SPRINGS PUMP STATION PROJECTIONS

	Development	Total Built as of 2021	Year 1 2021	Year 2 2022	Year 3 2023	Year 4 2024	Year 5 2025	Year 6 2026	Year 7 2027	Year 8 2028	Year 9 2029	Year 10 2030	Total Built Years 1-10	Total New Flow Years 1-10	Total Built Years 11-20	Total New Flow Years 11-20	
1	American Heritage (Huntwood)	0	0	0	0	20	20	20	20	20	20	20	140	21,000	160	24,000	
2	Aspen Green	46	20	20	20	20	20	20	20	17	0	0	157	23,550	0	0	
3	Beallair	112	20	20	20	20	20	20	20	20	20	20	200	30,000	60	9,000	
4	Blackford Village	0	0	0	20	20	20	20	20	20	20	20	160	24,000	178	26,700	
5	Breckenridge East	0	0	0	0	0	0	0	0	0	0	0	0	0	200	30,000	
6	Briar Run	122	9	0	0	0	0	0	0	0	0	0	9	1,350	0	0	
7	Burr Industrial Park and Bardane	170	3	3	3	3	3	3	3	3	3	3	30	4,500	0	0	
8	Cambridge	85	5	5	0	0	0	0	0	0	0	0	10	1,500	39	5,850	
9	Charles Town Infill	0	5	5	5	5	5	5	5	5	5	5	50	7,500	50	7,500	
10	Clayhill Farm	0	0	0	0	0	0	20	20	20	20	20	100	15,000	180	27,000	
11	Daniels Forest	0	0	0	0	0	0	20	20	20	20	20	100	15,000	92	13,800	
12	Fritts Property	0	0	0	0	0	20	20	20	20	20	20	120	18,000	200	30,000	
13	Harvest Hills	6	0	20	20	20	20	20	20	20	20	20	180	27,000	40	6,000	changed to 20/year per CTUB
14	Huntfield	421	0	0	0	0	20	20	20	20	20	20	120	18,000	200	30,000	
15	Jefferson Heights North	0	0	0	20	20	15	15	15	15	15	15	130	19,500	10	1,500	
16	Tate Manor	0	20	20	20	20	0	0	0	0	0	0	80	12,000	0	0	
17	Lakeland Place / Lloyd's	0	0	20	20	20	20	20	20	20	20	20	180	27,000	200	30,000	
18	Jefferson Orchards	0	0	0	0	0	0	0	0	0	0	0	0	0	200	30,000	
19	Langlet	0	0	0	0	0	0	0	0	0	0	0	0	0	200	30,000	
20	Lloyd Property	0	0	0	0	0	0	0	0	0	0	0	0	0	200	30,000	
21	Locust Knoll	0	0	0	0	0	0	20	20	20	20	20	100	15,000	200	30,000	
22	Magnolia Springs	0	20	20	20	20	20	20	20	20	20	20	200	30,000	100	15,000	
23	Norborne Glebe	246	0	0	0	20	20	20	20	20	20	20	140	21,000	180	27,000	
24	Old Town Ranson Infill	0	5	5	5	5	5	5	5	5	5	5	50	7,500	50	7,500	
25	Potomac Marketplace	0	0	5	5	5	5	5	5	5	5	5	45	6,750	9	1,350	
26	Presidents Pointe	77	50	50	50	50	50	50	50	50	50	50	500	75,000	523	78,450	
27	Prospect Place	0	0	0	0	0	9	9	25	25	25	25	118	17,700	52	7,800	
28	Ranson Gateway / Boulevard	0	0	0	0	20	20	20	20	20	20	20	140	21,000	200	30,000	
29	Shenandoah Springs	259	20	20	20	20	20	20	20	20	20	20	200	30,000	200	30,000	
30	Stolipher	0	0	0	0	0	0	0	0	0	0	0	0	0	200	30,000	
31	Washington Landing	0	0	0	0	50	50	50	50	50	24	0	274	41,100	0	0	
32	Winchester Cold Storage	0	0	0	0	0	0	0	0	0	0	50	50	7,500	500	75,000	
33	Windmill Crossing	146	1	1	1	1	0	0	0	0	0	0	4	600	0	0	
34	Greenhill	0	0	0	20	20	20	20	20	20	20	20	160	24,000	160	24,000	not in 2021 strategic plan. EDUs from request and timing from CTUB
35	Rockwool													27,000		27,000	not in 2021 strategic plan. 27,000 from CTUB
36	Shenandoah Junction	0	0	0	0	0	177	0	0	0	0	0	177	26,550	0	0	not in 2021 strategic plan.
	Total Projected Development	1,690	178	214	269	379	579	462	478	475	432	458	3,924	588,600	4,406	660,900	
	Total FSPS Projected EDU	877	127	163	198	218	395	278	278	275	258	258	2,448	394,200	2,681	429,150	
	Total FSPS Projected ADF	131,550	19,050	24,450	29,700	32,700	59,250	41,700	41,700	41,250	38,700	65,700	394,200				

Total FSPS Existing ADF	334650
Total Lloyd's Existing ADF	168720
Existing FSPS and Lloyds Flow GPM (with peak 4)	1398

	Year 1 ADF	Year 2 ADF	Year 3 ADF	Year 4 ADF	Year 5 ADF	Year 6 ADF	Year 7 ADF	Year 8 ADF	Year 9 ADF	Year 10 ADF	Years 1-10 ADF	Years 11-20 ADF
FSPS Projected Flow (ADF)	522,420	546,870	576,570	609,270	668,520	710,220	751,920	793,170	831,870	897,570	897,570	1,326,720
FSPS Projected Flow GPM (with peak 4)	1,451	1,519	1,602	1,692	1,857	1,973	2,089	2,203	2,311	2,493	2,493	3,685

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX I
EVITT'S RUN SEWER MODEL SCENARIO

Charles Town Sewer Model

System Improvements by Growth Period

Current (2021)

Model Alterations

Rerouted flows from Bardane, Shenandoah Junction and Vicinity (War Admiral PS, Jetts Farm PS, etc.) to Flowing Springs PS
Added Jefferson Park FM, rerouted flow from Clarence Drive PS

Model Predictions

No Overflowing Manholes
Limited Pipe Surcharging, Hydraulic Capacity -
Ranson - R-151 to R-251
Evitts Run - CT-423 to WWTP

Recommended Changes/Studies

None at this Time

5-Year Growth

Model Alterations

Increased Pump Capacity at Flowing Springs PS to 1,900 gpm
Incorporated Changes from "Current Conditions"

Model Predictions

Overflowing at Samuel Street P S, Upstream Manholes affected
Severe Pipe Surcharging -
Evitts Run - CT-47 to CT-58
Limited Hydraulic Capacity -
Ranson - R-151 to R-251
Evitts Run - R-259 to CT-423 and C-59 to WWTP

Recommended Changes/Studies

Investigate Conditions at Samuel Street PS
Replace/Upsize Sewer to 30" from CT-423 to CT-58 (1,600-LF)

10-Year Growth

Model Alterations

Increased Pump Capacity at Flowing Springs PS to 2,500 gpm
Added a parallel 12" FM from Flowing Springs PS
Incorporated Sewer Upsizing from "5-Year Growth"

Model Predictions

Overflowing at Samuel Street PS and Willow Spring PS, Upstream Manholes affected
Severe Pipe Surcharging -
Ranson - R-151 to R-251
Evitts Run - C-59 to WWTP
Limited Hydraulic Capacity -
Evitts Run - R-259 to CT-423

Recommended Changes/Studies

Additional Investigate Conditions at Willow Spring PS

Replace/Upsize Sewer following:

Ranson - Upsize to 18" from R-151 to R-259 (2,900-LF)

or reroute proposed development flow further downstream

Evitts Run - Upsize to 36" C-59 to WWTP (2,600-LF)

20-Year Growth

Model Alterations

Increased Pump Capacity at Flowing Springs PS to 3,700 gpm

Incorporated Sewer Upsizing from "10-Year Growth"

Model Predictions

Overflowing at Samuel Street PS and Willow Spring PS, Upstream Manholes affected as seen in prior simulations

Severe Pipe Surcharging -

Evitts Run - C-59 to WWTP

Upstream Surcharging -

Ranson - R-241 to R-251

Recommended Changes/Studies

Replace/Upsize Sewer following:

Evitts Run - Upsize to 24" R-259 to CT-423 (1,700-LF)

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX J
FAIRFAX CROSSING PARALLEL LINE REPORT

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

August 13, 2021

Ms. Kristen Stolipher, Utility Manager
Charles Town Utility Board
661 S. George Street
Charles Town, WV 25414

Re: Charles Town Utility Board
Fairfax Crossing Parallel Line
Top Level Budget

Ms. Stolipher,

At the request of the Board, RK&K reviewed the available information on the existing sewer collection system and prepared a "top level" budget for conveying sewage from the new Route 9 discharge at MH FC-59 to CTUB's existing 12" dia. sewer at MH FC-30 as shown in the display from the Hatch Route 9 Sewershed Study and as generally described in the Deed of Easement between Potomac TC Owner LLC and The City of Charles Town from August 20, 2018.

Enclosed with this letter is a drawing identifying the existing infrastructure and a drawing identifying the proposed modifications to convey sewage from MH FC-59 to MH FC-30.

Below is a summary of RK&K's findings:

SEWER SERVICE

As shown on the enclosed documents, options were considered for conveying sewage from MH FC-59 to MH FC-30, including evaluating the capacity of the proposed sewer line. Evaluation of the existing system showed that the new Route 9 gravity line is a 15" dia. line along Route 115 and transitions to a 10" dia. line at MH FC-59. The 10" dia. line then transitions to a 12" dia. line at MH-30 and transitions back to a 15" dia. line at MH FC-28. The War Admiral Pump Station will ultimately have a peak flow rate of 1,375 GPM, which a 10" dia. gravity line cannot handle. Therefore, all options include installing a new 15" dia. line under Route 9 as the existing 12" dia. line is undersized to handle the additional flows. The new Route 9 crossing will be installed via bore and jack and aligned perpendicular to Route 9 to meet DOH standards. Based on available information and without test-pit excavation verification, the existing 12" dia. line cannot be replaced with a larger diameter pipe in the current location.

Brief descriptions for each of the various options are as follows:

Option 1

This option consists of installing 3,090 LF of 15" dia. gravity sewer and 12 manholes from MH FC-59 to MH FC-28. This option parallels the existing 10" dia. sewer alignment through the Fairfax Crossing Development. Utilizing a parallel alignment will allow for the proposed line to be placed near the existing line, hopefully eliminating the need for blasting. Interruptions to traffic should only occur on Joshua M. freeman Boulevard and North Fairfax Boulevard. Interruptions to employee/customer parking within the parking lot for the multi-tenant business building will also occur. Pedestrian traffic will also be interrupted in several locations along the proposed alignment.

The cost estimate for Option 1 is $2,031,800, as summarized in the following table:

No.	Description	Quantity	Unit	Unit Price	Total Price
	Fairfax Crossing Parallel Line (Option 1)				
1	Mobilization	1	LS	$ 67,000	$ 67,000
2	Erosion & Sediment Control	1	LS	$ 64,000	$ 64,000
3	15" SDR 35 PVC Gravity Sewer (D<8')	570	LF	$ 110	$ 62,700
4	15" SDR 35 PVC Gravity Sewer (8'<D<12')	770	LF	$ 120	$ 92,400
5	15" SDR 35 PVC Gravity Sewer (D>12')	1,750	LF	$ 130	$ 227,500
6	4 ft. Dia. Manholes (up to 6')	12	EA	$ 7,500	$ 90,000
7	MH Extensions	125	LF	$ 300	$ 37,500
8	Frame & Cover (Highway)	12	EA	$ 650	$ 7,800
9	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
10	30" Steel Casing (Bore & Jack)	305	LF	$ 1,100	$ 335,500
11	48" Steel Casing (Bore & Jack)	240	LF	$ 1,500	$ 360,000
12	Traffic Control	1	LS	$ 30,000	$ 30,000
13	Concrete Sidewalk Repair	1	CY	$ 300	$ 300
14	Concrete Curb Repair	2	CY	$ 1,000	$ 1,500
15	Asphalt Repair	36	TON	$ 205	$ 7,380
16	Test Pit Excavation and Refill	4	EA	$ 1,000	$ 4,000
				Construction Subtotal	**$ 1,402,600**
17	Contingency	20%		$	280,600
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**1,683,200**
18	Soft Costs (Engineering, Survey, etc)	20%		**$**	**336,700**
19	Easements and Acquisition ($5/LF)			**$**	**11,900**
				Say	**$ 2,031,800**

Option 2

This option consists of installing 2,100 LF of 15" dia. gravity sewer and 14 manholes from MH FC-59 to MH FC-28. This option parallels the existing 10" dia. sewer line along Baker Place, follows North Fairfax Boulevard, and crosses the Potomac TC Owner LLC property. Utilizing this alignment allows for the sewer line to be bored under many of the roads, rather than open cut. Interruptions to traffic would occur on Joshua M. Freeman Boulevard, North Fairfax Boulevard, and the entrance and parking lot of the multi-tenant business building. Pedestrian traffic will also be interrupted along various sections of the proposed alignment.

The cost estimate for Option is $2,055,500, as summarized in the following table:

No.	Description	Quantity	Unit	Unit Price	Total Price
	Fairfax Crossing Parallel Line (Option 2)				
1	Mobilization	1	LS	$ 68,000	$ 68,000
2	Erosion & Sediment Control	1	LS	$ 65,000	$ 65,000
3	15" SDR 35 PVC Gravity Sewer (D<8')	410	LF	$ 110	$ 45,100
4	15" SDR 35 PVC Gravity Sewer (8'<D<12')	475	LF	$ 120	$ 57,000
5	15" SDR 35 PVC Gravity Sewer (D>12')	1,210	LF	$ 130	$ 157,300
6	4 ft. Dia. Manholes (up to 6')	14	EA	$ 7,500	$ 105,000
7	MH Extensions	155	LF	$ 300	$ 46,500
8	Frame & Cover (Highway)	14	EA	$ 650	$ 9,100
9	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
10	30" Steel Casing (Bore & Jack)	425	LF	$ 1,100	$ 467,500
11	48" Steel Casing (Bore & Jack)	240	LF	$ 1,500	$ 360,000
12	Concrete Sidewalk Repair	15	CY	$ 300	$ 4,500
13	Traffic Control	1	LS	$ 15,000	$ 15,000
14	Test Pit Excavation and Refill	4	EA	$ 1,000	$ 4,000
				Construction Subtotal	**$ 1,419,000**
15	Contingency	20%		$	283,800
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**1,702,800**
16	Soft Costs (Engineering, Survey, etc)	20%		**$**	**340,600**
17	Easements and Acquisition ($5/LF)			**$**	**12,100**
				Say	**$ 2,055,500**

Option 3

This option consists of installing 2,590 LF of 15" dia. gravity sewer and 12 manholes from MH FC-59 to MH FC-28. This option parallels the existing 10" dia. sewer line along Baker Place, goes around the Fairfax Boulevard roundabout, and crosses the Potomac TC Owner LLC property. Utilizing this alignment allows for the sewer line to be bored under North Fairfax Boulevard, rather than open cut. Interruptions to traffic will only occur on North Fairfax Boulevard. Pedestrian traffic will also be interrupted along various sections of the proposed alignment.

The cost estimate for Option 3 is $1,939,300, as summarized in the following table:

No.	Description	Quantity	Unit	Unit Price	Total Price
	Fairfax Crossing Parallel Line (Option 3)				
1	Mobilization	1	LS	$ 64,000	$ 64,000
2	Erosion & Sediment Control	1	LS	$ 61,000	$ 61,000
3	15" SDR 35 PVC Gravity Sewer (D<8')	25	LF	$ 110	$ 2,750
4	15" SDR 35 PVC Gravity Sewer (8'<D<12')	570	LF	$ 120	$ 68,400
5	15" SDR 35 PVC Gravity Sewer (D>12')	1,990	LF	$ 130	$ 258,700
6	4 ft. Dia. Manholes (up to 6')	12	EA	$ 7,500	$ 90,000
7	MH Extensions	160	LF	$ 300	$ 48,000
8	Frame & Cover (Highway)	12	EA	$ 650	$ 7,800
9	System Tie-in Connection	2	EA	$ 7,500	$ 15,000
10	30" Steel Casing (Bore & Jack)	315	LF	$ 1,100	$ 346,500
11	48" Steel Casing (Bore & Jack)	240	LF	$ 1,500	$ 360,000
12	Traffic Control	1	LS	$ 15,000	$ 15,000
				Construction Subtotal	**$ 1,337,200**
13	Contingency	20%		$	267,500
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**1,604,700**
14	Soft Costs (Engineering, Survey, etc)	20%		**$**	**321,000**
15	Easements and Acquisition ($5/LF)			**$**	**13,600**
				Say	**$ 1,939,300**

HYDRAULIC ANALYSIS

RK&K reviewed flow monitor data collected between 07/21//2021 and 08/05/2021 from manholes FC-29 and FC-58 along the existing Fairfax Crossing sewer line. Review of the data indicated that the maximum flow through the gravity line during the timeframe is 225 gpm.

Once the 2021 Collection System Project is complete, the projected maximum flow is estimated at 475 GPM. This projected flow is comprised of 150 gpm from the War Admiral PS; 250 gpm from the Lloyd's Flat PS; and the 75 gpm generated from the existing Fairfax Crossing commercial development. This projected flow does not include any flows from future developments.

Based on review of the available plans for the existing gravity sewer line between manholes FC-59 and FC-30, RK&K calculated an average hydraulic capacity of 550 GPM based on the current alignment, except for a 291 LF section between manholes FC-32 and FC-34 which has a limited capacity of 450 GPM. As a result, the proposed flows from the 2021 Collection System Project will exceed the available capacity in this section of the existing gravity line without upgrades. Likewise, as continued development occurs within the Fairfax Crossing development, it will further hinder the hydraulic capacity of the existing gravity line resulting in the need for continued reevaluation.

RECOMMENDATION

Based on the preceding information, RK&K's recommendation is that the limiting sections of 10" dia. line between manholes FC-32 and FC-34 are replaced with a 12" dia. gravity line. Replacing the approximately 291 LF of pipe will provide an overall capacity of 550 gpm which exceeds the 470 gpm projected from the 2021 Collection System Project. RK&K's further recommendation is that no parallel line is to be constructed at this time through Fairfax Crossing and the capacity of the existing line is monitored as each new development upstream is proposed. Depending on development, it is anticipated that the parallel line will need to be constructed in the following five years, as a second phase to the 2021 Collection System Project.

Overall, as more development occurs, and additional capacity is needed, RK&K's recommendation is that the parallel 15" dia. line is constructed in accordance with Option 3. The cost for this option is the less expensive of the various options evaluated at $1,939,300 and will also result in less impact on vehicular and pedestrian traffic during construction.

During the Board's review, should there be any questions or require additional information, please do not hesitate to contact us at 304.788.3370 or rdodge@rkk.com.

Very truly yours,
RUMMEL. KLEPPER & KAHL. LLP

Rhiannon A. Dodge, EIT
Associate Engineer

John W. Cole, PE
Senior Manager, Municipal Engineering

Existing Fairfax Crossing Gravity Sewer

u/s MH	d/s MH	pipe dia. (in)	u/s inv	d/s inv	LF	S (ft/ft)	A (SF)	Rh (ft)	n	Q Available (GPM)
FC-58	FC-57	10	496	494.73	353	0.004	0.5	0.21	0.015	512.6
FC-57	FC-56	10	494.63	493.02	352	0.005	0.5	0.21	0.015	577.9
FC-56	FC-75	10	493	491.95	216	0.005	0.5	0.21	0.015	595.8
FC-75	FC-44	10	491.83	490.42	323	0.004	0.5	0.21	0.015	564.6
FC-44	FC-36	10	490.39	489.71	180	0.004	0.5	0.21	0.015	525.2
FC-36	FC-35	10	489.51	488.09	201	0.007	0.5	0.21	0.015	718.3
FC-35	FC-34	10	488.04	487.94	21	0.005	0.5	0.21	0.015	589.7
FC-34	FC-33	10	487.84	487.36	177	0.003	0.5	0.21	0.015	445.0
FC-33	FC-32	10	487.36	487.05	114	0.003	0.5	0.21	0.015	445.6
FC-32	FC-31	10	486.95	485.05	380	0.005	0.5	0.21	0.015	604.3
FC-31	FC-30	10	483.1	477.9	72	0.072	0.5	0.21	0.015	2296.6
FC-30	FC-29	12	475.91	472.69	87	0.037	0.8	0.25	0.015	2673.4
FC-29	FC-28	12	472.59	469.76	296	0.010	0.8	0.25	0.015	1358.8

LAW OFFICES OF HOY SHINGLETON LC
115 AIKENS CENTER
SUITE 24
MARTINSBURG WV 25404-6210

Jefferson County
Jacqueline C Shadle, Clerk
Instrument 201800012482
10/19/2018 @ 11:27:47 AM
EASEMENT
Book 1214 @ Page 147
Pages Recorded 8
Recording Cost $ 14.00

After Recording Return To:
Law Offices of Hoy Shingleton, L.C.
115 Aiken Center, Suite 24
Martinsburg, WV 25404

DEED OF EASEMENT

THIS DEED OF EASEMENT made this 20th day of August, 2018, by and between **POTOMAC TC OWNER LLC**, a West Virginia Limited Liability Company, party of the first part and hereinafter referred to as "Grantor", and **CITY OF CHARLES TOWN,** party of the second part and hereinafter referred to as "Grantee".

RECITALS:

A. Grantor is the owner of certain parcels of real estate located in situate in the Ranson Corporate District, Jefferson County, West Virginia, conveyed pursuant to a Successor Trustee's Deed by and between Robert E. Glenn, IV, as Successor Trustee, and Grantor dated April 4, 2017, of record in the Office of the Clerk of the County Commission of Jefferson County, West Virginia in Deed Book 1191, Page 654 (the "Grantor's Property";

WITNESSETH:

That for and in valuable consideration, the receipt of which is hereby acknowledged, the Grantor does hereby grant and convey unto said Grantee, with special warranty of title, a 20' wide perpetual non-exclusive easement and right of way (the "Permanent Sanitary Sewer Easement" for purposes herein set forth, over, under and across the Grantor's Property, being more particularly described as follows:

That certain easement area described as "Proposed 20' Wide Sanitary Sewer Easement" as shown on Exhibit A attached hereto and made a part hereof (the "Permanent Easement Premises").

WITNESSETH: That for and in valuable consideration, the receipt of which is hereby acknowledged, the said Grantor does hereby grant and convey unto said Grantee, with general warranty of title, a 10' wide temporary non-exclusive road and utility easement or right of way (the "Temporary Construction Easement", and together with the Permanent Sanitary Sewer Easement, the "Easements"), for purposes herein set forth, over, under and across the Grantor's Property, being more particularly described as follows:

That certain easement area described as "Proposed 10' Wide Temporary Construction Easement" as shown on Exhibit A attached hereto and made a part hereof (the "Temporary Easement Premises", and together with the Permanent Easement Premises, the "Easement Premises").

The Easements herein are granted subject to the following terms and conditions:

1. PERMITTED USES:

a. The Permanent Easement Premises may be used by Grantee, at its sole cost and expense, for the following uses: to excavate for, lay, install, construct, operate, maintain, repair, replace and use a sanitary sewer pipeline (the "Sewer Pipeline") in, into, upon, over, across and under the Permanent Easement Premises herein above described for the purpose of conveying, transporting or carrying sewer effluent.

b. The Temporary Easement Premises may be used by Grantee for the following uses: to install and construct the Sewer Pipeline into upon, over, across and under the Permanent Easement Premises for the purpose of conveying, transporting or carrying sewer effluent.

2. COVENANTS, LIMITATIONS, AND OTHER CONDITIONS:

a. In connection with the Sewer Pipeline and the Easements contained herein, the Grantee hereby agrees, at its sole cost and expense, that upon receipt of notice from the Grantor that it intends to develop all or any portion of the Grantor's Property and such development needs additional sewer capacity, Grantee shall (i) construct and install approximately 2,400 linear feet of 10" sewer gravity line parallel with the existing 10" sewer gravity line and (ii) complete the installation and associated electrical connection of the third pump at the Flowing Springs Pump Station, located in Ranson, West Virginia. Such construction and completion shall accommodate development by Grantor and shall not unreasonably increase or reduce potential capacity for any upstream development by other parties.

b. At all times, Grantee shall be keep the Easement Premises free and clear of unnecessary and unsightly debris. All trash, rubbish and debris shall be cleaned by Grantee from the Easement Premises on a reasonably periodic basis during construction and/or repair, and all trash, rubbish and debris shall be promptly removed by Grantee from the Easement Premises after construction is completed.

c. Existing storm water and natural drainage of surface water patterns for the Easement Premises and any other portion of Grantor's Property shall be protected by Grantee at all times both during and after construction of the Sewer Pipeline. During construction and/or repair of the Sewer Pipeline, reasonable measures shall be taken by Grantee to prevent erosion by wind and water. No trash, sewage, garbage or any other debris shall be discharged into any stream or spring by Grantee at any point.

d. The Grantee hereby agrees to disturb only the amount of land within the Easement Premises necessary, using normal construction techniques, to install, repair and maintain said Sewer Pipeline and, on the Temporary Construction Easement Premises only, the construction road needed in connection with the same. Grantee further agrees to restore the Grantor's Property to the condition equal to, or improved upon, that which existed prior to construction or repair of the Sewer Pipeline and the construction road within a reasonable time after such construction or repair is completed. Grantee shall re-grade, provide for sediment control for, remove rocks from, and seed all disturbed areas. Grantee shall promptly backfill any trenches made by it on the Easement Premises or the Grantor's Property and shall properly compact the trench.

e. Grantee agrees that its right of ingress to and egress from the Easement Premises herein above described shall be limited to the Easement Premises, or, with the express prior written consent of Grantor, such other route or routes over the Grantor's Property which shall occasion the least practicable damage and inconvenience to the Grantor.

f. Grantee may, from time to time, trim, cut down and clear away any and all trees, brush, or other obstruction now or hereafter on the Easement Premises which hinders its use of such right of way by the Grantee.

g. Grantor reserves the right to use said Easement Premises for all legal purposes which will not unreasonably interfere with the Grantee's full enjoyment of the rights hereby granted, provided that the Grantor shall not erect or construct any building or other structure or dwelling, plant any trees, or construct or maintain any other material obstruction on said Easement Premises without the express written consent of the Grantee.

h. In consideration of this grant, the Grantee does hereby indemnify and save harmless the Grantor, its members, agents, employees, personal representatives, successors and assigns, for any damage and/or liability that might occur by virtue of the Grantee's, the Grantee's agents', and/or the Grantee's contractors' entrance upon and/or use of the Easement Premises pursuant to this Deed of Easement or by installation, operation and/or maintenance of the Sewer Pipeline and related equipment.

i. In case of damage to the Easement Premises due to the negligence of any third person who uses or maintains the Easement Premises pursuant to authority of either party hereto, the party granting such authority to use shall be liable for such damages.

j. In its use of the Easement Premises, the Grantee shall comply with all federal, state and local statutes, regulations, ordinances or other rules intended to protect the public health and welfare as related to land, water, groundwater, air or other aspects of the natural environment (the "Environmental Laws"). Environmental Laws shall include, but are not limited to, those laws regulating the use, generation, storage or disposal of hazardous substances, wastes and materials (collectively, the "Hazardous Materials"). The Grantee shall not knowingly use, generate, manufacture, store, release, dispose of or knowingly permit to exist in, on, under or about any portion of the Easement Premises, or transport to or from any portion of the Easement Premises any Hazardous Materials except in compliance with applicable federal, state and local laws, rules, regulations and ordinances.

k. Grantee's obligations hereunder shall be performed at Grantee's sole costs and expense.

3. RUNNING OF BENEFITS AND BURDENS: All provisions of this instrument, including the benefits and burdens, run with the land and are binding upon and inure to the heirs, assigns, successors, tenants and personal representatives of the parties hereto.

4. TERMINATION:

a. The Temporary Construction Easement shall terminate 30 days after final completion of the Sewer Pipeline by the Grantee in accordance with the plans set forth as Exhibit

B, but in any event, the Temporary Construction Easement shall terminate the earlier to occur, the date of final completion or March 1, 2025. Grantee shall provide Grantor written notice of final completion of the Sewer Pipeline.

b. The Permanent Sanitary Sewer Easement shall terminate upon (1) written consent from both Grantor and Grantee or (2) if Grantee abandons the Sewer Pipeline.

DECLARATION OF CONSIDERATION OR VALUE AND APPLICABILITY OF WITHHOLDING TAX

The undersigned Grantor does hereby certify that the document to which this declaration is attached is a conveyance to a political subdivision of the State of West Virginia and is therefore exempt on the excise tax on the transfer of real property and that each of the Grantor(s) is a resident entity of the State of West Virginia.

IN WITNESS WHEREOF, the undersigned have caused this Deed of Easement to be executed on as of the date first written above.

POTOMAC TC OWNER LLC,
a West Virginia limited liability company

By: _____
Name: Bobby Parillo
Title: Vice President

STATE OF Georgia
COUNTY OF Fulton, TO-WIT:

The foregoing instrument was acknowledged before me on this 20th day of August, 2018 by Bobby Parillo

KIMBERLY TEWKSBURY NOTARY EXPIRES GEORGIA NOVEMBER 19, 2020 PUBLIC CHEROKEE COUNTY

Kimberly Tewksbury
Notary Public
My Commission Expires: 11-19-20

CITY OF CHARLES TOWN

By: Daryl Hennessy
Name: DARYL HENNESSY
Title: CTUB CHAIR

STATE OF West Virginia
COUNTY OF Jefferson, TO-WIT:

The foregoing instrument was acknowledged before me on this 20th day of August, 2018 by Daryl Hennessy

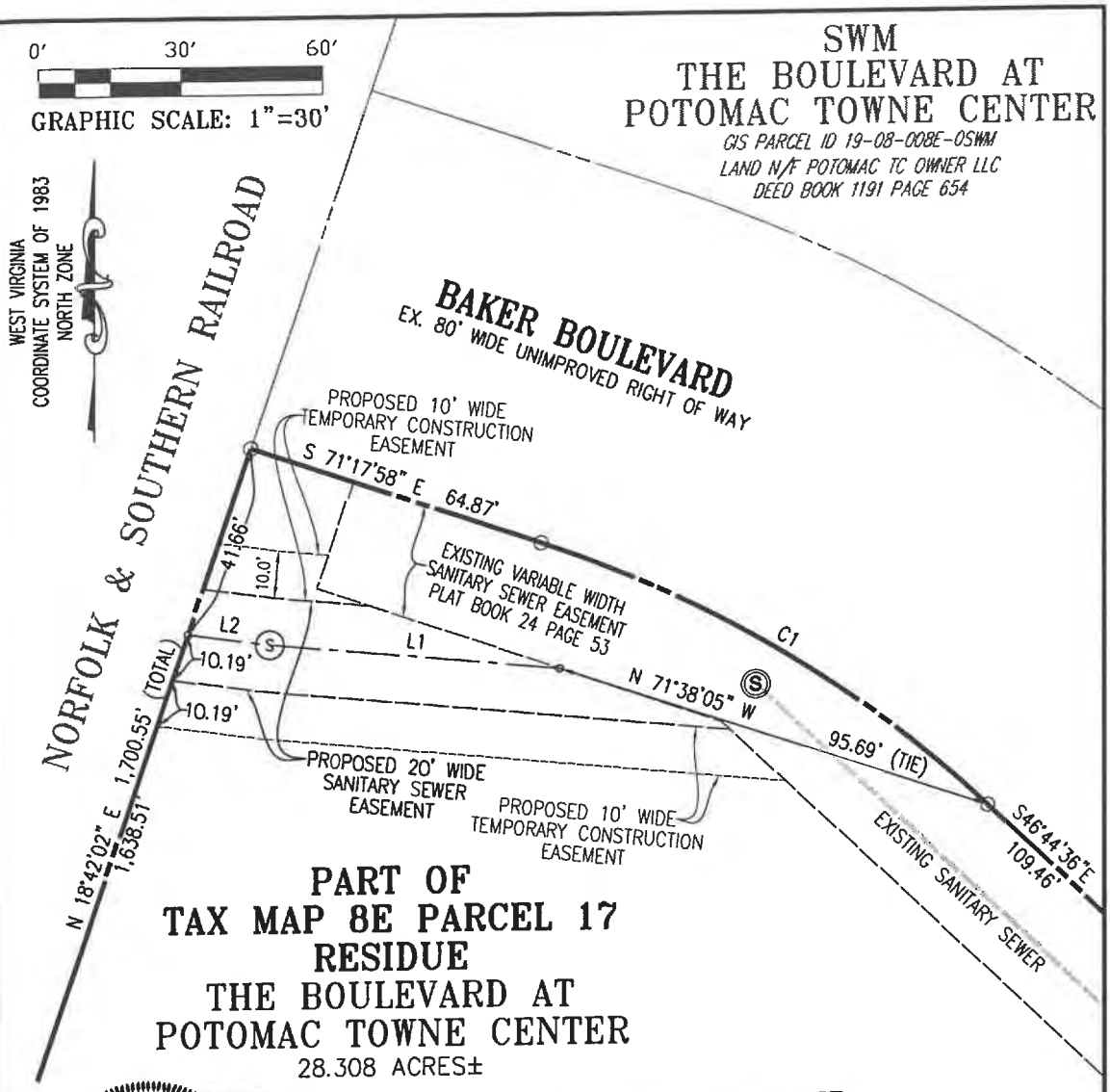
Valerie Campbell
Notary Public
My Commission Expires: March 6, 2022

VALERIE CAMPBELL
Notary Public Official Seal
State of West Virginia
My Comm. Expires Mar 6, 2022
Charles Town Utility Board
108 W. Congress St. Charles Town, WV 25414

This instrument was prepared by:
Law Offices of Hoy Shingleton, L.C.
115 Aiken Center, Suite 24
Martinsburg, WV 25404

EXHIBIT A
EASEMENT PLAT

[See attached]



PART OF TAX MAP 8E PARCEL 17 RESIDUE
THE BOULEVARD AT POTOMAC TOWNE CENTER
28.308 ACRES±

KEVIN P. O'CONNOR REGISTERED #2059 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

6/8/2018

SYMBOL LEGEND

Ⓢ PROPOSED SANITARY SEWER MANHOLE

Ⓢ EXISTING SANITARY SEWER MANHOLE

LINE	BEARING	DISTANCE
L1	N 84°38'57" W	61.74'
L2	N 82°17'25" W	17.48'

CURVE	RADIUS	DELTA	ARC	CHORD	LENGTH	TANGENT
C1	260.00'	24°33'23"	111.43'	S 59°01'17" E	110.58'	56.59'

PLAT SHOWING
CREATION OF
20' SANITARY SEWER EASEMENT AND 10' WIDE TEMPORARY CONSTRUCTION EASEMENT
ON THE LAND OF
POTOMAC TC OWNER LLC
RESIDUE
THE BOULEVARD AT POTOMAC TOWNE CENTER
PART OF TAX MAP 8E PARCEL 17
RANSON CORPORATION
JEFFERSON COUNTY, WEST VIRGINIA

GIS PARCEL ID	19-08-008E-0017
REFERENCE	DEED BOOK 1191 PAGE 654
OWNER NAME	POTOMAC TC OWNER LLC
SANITARY SEWER EASEMENT AREA	1,581 SQ.FT. (0.0363 ACRES±)
TEMPORARY CONSTRUCTION EASEMENT AREA	1,514 SQ.FT. (0.0348 ACRES±)

SCALE: 1" = 30'	SHEET: 2 OF 2
DATE: 5/21/2018	REVISED: 6/8/2018
DRAWN BY: DS	CHECKED BY: TJS

REFERENCE:
DEED BOOK 1191 PAGE 654
PLAT BOOK 24 PAGE 53

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Urban, Ltd.
133 S. Braddock Street
Winchester, Virginia 22601
Tel. 540.450.0211
www.urban-ltd.com

Projected flows shown in this section are derived in four spreadsheets which appear as the first four pages of Appendix 2, using the WWSP's discounted average daily flow values as a basis. The annual EDUs added to the Ranson Gravity Sewer are also shown on the first spreadsheet to show the projected growth anticipated from all Route 9 corridor properties, including ROXUL. The next three spreadsheets show annual EDUs associated with other area growth contributing to the other downstream elements. Gravity sewer capacities shown in this section are derived in a spreadsheet which appears as the fifth and last page of Appendix 2. The WWSP's projected average daily flow values (developer-generated values and CTUB-discounted values) appear in Appendix 3.

5.2.1 Ranson Gravity Sewer

The gravity sewer that extends from the Project's tie-in location to the FSPS is a Ranson sewer that consists of about 7,000 linear feet of 10-inch, 12-inch and 15-inch diameter piping. All this piping was constructed and put into service just over 10 years ago (i.e., in about 2005).

Each section of this piping is discussed by size as follows. After this discussion, Table 5.2A summarizes peak flow versus capacity for each section for projected 2019 conditions.

- The 10-inch sewer will carry Route 9 corridor flow (ROXUL, Burr, etc.), from the tie-in manhole (MH 11V) on Baker Boulevard, within The Boulevard at Potomac Towne Center development, to about the west right-of-way line of Route 9 (MH 11A). It will also carry flow from two feeder sewers, both from The Boulevard at Potomac Towne Center. It consists of 10 segments of 10-inch sewer, totaling about 2,400 linear feet in length. This sewer's capacity was evaluated using design information shown on utility drawings for The Boulevard at Potomac Towne Center since as-built drawings are not available. It is noted that three segments (MH 11D to MH 11A) are shown on the design drawings as 8-inch sewer to be upsized to 10-inch sewer, and this change in size to 10-inch was confirmed by Ranson staff during recent CCTV effort in September 2017.
- The 12-inch sewer will carry the 10-inch sewer's flow from about the west right-of-way line of Route 9 (MH 11A) to about the east right-of-way line of Route 9 (MH 11). It consists of two segments of 12-inch sewer, totaling about 400 linear feet in length. This sewer's capacity was evaluated using as-built information shown in Ranson's GIS database.
- The 15-inch sewer will carry the 12-inch sewer's flow from about the east right-of-way line of Route 9 (MH 11), through Flowing Springs Park, to the FSPS. It will also carry flow from two feeder sewers - one from The Marketplace at Potomac Towne Center, and one from Lakeland Place at Fairfax Crossing. It consists of 13 segments of 15-inch sewer, totaling about 4,200 linear feet in length. This sewer's capacity was evaluated using as-built information shown in Ranson's GIS database.

Refer to Figure 10 on the following page.



ROUTE 9 INFRASTRUCTURE PROJECT
FIGURE 10
RANSON 7,000-FOOT GRAVITY SEWER

Table 5.2A							
2019 - Day 1 Peak Flow in Ranson 7,000' Gravity Sewer							
A	B	C	D	E	F	G	H
total length (ft.)	section length (ft.)	pipe dia.	peak flow f/ Rt. 9 corridor (GPM)	peak flow f/ feeders (GPM)	total peak flow (GPM)	gross capacity (GPM)	% full during peak
7,000	2,400	10"	116	34	150	442	34%
	400	12"	116	34	150	1,357	11%
	4,200	15"	116	160	276	1,036	27%

Table 5.2A shows the following:

- The 10-inch section of sewer has a minimum or limiting capacity of about 442 GPM. This capacity is that of about 10% of the footage, which is at 0.27% grade; the other 90% of the footage is at steeper grade. This capacity is adequate to carry the combination of peak flow from the Route 9 corridor (ROXUL, Burr, etc.), and peak flow from the two feeders to the 10-inch sewer (150 GPM total peak); the flattest segment of 10-inch sewer will be about 34% full during 2019 peak flow conditions.
- The 12-inch section of sewer has a minimum or limiting capacity of about 1,357 GPM. This capacity is that of the flatter of the two segments (75% of the footage), which is still well above minimum grade (0.96% vs. 0.22%); the other 25% of the footage is at steeper grade. This capacity is plenty adequate to carry the peak flow coming from the 10-inch piping described above (150 GPM); the flatter segment of 12-inch sewer will be about 11% full during 2019 peak flow conditions.
- The 15-inch section of sewer has a minimum or limiting capacity of about 1,036 GPM. This capacity is that of the flattest segment (5% of the footage), which is just above minimum grade (0.17% vs. 0.15%); the other 95% of the footage is at steeper grade. This capacity is adequate to carry the combination of peak flow from the 12-inch piping described above, and peak flow from the two feeders to the 15-inch sewer (276 GPM total peak); the flattest segment of 15-inch sewer will be about 27% full during 2019 peak flow conditions.

5.2.2 Ranson Flowing Springs Pump Station

The facility that receives flow from the 7,000-foot gravity sewer is a Ranson-owned pump station known as the Flowing Springs Pump Station, located on Flowing Springs Road just north of Flowing Springs Run. FSPS receives flow from the west from the 15-inch gravity sewer described above. It also receives flow from the east from an 8-inch force-main that originates at the Breckenridge Pump Station, and from the south from an 8-inch gravity sewer serving Shenandoah Springs subdivision. FSPS was constructed and put into service just over 10 years ago (i.e., in about 2005).



RK&K
P: 304.788.3370
159 Plaza Drive | Keyser, WV 26726
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

PROJECT NO.	19339.015
DATE	JULY 6, 2021
DESIGNED	RAD
DRAWN	RAS
CHECKED	JWC

REVISIONS

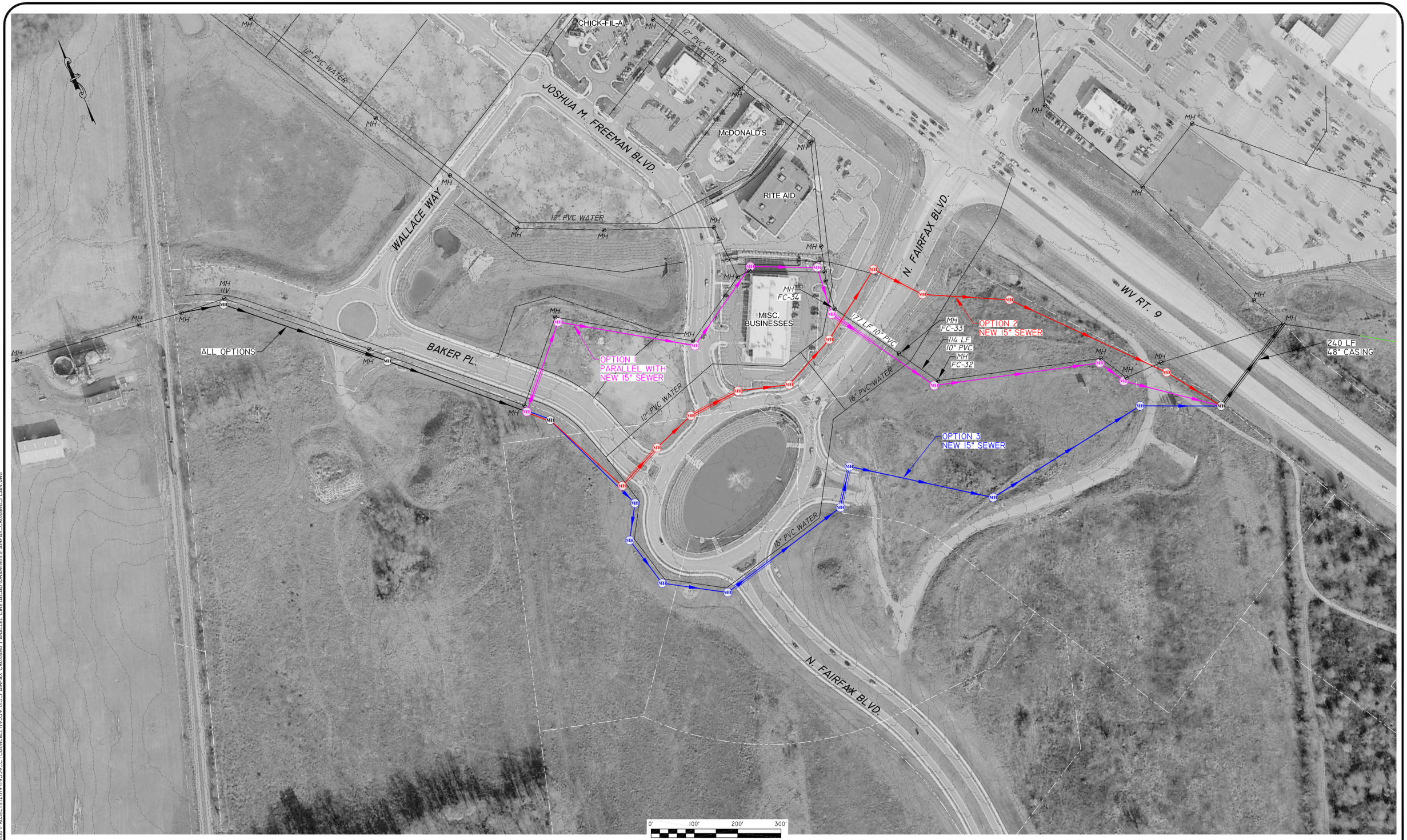
CHARLES TOWN UTILITY BOARD
661 S. GEORGE ST.
CHARLES TOWN, WV 25414

FAIRFAX CROSSING PARALLEL LINE PROJECT

EXISTING CONDITIONS

DRAWING NO. 1 OF X

\\AD.RKK.COM\FS\CLOUD\PROJECTS\2019\19339_CTUBONCALL\19339.015_FAIRFAX CROSSING PARALLEL LINE\ACAD\DRAWINGS\FAIRFAX_CROSSING_EXIST.DWG



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RK&K

P: 304.788.3370
159 Plaza Drive | Keyser, WV 26726
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
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PROJECT NO.	19339.015
DATE	AUGUST 13, 2021
DESIGNED	RAD
DRAWN	RAS
CHECKED	JWC

REVISIONS

CHARLES TOWN UTILITY BOARD
661 S. GEORGE ST.
CHARLES TOWN, WV 25414

FAIRFAX CROSSING
PARALLEL LINE PROJECT

OPTIONS 1, 2 & 3
GRAVITY SEWER ALTERNATIVES

DRAWING NO. 1 OF X

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX K
FORREST AVENUE / FAIRFAX CROSSING REPORT

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

June 15, 2021

Ms. Kristen Stolipher, Utility Manager
Charles Town Utility Board
661 S. George Street
Charles Town, WV 25414

Re: Charles Town Utility Board
Forrest Avenue and Fairfax Crossing
Top Level Budget

Ms. Stolipher,

At the request of the Board, RK&K reviewed the available information on the existing sewer collection system and the proposed development and prepared a "top level" budget for providing sewer service to the existing Fairfax Crossing Subdivision, the proposed Lakeland Place at Fairfax Crossing Subdivision, and the Forrest Street Pump Station service area via a single pump station.

HATCH previously evaluated the downstream gravity capacity of the Lakeland Place Subdivision and ultimately recommended relocating the Forrest Avenue Pump Station to the location of the proposed Lakeland Place Pump Station. HATCH also recommended that the Lakeland Place Pump Station be designed for less than the full build out of the sewershed to reduce the initial cost. Therefore, the Lakeland Place Pump Station would serve:

- 96 townhouses – Phase IIIB Lakeland Place at Fairfax Crossing
- 36 residential lots – Currently served by Forrest Avenue Pump Station
- Church of Christ – Currently served by Forrest Avenue Pump Station
- 70 townhouses - redevelopment of platted lots around the Fairfax Boulevard "peanut". This redevelopment was noted as likely in discussions with the City of Ranson and if this occurs the CTUB could prorate their connection contribution cost based on those lots., thereby saving long-term O&M costs, but at an extremely high initial cost for the CTUB (much of the flow within this gravity sewer is attributed to future and current users).
- 15 residential lots – Currently served by the 11th Avenue Pump Station. RK&K looked at the feasibility of decommissioning the 11th Avenue Pump Station and redirecting flow to the new Lakeland Place Pump Station.

Enclosed with this letter is a drawing of the proposed option for combining all flows into a single pump station. A breakdown of construction costs and a pro rata share of construction costs for the chosen alternative is identified in the following section.

SEWER SERVICE

Two (2) options were evaluated for conveying sewage from the 11th Avenue Pump Station to a proposed Lakeland Place Pump Station, and seven (7) options were evaluated for conveying sewage from the Forrest Avenue Pump Station to a proposed Lakeland Place Pump Station. The composition of properties and unit counts are based off of the HATCH Report dated March 9, 2020. A brief description of the chosen alternatives is below:

11th Avenue Pump Station Chosen Option

This option consists of the construction of 735 LF of 8" gravity sewer, 5 manholes, demolition of the existing 11th Avenue PS; and converting the existing pump station into a sanitary manhole. This option utilizes the alley between E. 10th Ave. and E. 11th Ave. and ties into the proposed manhole at the location of the existing Forrest Ave. Pump Station.

Overall, the construction cost for 11th Avenue Option 1 is $210,000, as shown below.

CONCEPTUAL LEVEL COST ESTIMATE
June 9, 2021

No.	Description	Quantity	Unit	Unit Price	Total Price
	11th STREET PS PURPLE LINE (CTUB)				
1	Mobilization	1	LS	$ 8,000	$ 8,000
2	Erosion & Sediment Control	1	LS	$ 8,000	$ 8,000
3	8" SDR 35 PVC Gravity Sewer	735	LF	$ 125	$ 91,875
4	4 ft. Dia. Manholes (up to 6')	5	EA	$ 7,500	$ 37,500
5	MH Extensions	3	EA	$ 500	$ 1,500
6	Frame & Cover (Highway)	5	EA	$ 500	$ 2,500
7	System Tie-in Connection	1	EA	$ 2,000	$ 2,000
8	Test Pit Excavation and Refill	3	EA	$ 1,000	$ 3,000
9	Asphalt Trench Patch (Base)	2	TON	$ 150	$ 225
10	Asphalt Overlay	3	TON	$ 120	$ 300
11	Aggregate for Backfill	7	CY	$ 50	$ 350
12	11th St. PS Demolition	1	LS	$ 12,000	$ 12,000
				Construction Subtotal	**$ 167,300**
	Contingency	20%		$	33,500
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**200,800**
	Easements and Acquisition (0 Easements, $5/LF)			**$**	**-**
				Say	**$ 210,000**

Forrest Avenue Pump Station Chosen Option

This option consists of the construction of 685 LF of gravity sewer, 3 manholes, demolition of the existing Forrest Avenue PS, and 830 LF of force main. This option also includes the construction of the Lakeland Place Pump Station at the low point of the developer's property in the proposed dog park. This alignment utilizes the property lines and will require 125 LF of easement from a homeowner and 242 LF of easement from the GLP capital tract property. This leaves the GLP capital tract property open for future development.

The benefit of this Option is that it removes the existing Forrest Ave. Pump Station from the front yards and combines the existing Forrest Ave. Pump Station and the proposed Lakeland Place Pump Station into a single pump station. The new force main will run along Mare Street and will tie into an existing manhole in the development.

Overall, the construction cost for Forrest Avenue Option 1 linework is $200,000. The construction cost for the Lakeland Place Pump Station is $480,000 as shown in the tables below:

CONCEPTUAL LEVEL COST ESTIMATE					
June 11, 2021					
No.	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Price**
	FORREST AVE BLUE LINE				
1	Mobilization	1	LS	$ 8,000	$ 8,000
2	Erosion & Sediment Control	1	LS	$ 8,000	$ 8,000
3	8" SDR 35 PVC Gravity Sewer (D<8')	310	LF	$ 110	$ 34,100
4	8" SDR 35 PVC Gravity Sewer (8'<D<12')	108	LF	$ 125	$ 13,500
5	8" SDR 35 PVC Gravity Sewer (D>12')	267	LF	$ 175	$ 46,725
6	4 ft. Dia. Manholes (up to 6')	3	EA	$ 7,500	$ 22,500
7	MH Extensions	10	EA	$ 500	$ 5,000
8	Frame & Cover (Highway)	3	EA	$ 500	$ 1,500
9	System Tie-in Connection	1	EA	$ 2,000	$ 2,000
10	Test Pit Excavation and Refill	3	EA	$ 1,000	$ 3,000
11	Forrest Ave. PS Demolition	1	LS	$ 12,000	$ 12,000
				Construction Subtotal	**$ 156,400**
	Contingency	20%		$	31,300
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**187,700**
	Easements and Acquisition (2 Easements, $5/LF)			**$**	**1,850**
				Say	**$ 190,000**

CONCEPTUAL LEVEL COST ESTIMATE					
June 11, 2021					
No.	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Price**
	LAKELAND PLACE PUMP STATION				
1	Pump Station	1	LS	$ 358,355	$ 358,355
2	4" PVC Force Main	830	LF	$ 45	$ 37,350
				Construction Subtotal	**$ 395,800**
	Contingency	20%		$	79,200
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**475,000**
	Easements and Acquisition (1 Easement)				
				Say	**$ 480,000**

TIMING / RECOMMENDATION

It is recommended that 11th Avenue Pump Station Chosen Option and Forrest Avenue Pump Station Chosen Option are constructed. Construction of 11th Avenue Pump Station chosen option will eliminate the 11th Avenue Pump Station, whereby lowering O&M costs to the sewer system. The Forrest Avenue Pump Station Chosen Option will combine the Forrest Avenue Pump Station and the proposed Lakeland Place Pump Station into a single pump station.

The total cost for the combined Lakeland Place pump station and force main is $480,000. Below is a summary of the pro rata share of the construction costs for the proposed combined pump station and force main.

Property	EDU	% Total	Responsibility	Pro Rata Cost
Residential Lots – Phase IIIB	96	44%	Developer	$211,200
Residential Lots – Existing Forrest Ave PS	38	17%	CTUB	$81,600
Residential Lots – Existing 11th Ave PS	15	7%	CTUB	$33,600
Church of Christ	1	1%	CTUB	$4,800
Residential Lots - Redeveloped	70	31%	Future Developer (CTUB now)	$148,800

The cost for demolition of the 11th Avenue Pump Station and the linework from the existing 11th Avenue and Forrest Street Pump Stations to the combined pump station will be the responsibility of the CTUB. Below is a summary of the total pro rata share of construction costs for the overall project.

CTUB: $210,000 + $190,000 + $81,600 + $ $33,600 + $4,800 + $148,800 = $668,800

Developer: $211,200

CAPACITY ANALYSIS

Construction of a combined Lakeland Place pump station that discharges into the existing Flowing Springs Pump Station will relieve the Old Ranson sewer of flow. The proposed combined pump station will immediately serve a total of 147 EDUs and will ultimately serve a total of 217 EDUs.

The Flowing Springs Pumps and the Evitt's Run Gravity Sewer are being upgraded as part of the 2021 Charles Town Sewer Project and therefore, will be designed to handle the flow from the Lakeland Place Pump Station. It is recommended that the Flowing Springs Pump Station and Evitt's Run Gravity Sewer are upgraded prior to connection of the proposed combined Lakeland Place Pump Station.

Any future development not planned for in the area served by the combined pump station will need to be evaluated prior to construction. Future development may require replacement of the pumps with larger pumps or modifications to the pump station to handle the additional capacity. The construction of a 4" force main from the proposed pump station will allow for larger pumps in the future as the maximum flow in a 4" force main is 313 GPM.

During the Board's review, should you have any questions or require additional information, please do not hesitate to contact me at 304.788.3370 or rdodge@rkk.com.

Very truly yours,
RUMMEL, KLEPPER & KAHL, LLP

Rhiannon A. Dodge, EIT
Associate Engineer

John W. Cole, PE
Manager, Municipal Engineering

Enc.
Forrest Ave and Fairfax Crossing Chosen Alternative Display
Fairfax Crossing Chosen Alternative Profile
HATCH TO 07 Fairfax Crossing Evaluation
Proposed Developer PS Units



\\AD.RKK.COM\VS\CLOUD\PROJECTS\2019\19339_CTUBONCALL\19339.012_FORREST AVE AND FAIRFAX CROSSING\ACAD\DRAWINGS\FORREST AVE_FAIRFAX CROSSING_OPTIONS.DWG

RK&K

P: 304.788.3370
159 Plaza Drive | Keyser, WV 26726
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

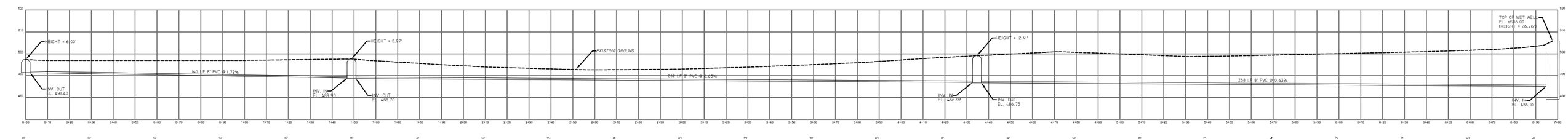
PROJECT NO.	19339.012-001
DATE	06/15/2021
DESIGNED	RAD
DRAWN	RAS
CHECKED	JWC

REVISIONS

CHARLES TOWN UTILITY BOARD
661 S. GEORGE ST.
CHARLES TOWN, WV 25414

FORREST AVENUE & FAIRFAX CROSSING PUMP STATION RELOCATION

DRAWING NO.....
OF..... **617**



PROPOSED RELOCATED PUMP STATION OPTION

March 9, 2020

H/359787/100-700

Ms. Kristen M. Stolipher, Assistant Utility Manager
Charles Town Utility Board
661 South George Street, Suite 101
Charles Town, WV 25414

Subject: Evaluation Findings
Task Order #7 – Fairfax Crossing Evaluation
Engineering Services for Water/Wastewater Systems Upgrades Projects

Dear Kristen,

This task order's scope includes evaluating the impact of the next phase of the Lakeland Place at Fairfax Crossing development (459 townhouses), including whether an upgrade in downstream gravity trunk sewer capacity is required. The downstream capacity analysis to Flowing Springs Pump Station will assume the replacement of the small pump station at Forrest and 11th Avenues. The undeveloped industrial land between Fairfax Crossing and the existing Norfolk-Southern Railroad will be reviewed for possible future inclusion into the gravity trunk sewer. These parcels are shown on the attached Task Order #7 Exhibit and are purple, Zone I - Industrial.

This task order's scope also includes review and comment of the Sanitary Sewer Trunkline, Forrest Avenue to Rt. 9 plan set prepared by Allegheny Surveys, Inc. and approved by WV Dept. of Health 5/7/2015. It is noted that this trunk sewer eliminates the Forrest and 11th Avenues pump station by serving that area with gravity sewer. It also connects the (assumed) next phase of Lakeland Place at Fairfax Crossing, thereby eliminating the pump station shown on the attached Task Order #7 Exhibit.

Lack of Design and As-built Sewer System Plans

The sewer system design plans for all phases of Lakeland Place at Fairfax Crossing, as well as the 12-inch sewer to the 15-inch Trunk Sewer were never provided to the City of Ranson due to bankruptcy of the original developer. Further, the City was never provided all the as-built plans for the sewers constructed by the Ranson Builders Consortium, LLC. These include the sewers within The Boulevard, and The Market Place at Potomac Towne Center, and Shenandoah Springs subdivision. It is noted there are Record Plans for the 15-inch Trunk Sewer to Flowing Springs Pump Station (FSPS) and the FSPS.

It is recommended that CTUB's conditional acceptance of the Lakeland Place at Fairfax Crossing, Phase IIIB also include as-built survey of all sewers that feed to the 15-inch Truck Sewer from this development.

Downstream Capacity Analysis

Hatch reviewed the sewershed that includes the Phase IIIB, Lakeland Place at Fairfax Crossing, the lots served by the Forrest Avenue Pump Station, including those platted lots in the vicinity of the Fairfax Avenue Circle, and the industrial lots east of the Norfolk-Southern Railroad (refer to the attached Sewershed Exhibit and the Sewer Capacity Calculations).

Currently, Lakeland Place at Fairfax Crossing is connected to the 15-inch trunk sewer on the east side of Route 9 via a 12-inch sewer at MH-20. It is understood that originally the Phase IIIB sewer system planned to include a proposed pump station (refer to the TO#7 Exhibit) that would discharge to the existing gravity sewers and flow through the 12- and 15-inch sewers to Flow Springs Pump Station.

An alternate gravity sewer was designed by Allegheny Surveys, Inc. that eliminates this Lakeland Place pump station (see Review of Sanitary Sewer Trunkline Plans below). Considering this alternative and the possibility that other properties east of the Norfolk-Southern Railroad could flow by gravity to this same gravity system, we looked at existing topography and developed the attached Sewershed Exhibit. This shows that conservatively four out of five Industrial properties could flow into this alternate gravity sewer. Further, the GLP Capital tract (triangular shape) southeast of Lakeland Place would also naturally flow to the alternate gravity sewer. It is noted that the fifth Industrial property is currently vacant, and it likely drains southerly and connect to the existing sewers within the City of Ranson.

Compiling these properties and converting their acreage into Equivalent Dwelling Units (EDUs) results in a combined flow at the 12-inch junction with the 15-inch Trunk Sewer of 1644 EDUs (refer to Sewer Capacity Calculations attached). The existing sewer system information is not available under or east of Route 9 as noted above. Hatch used a design set of plans for the 15-inch Trunk Sewer, which included the 12-inch segments east of Route 9 that serves Lakeland Place. These same 12-inch pipe segments would serve the 1644 EDUs noted above and identified in the Sewer Capacity Calculations. Based on the analysis we reached these conclusions:

- The 12-inch sewer (east of route 9) has adequate capacity for the proposed Lakeland Place at Fairfax Crossing and other proposed development in its sewershed.
    - The projected peak flows (current plus future) for this sewershed are 688 gpm as shown within the attached Sewer Capacity Calculations, and
    - The 12-inch sewer currently serving Lakeland Place at Fairfax Crossing has a limiting/critical sewer segment between MH-20C and MH-20D with a peak capacity of 1018 gpm, but, again, the capacity of the segments upstream of MH-20D (under Route 9 and to Lakeland Place) is unknown.
- The 15-inch sewer has adequate capacity for its current and future sewershed development.
    - The current and future peak flows for this sewershed are 229 gpm and 936 gpm, respectively, as shown within the attached Sewer Capacity Calculations, and
    - The 15-inch sewer between the connection of the 12-inch sewer at MH-20 and Flowing Springs Pump Station has a limiting/critical sewer segment between MH-21 and MH-22 with a peak capacity of 1830 gpm.

Review of Sanitary Sewer Trunkline Plans

Hatch reviewed the Sanitary Sewer Trunkline, Forrest Avenue to Rt. 9 plan set prepared by Allegheny Surveys, Inc. and approved by WV Dept. of Health on 5/7/2015. Generally, this trunk sewer eliminates the small pump station serving the Forrest Avenue area and would serve what appears as the next phase of Lakeland Place at Fairfax Crossing. Following are general comments:

1. This trunk sewer provides a gravity solution for the next phase of Lakeland Place at Fairfax Crossing rather than a pump station. Refer to the Recommendations Moving Forward section below.
2. The minimum slope for a 12” sewer is 0.22% compared to the 0.50% shown. Many places this trunk sewer is deep and revising the slope could save several feet of excavation.
3. The lower segment under Route 9 passes under the highway bridge between its foundations and the 12-inch force main from Flowing Springs Pump Station adjacent to the CSX Railroad. This segment is greater than 20 feet deep, making it a constructability issue. It may be more economical than a 250-foot long bore and jack operation under Route 9, but that option should be provided during bidding if this alignment is pursued.
4. An alternate alignment starting at MH-8E could be continuing the 12-inch sewer to the existing 12-inch sewer under Route 9 (approximately 450 feet north of the bridge). As noted above the sewer system plans for the sewer under Route 9 and within Lakeland Place at Fairfax Crossing were never provided to the City of Ranson due to bankruptcy of the original developer. We believe it may be possible to connect to the existing 12-inch sewer west of Route 9 (assume 10-foot deep sewer at

Route 9 and 12-inch sewer run at minimum 0.22% slope), but that connection must be field verified.

5. MH-8M and MH-8N are only 15 feet apart and 22 feet deep and are necessary to "turn the corner" without an acute angle of sewage flow. It is recommended that an easement or right-of-way is explored east of the rear yards over the GLP Capital Tract to prevent the need for this sewer alignment (two deep manholes within 15 feet). The segment of sewer between MH-8P and MN-8M is "bucking grade", so the easement/right-of-way across this land toward MH-8L (the connection to Fairfax Crossing could help reduce the depth of the sewer.
6. An alternate alignment to installing the sewer in the alley across the rear yards is to place the sewer within the right-of-way of Forrest Avenue and pass it adjacent to the "corner" lots at 12th Avenue (easement required). This alignment is not necessarily more economical due to the surface restoration required along Forrest Avenue, but would eliminate the two manholes 15 feet apart and 22 feet deep.
7. The City of Ranson is currently planning to construct a 48-inch storm sewer within the same alley behind the houses as this sewer segment MH-8N to MH-8P, so an easement as discussed in #5 above is likely mandatory unless the alternate alignment discussed in #6 above is pursued.

<u>Recommendations Moving Forward</u>

While a gravity sewer option to serve this sewershed is possible, its cost will be prohibitive for the CTUB at this time. Only a small portion (81 out of 459 townhouses) of the new Phase IIIB of Lakeland Place at Fairfax Crossing will flow to the Proposed Lakeland Place Pump Station. Therefore, the majority of the cost will be borne by the CTUB.

Alternatively, relocating Forrest Avenue Pump Station to the location of the Proposed Lakeland Place Pump Station would serve the CTUB well.

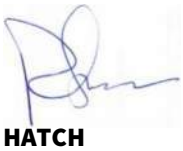
- Relocation would result in one pump station rather than two.
- The Lakeland Place Pump Station could be designed for less than the full build-out of the sewershed to reduce the initial costs. No interest in redevelopment was noted by the City of Ranson for the four industrial properties (Ameristore, Ameritech Tire & Auto, Thompson Gas and Potomac Metals) or the Lloyd Tract, so the initial design for the relocated pump station could be limited to:
    - 81 townhouses – Phase IIIB Lakeland Place at Fairfax Crossing
    - 38 residential lots – currently served by the Forrest Avenue Pump Station
    - Church of Christ – currently served by the Forrest Avenue Pump Station
    - 70 townhouses – redevelopment of platted lots around the Fairfax Boulevard "peanut". This redevelopment was noted as likely in discussions with the City of Ranson and if this occurs the CTUB could prorate their connection contribution cost based on those lots., thereby saving long-term O&M costs, but at an extremely high initial cost for the CTUB (much of the flow within this gravity sewer is attributed to future and current users).
    - The pro-rata share for the above scenario is shown on the Opinion of Probable Construction Cost attached and summarized below:

Property	EDU	Responsibility	Cost
Residential Lots - Phase IIIB	81	Developer	$ 456,158
Residential Lots (existing)	38	CTUB	$ 214,000
Church of Christ	1	CTUB	$ 5,632
Residential Lots (redeveloped)	70	Future Developer	$ 394,211

Ultimately, a gravity sewer will likely serve the Commercial Use (76 acres between Lakeland Place and Route 9) when it is developed. A determination can be made at that time if elimination of the Lakeland Place Pump Station discussed above would be warranted.

Should you have any questions concerning the evaluation findings above, please contact me at 240-751-7002 or Richard.Travers@hatch.com.

Respectfully,



HATCH
Rick Travers, PE
Senior Project Manager

Lakeland Place Concept Plan
Task Order #7 Exhibit
Sewershed Exhibit
Sewer Capacity Calculations (4 pages)
Fairfax Crossing Phase IIIB Sewersheds

cc: Scott Yearley, Hatch

PIEDMONT DESIGN GROUP
PS 25 Pg 416
WV COORD SYS
NORTH ZONE (NAD 83)

#6
0.17 Ac.
Interim Park - To be Relocated Upon Development of Adjacent Lloyd's Landing Property

#5
0.28 Ac.
Splash Pad

#2
Park Area
0.39 Ac.
Junior High Basketball 44.25 x 75.0'

#3
Park Area (green)
0.21 Ac.

#4
PARK
Active Trekking & Dog Park (open space)
0.73 Ac.
Dog Park

#1
Fairfax Crossing Park
0.32 Ac. (exist)

T3
Existing Single Family Detached (front load)

T4
Existing Single Family Detached (rear load)

T4
Existing Single Family Detached (rear load)

T4
Existing Single Family Detached (front load)

T4
Existing Garage Townhouses (front load)

T4
Existing Garage Townhouses (front load)

T4
Existing Townhouses (front load)

T4
Existing Townhouses (front load)

T4
Existing Townhouses (front load)

T4
Existing Townhouses (front load)

T5
Existing Single Family Detached (rear load)

T5
Existing Single Family Detached (rear load)

T5
Existing Single Family Detached (front load)

T5
Existing Single Family Detached (front load)

T5
Existing Single Family Detached (front

1 in =500 feet

#1 - Ffx Crossing

#2 - Lloyd Trust

#3 - Potomac TC -
Phase IIIB Lakeland
Place at Fairfax Crossing

15" Trunk Sewer

MH-20

12" Sewer

MH-20C

MH-20D

12" Sewer serving
Lakeland Place

Flowing Springs
Pump Station

Critical/ Limiting
Sewer Segments

Commercial
Use - 76 acres

Proposed Lakeland
Place Pump Station

GLP Capital tract

Thompson Gas

Glendwell & Joann
Lloyd tract

Ameristore

Ameritech Tire & Auto

Potomac Metals

Forrest Avenue
Pump Station

RANSON

TASK ORDER #7 EXHIBIT

Base mapping produced by City of Ranson

Existing Pump Station	Parcel Boundary - Approximate	T3 - Sub-Urban
Private Pump Station	RR - Rural Reserve	T4 - General Neighborhood
Proposed Pump Station	R-6 - R-6 Residential	T4O - General Neighborhood Open
Existing Gravity Main	R-7 - R-7 Residential	T5L - Town Center Limited
Existing Force Main	HC - Highway Commercial	T5 - Town Center
Proposed Gravity Main	RC - Racetrack Commercial	SD - Special District
Proposed Force Main	I - Industrial	CS - Civic Space
Existing Stormwater	SCNC - Smart Code New Community	MUX - Mixed Use - Retired
Proposed Stromwater	T1 - Natural	NCX - Neighborhood Center Mix - Retired
Railroad	T2 - Rural	UCX - Urban Commercial - Retired

15" Trunk Sewer

MH-20C

MH-20

MH-20D

Alternate Sewer Alignment

MH-8E

MH-8M & MH-8N

Forrest Ave. PS

OVERALL PLAN

CITY OF RANSON
FORREST AVENUE TO ROUTE 9
SANITARY SEWER TRUNKLINE PLAN & PROFILE
Ranson Corporation
Jefferson County, West Virginia

ALLEGHENY SURVEYS, INC.
401 S. Fairfax Blvd., Suite 3
Ranson, WV 25438
www.alleghenysurveys.com
Ranson, WV Office
Phone: (304) 724-5008
Fax: (304) 724-5010

DRAWING NO.	2
PROJECT NO.	167-43-R-14
PREPARED	LDM
DRAWN BY	LDM
PARTY CHIEF: MM	
RESEARCH: RKB	
SURVEYED: RKB	
FIELD CREW: MM/A.J.	

Plan Number	
Drawn By	LDM
Designed By	LDM
Checked By	LDM
Date	APRIL 2015
Scale	1" = 150'
Sheet	2 of 8
File Number	167-43-R-14

NO.	DATE	DESCRIPTION	BY
1	5/1/2015	Revisions per 5.1.14 DEP comments	LDM

LISA D. McCAULEY
REGISTERED
NO. 11740
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
ENGINEERS SEAL & SIGNATURE

Plotted: May 01, 2015 at 1:54pm
G:\Projects\2014 Proposals and Projects\16714 City of Ranson Sewer 167-43-R-14\CAD\DELIVERABLES\2-OVERALL.dwg

CHARLES TOWN UTILITY BOARD

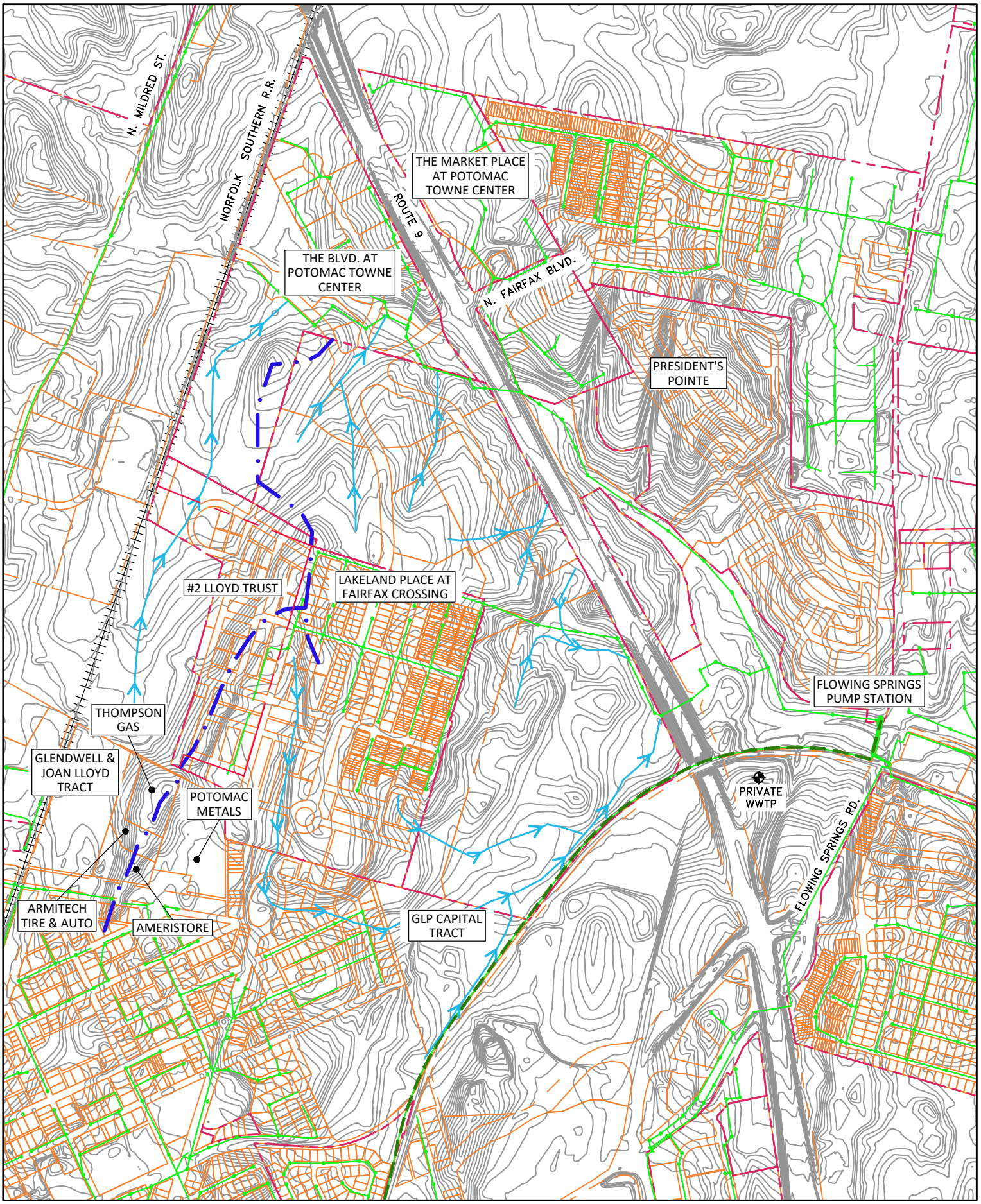
TO #7 Fairfax Crossing Evaluation 12/5/2019

Opinion of Probable Construction Cost Travers

Relocated Forrest Avenue Pump Station

Item	Quantity	Unit	Unit Price	Total
General Conditions & Mobilization (~5% of subtotal)	1	LS	$ 42,000.00	$ 42,000
Site Survey/Layout	1	LS	$ 5,000.00	$ 5,000
Sediment Control	1	LS	$ 7,500.00	$ 7,500
Clearing, Grubbing & Stripping Top Soil	1	LS	$ 2,000.00	$ 2,000
Gravity Sewer - 12" (0'-8' deep)*	544	LF	$ 175.00	$ 95,200
Gravity Sewer - 12" (>8' deep)*	200	LF	$ 350.00	$ 70,000
Manholes (up to 8' deep)*	4	EA	$ 2,500.00	$ 10,000
Manholes (>8' deep)*	80	VF	$ 100.00	$ 7,950
Lakeland Place Pump Station	1	LS	$ 650,000.00	$ 650,000
Site Landscaping (at PS and side yard)	1	LS	$ 5,000.00	$ 5,000
Demolition of Existing PS (by CTUB staff)	0	LS	$ 12,000.00	$ -
			SUBTOTAL	$ 894,650
			Contingency (20%)	$ 178,930
			TOTAL	$ 1,073,580
			SAY	**$ 1,070,000**

Property	EDUs	% Total	Responsibility	Pro Rata Cost
Lakeland Place at Fairfax Crossing				
Residential Lots - Phase IIIB *	81	43%	FFX Crossing IIIB	$ 456,158
Forrest Avenue Pump Station				
Residential Lots (existing)	38	20%	CTUB	$ 214,000
Church of Christ	1	1%	CTUB	$ 5,632
Residential Lots (redeveloped)	70	37%	Fut. Developer	$ 394,211
Total EDUs =	**190**			$ 1,070,000
			TOTAL CTUB =	**$ 219,632**
			FFX Crossing IIIB =	**$ 456,158**
			Future Developer(s) =	**$ 394,211**
CURRENT CTUB includes Future Developer(s) =				**$ 613,842**



SEWERSHED EXHIBIT

627

CHARLES TOWN UTILITY BOARD
TO #7 Fairfax Crossing Evaluation
Sewer Capacity Calculations

12/19/2019
Travers

HATCH

Sewershed Flows, 12-inch Sewer under Route 9 to 15-inch Trunk Sewer within stream valley flowing to Flowing Springs Pump Station

Property No.		Use	Acres	Avg. Daily Flows* (gpd)	EDUs	Percent Total EDUs		
--	Lakeland Place at Fairfax Crossing							
1	Residential Lots	current	--	49,680	276	17%		
2	** Commercial (west of Route 9)	future	76	76,000	422	26%		76 acres, Potomac TC tract
3	Residential Lots - Phase IIIB	future	41.8	82,620	459	28%		11.0 units/acre per Sketch Plan-9, dated 2/27/2019
4	Other Residential (per LDP)	future	21	34,020	189	11%	(Note 2)	only part of Lloyd tract assumed flowing toward Lakeland Place; 9.0 units/acre are assumed through discussion with Ranson
--	Forrest Avenue Pump Station							
5	Residential Lots	current	--	6,840	38	2%		served by Forrest Ave. Pump Station
6	Church of Christ	current	--	180	1	0%		at 2 gal/member = 90 members
7	Residential Lots	future	--	12,600	70	4%	(Note 5)	assumes townhouse redevelopment adjacent to Lakeland Place
8	Potomac Metals***	future	11.1	5,550	31	2%		current use is recycling center
9	Thompson Gas***	future	3.8	1,900	11	1%	(Note 3)	current use is Thompson Gas
10	Ameritch Tire & Auto***	future	3.1	1,550	9	1%	(Note 3)	current use is tire and auto services
11	Ameristore***	future	3.1	1,550	9	1%	(Note 3)	current use is self storage
12	GLP Capital (triangular tract)****	future	19.6	23,220	129	8%		Jeff. Co. zoning: residential/light industrial/commercial
		Total Flow (gpd) =		*295,710*				
				Total EDUs =	**1644**		(Note 4)	
							peak factor =	3.32
					682		GPM (peak)	682 gpm < 876 gpm (critical segment TBD)
								capacity OK assume 12" at 0.40% slope

EDU - Equivalent Dwelling Unit AMLEA - *Alternate Mainline Extension Agreement*

Note 1 - the original AMLEA for Lakeland Place, date 12/14/2004 computed 131,880 gpd design flow (203 single family, 208 townhouses, 72 apartments, 35 apratments/mixed-use commercial, and 15.99 acres of mixed-use commercial.

Note 2 - It is unclear if, or how much of, Property #4 will drain toward Lakeland Place, but it is added as a possibility.

Note 3 - Properties #9-11 were conservatively added to the sewershed as they are located on the drainage divide. If redevloped with adjacent Lloyd property, the sewage flows will most likely be directed toward the existing system through the City of Ranson.

Note 4 - The computed flows and the resultant EDUs are 2.2 times the original 131,880 gpd design flow outlined in the Lakeland Place AMLEA, dated 12/4/2004 between the City of Ranson and Fairfax Crossing. It is noted that Properties #4 and #5-12 are outside of the original Lakeland Place AMLEA. The computed flow of these tracts/lots equal 87,410 gpd or 66% of the original design flow. Without these properties, the computed flows are 1.6 times the original 131,880 gpd design flow outlined in the Lakeland Place AMLEA.

Note 5 - 70 townhouses assumes a slightly lower density of 7 units/acre on ~10 acres due to topography and the adjacent larger residential lots.

* Each residential lot = 1 EDU; 180 gpd = 1 EDU; which accounts for I&I within the system
** Commercial use planned at 1000 gpd/acre for Commercial use per Lakeland Place AMLEA, dated 12/4/2004
*** Sewage flows based on site acreage = 500 gpd/acre for Industrial Use, WV Design Loading (Table 64-47-B) (using flows > existing use for planning purposes)
**** Density assumed similar to earlier phases of Lakeland Place (249 units on 42 acres = 6.6 units/acre)

typical capacity of gravity sewers

dia.	slope (%)	capacity (GPM)	Equivalent EDU*	Notes
8	0.40	297	719	
10	0.40	538	1305	
12	0.40	876	2124	AMLEA referenced in Note 1 above, indicated that the 12" sewers would be designed at a minimum slope of 0.40%, but as-built drawings are not available, so field survey of the system is necessary to verify system slopes.
	* using peaking factor =	3.30		

City of Ranson Route 9 Infrastructure Project

COMPUTATION OF CAPACITIES OF GRAVITY SEWERS

Ranson 7,000' Sewer (Note 1)

u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF (Note 6)	slope %	capacity (GPM) (Note 2)	
Sewers through The Boulvard at Potomac Towne Center								
11D	11C	10	487.84	487.05	291	0.27	442	(Notes 3, 4)
11C	11B	10	486.95	485.05	380	0.50	602	(Note 3)
11B	11A	10	483.10	477.90	72	7.22	2,288	(Note 5)
Serving The Boulvard at Potomac Towne Center (under Route 9)								
11A	11-2	12	475.91	472.69	87	3.70	2,665	
11-2	11	12	472.59	469.76	296	0.96	1,357	
Trunk Sewer in stream valley to Flowing Springs PS								
11	11-1	15	469.76	469.46	179	0.17	1,036	(Note 8)
11-1	12	15	469.27	468.00	224	0.57	1,898	
12	13	15	467.97	466.19	254	0.70	2,103	
13	14	15	466.19	464.04	245	0.88	2,358	
14	15	15	463.94	460.54	396	0.86	2,331	
15	16	15	460.52	456.17	396	1.10	2,636	
16	17	15	456.06	454.72	380	0.35	1,487	
17	18	15	454.67	453.33	345	0.39	1,570	
18	19	15	453.28	449.40	337	1.15	2,696	
19	20	15	449.34	446.97	337	0.70	2,103	
20	21	15	446.97	445.01	358	0.55	1,864	
21	22	15	444.99	442.86	399	0.53	1,830	(Note 9)
22	FSPS	15	442.82	438.49	399	1.09	2,624	
Serving Lakeland Place at Fairfax Crossing								
20D1	20D	12	452.98	452.97	20	0.05	310	(Note 7)
20D	20C	12	452.87	452.17	129	0.54	1,018	(Note 7)
20C	20B	12	452.07	451.25	147	0.56	1,037	
20B	20A	12	451.21	447.97	287	1.13	1,473	
20A	20	12	447.96	446.97	158	0.63	1,100	

Note 1: MHs and LFs are based on design info, and differ slightly but not significantly from those shown on Figures 9 and 10 which are based on Ranson GIS info.

Note 2: Capacities are computed using a Manning "N" factor of 0.015.

Note 3: This pipe was reportedly designed and constructed as 8" diameter at 0.50%, but was reportedly upsized to 10" diameter.

Note 4: Computed slope of 0.27% is probably closer to 0.50%. It is computed using an as-built invert for MH 11D and a design invert for MH 11C.

Note 5: This pipe was reportedly designed and constructed as 8" diameter at 7.22%, but was reportedly upsized to 10" diameter.

Note 6: MHs and LFs are based on design info, and differ slightly but not significantly from those shown on Figures 9 and 11 which are based on Ranson GIS info.

Note 7: no as-built information is available upstream of MH-20D. Assume that the MH-20D to MH-20C is the critical segment serving Lakeland Place at Fairfax Crossing.

Note 8: Limiting/critical segment for 15" trunk sewer downstream of The Boulevard, and the Market Place at Potomac Towne Center.

Note 9: Limiting/critical segment for 15" trunk sewer downstream of Lakeland Place.

City of Ranson Route 9 Infrastructure Project

GROWTH - TRIBUTARY TO RANSON 7,000' GRAVITY SEWER (Version 2.0, Note 5)

Development	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Rt. 9 corridor flow into u/s end of 10"														
Blackford Village	0	0	0	0	0	0	0	0	0	0	0	0	0	
BOE site (fmr. Lloyd Property)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bridgeforth Property	0	0	0	0	0	0	0	0	0	0	0	0	0	
Burr Business Park (Note 1)	0	0	0	0	27,000	0	6,264	0	6,264	0	6,264	0	6,264	
Clay Hill Farm - North	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clay Hill Farm - South	0	0	0	0	0	0	0	0	0	0	0	0	0	
Day-Care Center	0	0	0	0	833	0	0	0	0	0	0	0	0	
Harvest Hills	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jefferson Orchard - East	0	0	0	0	16,500	0	16,500	0	16,500	0	16,500	0	16,500	GPD (avg)
Jefferson Orchard - North	0	0	0	0	0	0	0	0	7,500	0	7,500	0	7,500	
Jetts Farm flow (less W. Burr)	0	0	0	0	0	0	45,000	0	0	0	0	0	0	
Locust Knoll	0	0	0	0	0	0	12,924	0	12,924	0	12,924	0	12,924	
Locust Knoll - West	0	0	0	0	0	0	0	0	0	0	0	0	0	
Miller Property	0	0	0	0	0	0	0	0	0	0	0	0	0	
North Ranson Development	0	0	0	0	0	0	0	0	0	0	0	0	0	
ROXUL	0	0	40,000	0	0	0	0	0	40,000	0	0	0	0	
Shenandoah Junction	0	0	0	0	0	0	28,800	0	0	0	0	0	0	
Tackley Mill	0	0	0	0	0	0	0	0	0	0	21,600	0	21,600	
			69		77		267		411		524		636	GPM (peak)
			cum. 2017-2019		cum. 2020-2021		cum. 2020-2023		cum. 2020-2025		cum. 2020-2027		cum. 2020-2029	
Feeder flow into 10"														
Boulevard at PTC, MH-11 (Note 2)	6,627	675	12,150	2,700	2,700	2,700	2,700	3,375	3,375	3,375	3,375	0	0	GPD (avg)
			34		9		19		30		42		42	GPM (peak)
			cum. 2017-2019		cum. 2020-2021		cum. 2020-2023		cum. 2020-2025		cum. 2020-2027		cum. 2020-2029	
Feeder flow into 15"														
Lakeland Place at Fairfax Crossing, MH-20 (Note 3)	56,267	0	0	0	0	1,350	1,350	1,350	1,350	1,350	1,350	2,250	2,250	
Marketplace at PTC, MH-11 (Note 4)	15,925	270	270	162	162	162	162	0	0	0	0	0	0	GPD (avg)
President's Pointe, MH-__		0	0	0	0	0	0	0	0	0	675	1,080	1,080	
			126		1		6		11		16		28	GPM (peak)
			cum. 2017-2019		cum. 2020-2021		cum. 2020-2023		cum. 2020-2025		cum. 2020-2027		cum. 2020-2029	
All Sewershed Contributions			229		316		521		682		812		936	GPM (peak)
YEAR			2019		2021		2023		2025		2027		2029	
	438	5	291	16	262	23	632	26	488	26	390	19	378	EDU
	438	443	734	750	1012	1036	1668	1694	2182	2208	2598	2617	2995	cum. EDU

7,000' Gravity Sewer is shown in blue on Figure 9 of the Route 9 Sewer Design Report; figure 9 attached for reference

Note 1: 27,000 GPD = 150 EDU x 180 GPD/EDU. 150 EDU is the estimated interception in Options #3, #5 & #6 (existing Burr tenants constitute 167 EDU per Jefferson County Development Authority letter dated 7/15/2016).

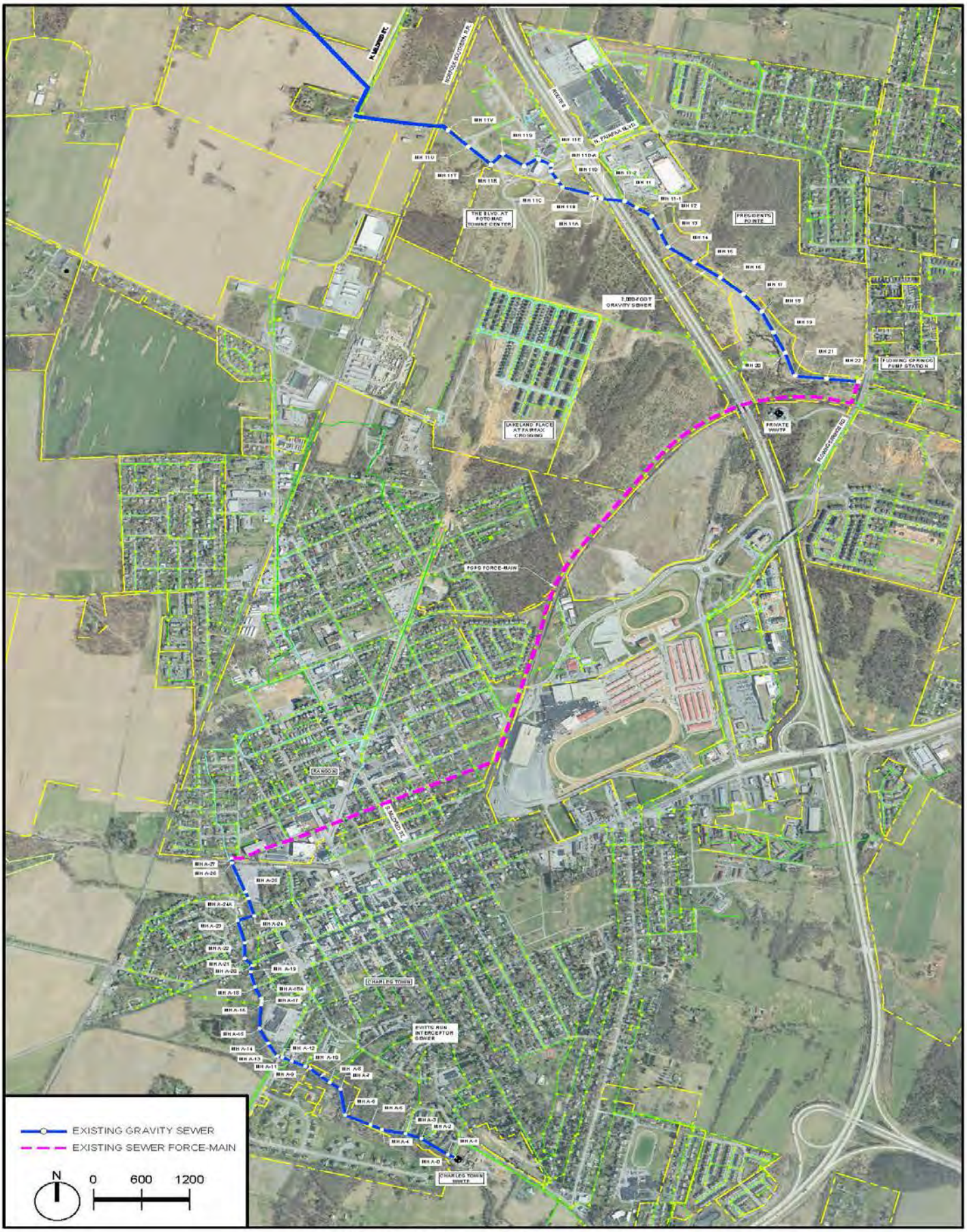
Note 2: 6,627 GPD = (198,810 GAL/MO) / (30 DAY/MO). 198,810 GAL/MO is for 12/1/2016-11/30/2017 per Jefferson Utilities, Inc.

Note 3: 56,267 GPD = 81,552 GPD - 15,925 GPD - 9,360 GPD. 81,552 GPD is per Ranson metering data for 1/1/2017-10/31/2017; 15,925 GPD is per Note 4 below; 9,360 GPD is per Note 2 on next page.

Note 4: 15,925 GPD = (477,756 GAL/MO) / (30 DAY/MO). 477,756 GAL/MO is for 12/1/2016-11/30/2017 per Jefferson Utilities, Inc.

Note 5: Version 2.0, prepared 7/12/2018, is an update of this "GROWTH" table from the "Route 9 Corridor Sewershed Study" dated 1/22/2018. Version 2.0 is for the use of Charles Town Utility Board as a planning tool.

Note 6 - Peaking factor (average to peak) = 2.5; Sewer Capacity Calculations use a computed peaking factor



ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 9
EXISTING DOWNSTREAM SYSTEM

N. FAIRFAX BLVD
100' R/W

PARK

Alley 3-TEE

15th AVENUE
66' R/W

20' ALLEY

ALLEY # 2 SQ

16th AVE.

355' - 8" SS

NORTH FAIRFAX BOULEVARD

100' R/W

296' - 8" SS

94' - 8" SS

17th AVENUE
50' R/W

ALLEY #2

STALLION ST.
60' R/W

STALLION STREET

STEED ST.
60' R/W

400' of 8 inch PVC

274' of 8 inch PVC

139' of 8 inch PVC

STEED STREET

MARE ST.
50' R/W

MARE ST

Pump Station

96 Units flowing directly to Pump Station

Plotted: Dec 14, 2020 at 4:22pm
\\Intel_i5\c\Dwg\Fairfax3\PA\FC-UTIL-PROF_PA_2.dwg

REVISIONS

5283 Corporate Drive, Suite 300
Frederick, MD 21703
(301) 695-5814

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Units trib. to Pump Sta.
Fairfax Crossing
Ranson, WV

SEAL

SCALE: AS SHOWN

DESIGN: PSA	CHECK:	APPROVED

SHEET
SSPS

DATE: December 14, 2020

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX L
BURR EAST PUMP STATION DISPLAY

INSTALL DOGHOUSE MANHOLE FOR BYPASS PUMPING

BURR PARK EAST PUMP STATION MODIFICATIONS

CONNECT EXIST. FORCEMAIN TO EXIST. GRAVITY SEWER

BURR PARK EAST PUMP STATION

EDMOND RD.

E. BURR BLVD.

A LOWERY ELEMENTARY SCHOOL

SHENANDOAH JUNCTION RD.

MODIFIED FORCEMAIN REDUCE SIZE & REVERSE FLOW 1,256 LF 1 1/2" SDR-9 IPS HDPE (2 HOUSE CONNECTIONS)

WV 115/5 CHARLES TOWN RD.

BIKE ROUTE

WV 9 (WESTBOUND)

WV 9 (EASTBOUND)

WV 115

WAR ADMIRAL BLVD.

INSTALL FORCEMAIN REVERSE FLOW 1,749 LF 6" C900 CLASS 165 PVC

WAR ADMIRAL PUMP STATION

W. BURR BLVD.

CHILDRENS WAY

\\AD.RKK.COM\FS\CLOUD\PROJECTS\2019\19339-CTUBONCALL\19339.004_MODIFIED FS\ACAD\DRAWINGS\PRESENTATION.DWG

RK&K
P: 304.788.3370
159 Plaza Drive | Keyser, WV 26726
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

PROJECT NO.	19339.004
DATE	MARCH 17, 2020
DESIGNED	RAD
DRAWN	RAS
CHECKED	JWC

REVISIONS

CHARLES TOWN UTILITY BOARD
661 S. GEORGE ST.
CHARLES TOWN, WV 25414

MODIFIED FLOWING SPRING PROJECT

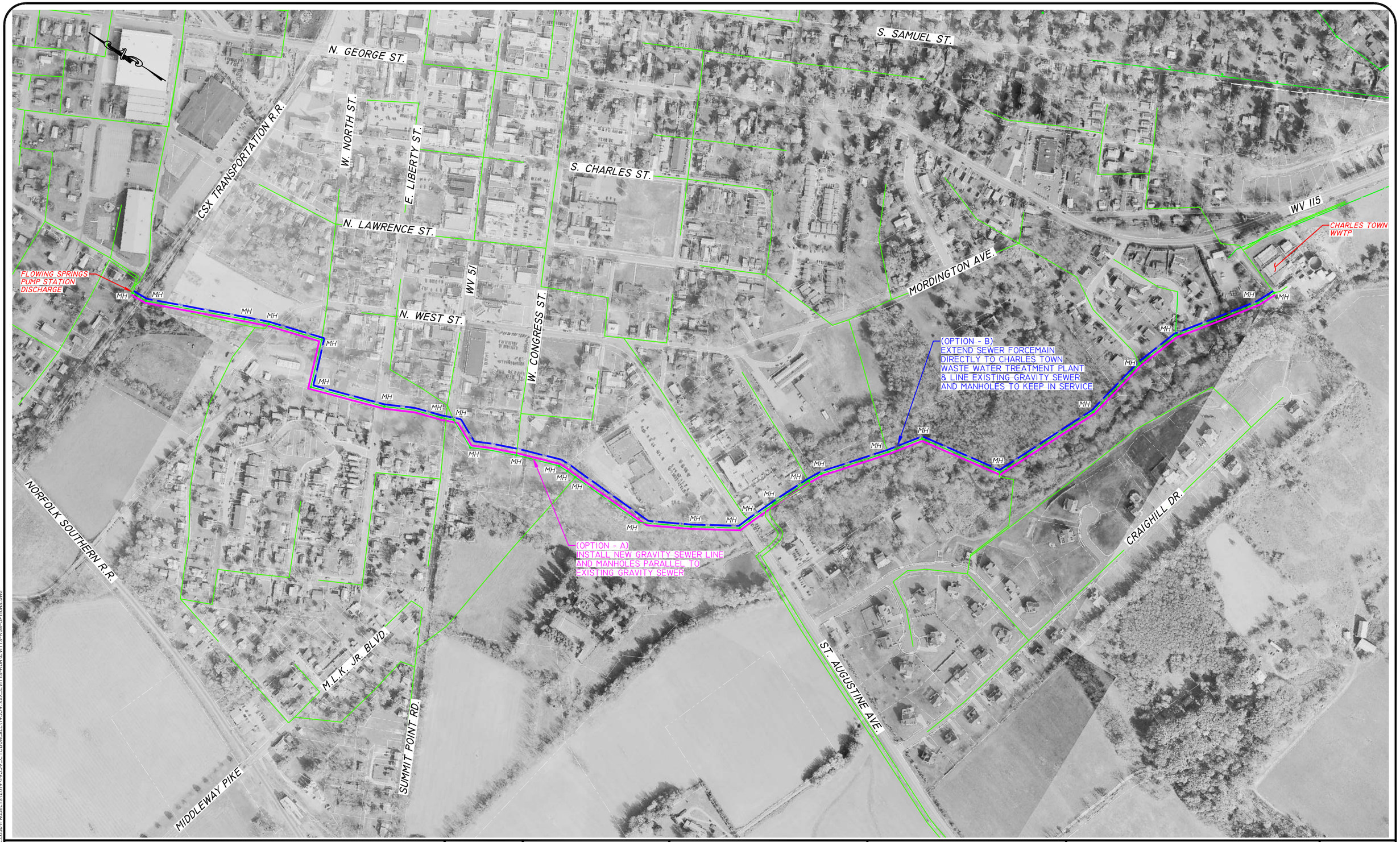
PRESENTATION

DRAWING NO.....
OF.....

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX M
EVITT'S RUN ALTERNATIVES DISPLAY



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PROJECT NO.	19339.017
DATE	JULY 8, 2021
DESIGNED	
DRAWN	
CHECKED	JWC

REVISIONS

CHARLES TOWN UTILITY BOARD
661 S. GEORGE ST.
CHARLES TOWN, WV 25414

DRAWING
NO.....
OF..... 636

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX N
JEFFERSON PARK ALTERNATIVES DISPLAY



\\RAD.RKK.COM\FS1\CLOUD\PROJECTS\2019\19339_CT\BONCALL\19339.010_JEFFERSON MEMORIAL PARK FORCE MAIN\ACAD\DRAWINGS\JEFF PARK_INDEX.DWG

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PROJECT NO.	19339.010
DATE	JULY 14, 2020
DESIGNED	RAD
DRAWN	RAD
CHECKED	JWC

REVISIONS

CHARLES TOWN UTILITY BOARD
661 S. GEORGE ST.
CHARLES TOWN, WV 25414

JEFFERSON MEMORIAL PARK FORCE MAIN

JEFFERSON MEMORIAL PARK FORCE MAIN EXTENSION INDEX

DRAWING NO. 1 OF 3

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX O
ENVIRONMENTAL CORRESPONDENCE

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

July 2, 2021

Mr. Jon Coleman
Chief, South Branch
Pittsburgh District, Corps of Engineers
William S. Moorehead Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

Reference: Charles Town Utility Board
2021 Collection System Project

Dear Mr. Coleman,

The Charles Town Utility Board is in the process of performing an environmental review so that it may assess the environmental impacts of a proposed wastewater collection system project to improve the Utility's overall wastewater collection system. In general, the project will consist of improvements to the Burr East Pump Station, Jett's Farm Pump Station and Force Main, Moose Lodge Pump Station and Force Main, Flowing Springs Pump Station and Evitts Run Interceptor, Jefferson Memorial Park Force Main, Fairfax Crossing Parallel Line, and Forrest Avenue Pump Station Relocation. This project will redirect flows to relieve the Old Town Ranson gravity sewer system of high flows and surcharges. It is anticipated that funding for the project will be provided in partnership with SRF. A detailed list of the improvements are as follows:

- Burr East Pump Station
  - Redirecting flow from the northern portion of the system (Jefferson high School Pump Station, Burr East Pump Station) into the new Route 9 line at the War Admiral Pump Station
  - Modifications to the Burr East Pump Station
  - Abandoning of the existing Burr East Pump Station Force Main
- Jett's Farm Pump Station and Force Main
  - Downsizing the Jett's Farm Pump Station and installing 2,200 LF of 3" force main from the Jett's Farm Pump Station to the new Route 9 force main from the War Admiral Pump Station
  - Abandoning existing 6" force main from Jett's Farm Pump Station to the residence at 2466 North Mildred Street and installing a grinder pump and 870 LF of 1.5" force main from the residence to MH 37
- Moose Lodge Pump Station and Force Main
  - Downsizing the Moose Lodge Pump Station and installing 1,400 LF of 1.5" force main inside of the existing force main
- Flowing Springs Pump Station and Evitt's Run Interceptor
  - Modifications to the Flowing Springs Pump Station to increase the pump flow
  - Construction of a new gravity sewer line in the existing sewer easement from the Flowing Springs Pump Station discharge to the Charles Town WWTP

- Jefferson Memorial Park Force Main
  - Continuation of the Clarence Drive Pump Station force main down Morison Street, through an existing utility easement, to the Samuel Street Pump Station
- Fairfax Crossing Parallel Line
  - Construction of a parallel 15" sewer line from the new Route 9 line to MH FC 28 on the opposite side of Route 9
- Forrest Avenue Pump Station Relocation
  - Demolition of the Forrest Avenue and 11th Avenue Pump Stations
  - Construction of gravity lines from the existing pump station locations to the new Lakeland Place Pump Station
  - Construction of the Lakeland Place Pump Station to serve the former Forrest Avenue and 11th Avenue Pump Stations and the new Lakeland Place Development

Enclosed are a USGS topographic map and project maps identifying the location of the proposed improvements within the Charles Town Utility Board's Wastewater Collection System

The Charles Town Utility Board requests the assistance of your office in identifying any concerns with impacts that may be affected by the project. The work will primarily be within previously disturbed areas. Please provide any recommendations you may have to mitigate or avoid these impacts.

A response within 30 days would be appreciated. Should you have any questions or require additional information, please do not hesitate to contact me at 304.788.3370 or e-mail, rdodge@rkk.com

Sincerely yours,
RUMMEL, KLEPPER, & KAHL, LLP

Rhiannon A. Dodge, E.I.T.
Associate Engineer

cc: Charles Town Utility Board

Enclosure

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

July 2, 2021

Mr. Michael Jones
U.S. Department of Agriculture
Natural Resources Conservation Service
1550 Earl Core Road, Suite 200
Morgantown, WV 26505

Reference: Charles Town Utility Board
2021 Collection System project

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Sincerely yours,
RUMMEL, KLEPPER, & KAHL, LLP

Rhiannon A. Dodge, E.I.T.
Associate Engineer

cc: Charles Town Utility Board

Enclosure

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Jefferson County, West Virginia

CTUB 2021 Collection System Project



July 1, 202´

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

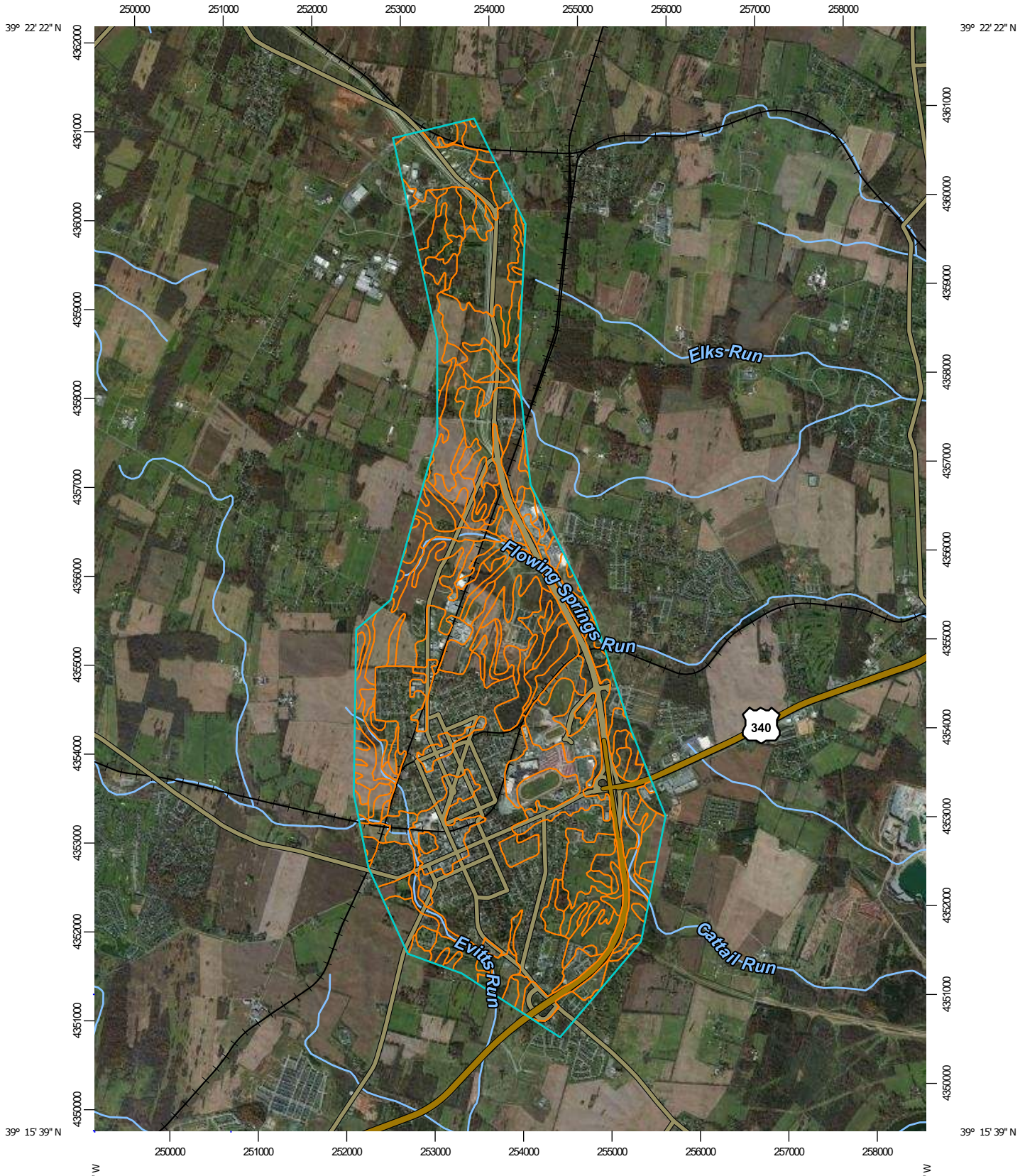
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



Map Scale: 1:60,600 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2500 5000 10000 15000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jefferson County, West Virginia
Survey Area Data: Version 14, Jun 3, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 14, 2011—Nov 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DyD	Duffield-Ryder complex, 15 to 25 percent slopes	35.4	0.7%
Fa	Fairplay silt loam, 0 to 3 percent slopes	34.0	0.7%
Fd	Fairplay silt loam, 0 to 3 percent slopes, drained	13.1	0.3%
Fk	Funkstown silt loam	230.6	4.7%
HbB	Hagerstown silt loam, 3 to 8 percent slopes	396.7	8.1%
HbC	Hagerstown silt loam, 8 to 15 percent slopes	214.2	4.4%
HcC	Hagerstown silty clay loam, 8 to 15 percent slopes	7.9	0.2%
HeB	Hagerstown silt loam, 3 to 8 percent slopes, very rocky	120.0	2.5%
HeC	Hagerstown silt loam 8 to 15 percent slopes, very rocky	235.7	4.8%
HgE	Hagerstown-Opequon-Rock outcrop complex, 15 to 35 percent slopes	21.3	0.4%
HrB	Hagerstown-Rock outcrop complex, 3 to 8 percent slopes	10.1	0.2%
HrC	Hagerstown-Rock outcrop complex, 8 to 15 percent slopes	106.8	2.2%
La	Lappans loam, 0 to 3 percent slopes	28.8	0.6%
Mn	Massanetta loam, 0 to 3 percent slopes	30.9	0.6%
PmB	Poplimento silt loam, 3 to 8 percent slopes	565.5	11.6%
PmC	Poplimento silt loam, 8 to 15 percent slopes	446.7	9.1%
PpC	Poplimento silt loam, 8 to 15 percent slopes, very rocky	250.3	5.1%
PrC	Poplimento-Rock outcrop complex, 8 to 15 percent slopes	13.4	0.3%
RpC	Ryder-Poplimento complex, 8 to 15 percent slopes	4.5	0.1%
RrD	Ryder-Poplimento complex, 15 to 25 percent slopes, very rocky	13.2	0.3%
Tm	Toms silt loam	55.5	1.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ua	Udorthents, smoothed	381.6	7.8%
Ub	Urban land	319.9	6.5%
Uu	Urban land-Udorthents	312.6	6.4%
UwC	Urban land-Hagerstown complex, 0 to 15 percent slopes	1,045.7	21.4%
W	Water	0.8	0.0%
Totals for Area of Interest		**4,895.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Jefferson County, West Virginia

DyD—Duffield-Ryder complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 1vdr3
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Duffield, silt loam, and similar soils: 55 percent
Ryder, channery silt loam, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Duffield, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from limestone and shale

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 30 inches: silty clay loam
H3 - 30 to 60 inches: silty clay loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Description of Ryder, Channery Silt Loam

Setting

Landform: Hillslopes

Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from limestone and shale

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 30 inches: channery silty clay loam
H3 - 30 to 35 inches: very channery silt loam
H4 - 35 to 45 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: No

Minor Components

Poplimento, silt loam

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Fa—Fairplay silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y003
Elevation: 320 to 710 feet
Mean annual precipitation: 39 to 40 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Fairplay and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fairplay

Setting

Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous loamy marl

Typical profile

Ap - 0 to 11 inches: silt loam
Ag - 11 to 15 inches: silt loam
Bkg - 15 to 20 inches: sandy loam
Agb - 20 to 27 inches: silt loam
Bkb - 27 to 40 inches: sandy loam
A'gb - 40 to 47 inches: silt loam
B'kb - 47 to 53 inches: sandy loam
Bkmb - 53 to 60 inches: loamy sand
A"gb - 60 to 68 inches: sandy loam
B"kb - 68 to 79 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 48 to 58 inches to cemented horizon
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 99 percent

Available water capacity: Very high (about 16.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Massanetta

Percent of map unit: 10 percent
Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Melvin

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Histosols

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Fd—Fairplay silt loam, 0 to 3 percent slopes, drained

Map Unit Setting

National map unit symbol: 2y002
Elevation: 340 to 760 feet
Mean annual precipitation: 39 to 40 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Fairplay, drained, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fairplay, Drained

Setting

Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous loamy marl

Typical profile

Ap - 0 to 10 inches: silt loam
Ab - 10 to 21 inches: silt loam
Bkb - 21 to 43 inches: loam
Bkmb - 43 to 70 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 36 to 48 inches to cemented horizon
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: About 6 to 60 inches
Frequency of flooding: RareNone
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 95 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very high (about 12.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Hydric soil rating: Yes

Minor Components

Massanetta

Percent of map unit: 10 percent
Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Fairplay

Percent of map unit: 5 percent
Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Calciudolls, moderately deep to bedrock
Percent of map unit: 5 percent
Hydric soil rating: No

Fk—Funkstown silt loam

Map Unit Setting
National map unit symbol: 1vdqc
Elevation: 80 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Funkstown, silt loam, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Funkstown, Silt Loam

Setting
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy alluvium derived from limestone

Typical profile
H1 - 0 to 12 inches: silt loam
H2 - 12 to 29 inches: gravelly silt loam
H3 - 29 to 45 inches: silty clay loam
H4 - 45 to 80 inches: channery silt loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 20 to 28 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water capacity: High (about 9.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Minor Components

Toms, silt loam
Percent of map unit: 10 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: Yes

Holly, loam
Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Wetlands (W1)
Hydric soil rating: Yes

HbB—Hagerstown silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2rc98
Elevation: 600 to 1,750 feet
Mean annual precipitation: 37 to 45 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 155 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Hagerstown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown

Setting
Landform: Hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, base slope, interfluve
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Clayey residuum weathered from limestone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt1 - 10 to 21 inches: silty clay loam
Bt2 - 21 to 56 inches: silty clay
C - 56 to 73 inches: silty clay loam
R - 73 to 83 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 43 to 98 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Opequon

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Carbo

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Funkstown

Percent of map unit: 3 percent
Landform: Valley floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Timberville

Percent of map unit: 2 percent
Landform: Hills

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Convex, concave, linear
Hydric soil rating: No

HbC—Hagerstown silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tb03
Elevation: 600 to 1,750 feet
Mean annual precipitation: 32 to 45 inches
Mean annual air temperature: 41 to 65 degrees F
Frost-free period: 155 to 181 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hagerstown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex, concave
Across-slope shape: Linear, convex
Parent material: Clayey residuum weathered from limestone and dolomite

Typical profile

Ap - 0 to 8 inches: silt loam
Bt1 - 8 to 19 inches: silty clay loam
Bt2 - 19 to 54 inches: silty clay
C - 54 to 71 inches: silty clay loam
R - 71 to 81 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 43 to 98 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Carbo

Percent of map unit: 8 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Opequon

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Clarksburg

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

HcC—Hagerstown silty clay loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vdqn
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hagerstown, silty clay loam, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown, Silty Clay Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 4 inches: silty clay loam
H2 - 4 to 14 inches: silt loam
H3 - 14 to 65 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Minor Components

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Vertrees, silt loam

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Duffield, silt loam

Percent of map unit: 3 percent

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Opequon, silty clay loam
Percent of map unit: 2 percent
Landform: Upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

HeB—Hagerstown silt loam, 3 to 8 percent slopes, very rocky

Map Unit Setting
National map unit symbol: 1vdqm
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Hagerstown, silt loam, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown, Silt Loam

Setting
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile
H1 - 0 to 4 inches: silt loam
H2 - 4 to 14 inches: silt loam
H3 - 14 to 65 inches: silty clay

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Minor Components

Vertrees, silt loam

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Opequon, silty clay loam

Percent of map unit: 5 percent
Landform: Upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

HeC—Hagerstown silt loam 8 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 1vdqk
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hagerstown, silt loam, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 14 inches: silt loam
H3 - 14 to 65 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Minor Components

Vertrees, silt loam
Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Rock outcrop
Percent of map unit: 5 percent
Hydric soil rating: No

Funkstown, silt loam
Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Opequon, silty clay loam
Percent of map unit: 5 percent
Landform: Upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

HgE—Hagerstown-Opequon-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting
National map unit symbol: 1vdqh
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition
Hagerstown, silt loam, and similar soils: 45 percent
Opequon, silty clay loam, and similar soils: 30 percent
Rock outcrop: 20 percent

Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 14 inches: silt loam
H3 - 14 to 65 inches: silty clay

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Limy Soils (RL2)
Hydric soil rating: No

Description of Opequon, Silty Clay Loam

Setting

Landform: Upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 6 inches: silty clay loam
H2 - 6 to 16 inches: clay
R - 16 to 20 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Hydrologic Soil Group: D
Other vegetative classification: Very Rocky, Limy Soils (RL2)
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)

Minor Components

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

HrB—Hagerstown-Rock outcrop complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1vdqg
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition

Hagerstown, silt loam, and similar soils: 65 percent

Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 14 inches: silt loam
H3 - 14 to 65 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Limy Soils (RL2)
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)

Minor Components

Opequon, silty clay loam

Percent of map unit: 10 percent
Landform: Upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Convex
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

HrC—Hagerstown-Rock outcrop complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vdqf
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition

Hagerstown, silt loam, and similar soils: 65 percent
Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 14 inches: silt loam
H3 - 14 to 65 inches: silty clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Limy Soils (RL2)
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)

Minor Components

Opequon, silty clay loam

Percent of map unit: 10 percent
Landform: Upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

La—Lappans loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y005
Elevation: 330 to 760 feet
Mean annual precipitation: 39 to 40 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Lappans and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lappans

Setting

Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous loamy marl

Typical profile

Ap - 0 to 7 inches: loam
BA - 7 to 13 inches: sandy loam
A - 13 to 20 inches: sandy loam
Bk - 20 to 47 inches: loam
Ab - 47 to 54 inches: clay loam
Bkb1 - 54 to 71 inches: loam
Akb - 71 to 78 inches: clay loam
B'kb2 - 78 to 85 inches: loam
Ck - 85 to 115 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 44 to 72 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Calcium carbonate, maximum content: 99 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water capacity: Very high (about 19.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Massanetta

Percent of map unit: 13 percent
Landform: Terraces, flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Fairplay

Percent of map unit: 5 percent
Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Mn—Massanetta loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y004
Elevation: 340 to 2,580 feet
Mean annual precipitation: 39 to 40 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Massanetta and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Massanetta

Setting

Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Calcareous loamy marl

Typical profile

Ap1 - 0 to 4 inches: loam
Ap2 - 4 to 6 inches: silt loam
Bk1 - 6 to 14 inches: silt loam
Bk2 - 14 to 22 inches: silt loam
Bk3 - 22 to 33 inches: silt loam
Bk4 - 33 to 46 inches: silt loam
C - 46 to 70 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 21 to 44 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Calcium carbonate, maximum content: 99 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very high (about 16.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Lappans

Percent of map unit: 15 percent
Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Calciudolls, moderately deep to bedrock

Percent of map unit: 5 percent
Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Fairplay

Percent of map unit: 5 percent
Landform: Flood plains, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Hydric soil rating: Yes

PmB—Poplimento silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1vdnz
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Poplimento, silt loam, and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Poplimento, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and siltstone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 58 inches: clay
H3 - 58 to 72 inches: very channery silty clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: No

Minor Components

Duffield, silt loam

Percent of map unit: 25 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Ryder, channery silt loam

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

PmC—Poplimento silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vdp0
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Poplimento, silt loam, and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Poplimento, Silt Loam

Setting

Landform: Hillslopes

Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and siltstone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 58 inches: clay
H3 - 58 to 72 inches: very channery silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: No

Minor Components

Duffield, silt loam

Percent of map unit: 25 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Ryder, channery silt loam

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave

Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

PpC—Poplimento silt loam, 8 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 1vdp2
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Poplimento, silt loam, and similar soils: 65 percent
Minor components: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Poplimento, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and siltstone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 58 inches: clay
H3 - 58 to 72 inches: very channery silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Fertile Loams (FL2)

Hydric soil rating: No

Minor Components

Duffield, silt loam

Percent of map unit: 15 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Ryder, channery silt loam

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

PrC—Poplimento-Rock outcrop complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vdqt
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition

Poplimento, silt loam, and similar soils: 60 percent
Rock outcrop: 25 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Poplimento, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and siltstone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 58 inches: clay
H3 - 58 to 72 inches: very channery silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Limy Soils (RL2)
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)

Minor Components

Duffield, silt loam

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)

Hydric soil rating: No

Opequon, silty clay loam

Percent of map unit: 5 percent
Landform: Upland slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

RpC—Ryder-Poplimento complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vdr5
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ryder, channery silt loam, and similar soils: 40 percent
Poplimento, silt loam, and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ryder, Channery Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from limestone and shale

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 30 inches: channery silty clay loam
H3 - 30 to 35 inches: very channery silt loam
H4 - 35 to 45 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: No

Description of Poplimento, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and siltstone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 58 inches: clay
H3 - 58 to 72 inches: very channery silty clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: No

Minor Components

Duffield, silt loam

Percent of map unit: 20 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex

Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

RrD—Ryder-Poplimento complex, 15 to 25 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 1vdr7
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ryder, channery silt loam, and similar soils: 40 percent
Poplimento, silt loam, and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ryder, Channery Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy residuum weathered from limestone and shale

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 30 inches: channery silty clay loam
H3 - 30 to 35 inches: very channery silt loam
H4 - 35 to 45 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 24 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: No

Description of Poplimento, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and siltstone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 58 inches: clay
H3 - 58 to 72 inches: very channery silty clay loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Fertile Loams (FL2)
Hydric soil rating: No

Minor Components

Duffield, silt loam

Percent of map unit: 15 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex

Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Rock outcrop
Percent of map unit: 5 percent
Hydric soil rating: No

Funkstown, silt loam
Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Tm—Toms silt loam

Map Unit Setting
National map unit symbol: 1vdq7
Elevation: 80 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Toms, silt loam, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Toms, Silt Loam

Setting
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Clayey colluvium derived from limestone and siltstone

Typical profile
H1 - 0 to 7 inches: silt loam
H2 - 7 to 53 inches: clay
H3 - 53 to 65 inches: silty clay loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained

Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.50 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water capacity: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: Yes

Minor Components

Funkstown, silt loam

Percent of map unit: 10 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Holly, loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Wetlands (W1)
Hydric soil rating: Yes

Ua—Udorthents, smoothed

Map Unit Setting

National map unit symbol: 1vdpn
Elevation: 310 to 820 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Properties and qualities

Slope: 0 to 100 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Minor Components

Urban land

Percent of map unit: 10 percent
Hydric soil rating: No

Ub—Urban land

Map Unit Setting

National map unit symbol: 1vdpq
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 10 percent
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Uu—Urban land-Udorthents

Map Unit Setting

National map unit symbol: 1vdpp
Elevation: 90 to 660 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Udorthents and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Description of Udorthents

Properties and qualities

Slope: 0 to 35 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Minor Components

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope

Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

UwC—Urban land-Hagerstown complex, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1vdpm
Elevation: 90 to 180 feet
Mean annual precipitation: 33 to 46 inches
Mean annual air temperature: 40 to 64 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 40 percent
Hagerstown, silt loam, and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Description of Hagerstown, Silt Loam

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 23 inches: silt loam
H3 - 23 to 75 inches: clay

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 15 percent
Hydric soil rating: No

Duffield, silt loam

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

Funkstown, silt loam

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Moist Loams (ML2)
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 1v386
Mean annual precipitation: 33 to 45 inches
Mean annual air temperature: 51 to 56 degrees F
Frost-free period: 141 to 168 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

July 2, 2021

U.S. Fish and Wildlife Service
West Virginia Field Office
90 Vance Drive
Elkins, WV 26241
Attn: Project Review Request

Reference: Charles Town Utility Board
2021 Collection System Project

Dear Whom it May Concern,

The Charles Town Utility Board is in the process of performing an environmental review so that it may assess the environmental impacts of a proposed wastewater collection system project to improve the Utility's overall wastewater collection system. In general, the project will consist of improvements to the Burr East Pump Station, Jett's Farm Pump Station and Force Main, Moose Lodge Pump Station and Force Main, Flowing Springs Pump Station and Evitts Run Interceptor, Jefferson Memorial Park Force Main, Fairfax Crossing Parallel Line, and Forrest Avenue Pump Station Relocation. This project will redirect flows to relieve the Old Town Ranson gravity sewer system of high flows and surcharges. It is anticipated that funding for the project will be provided in partnership with SRF. A detailed list of the improvements are as follows:

- Burr East Pump Station
  - Redirecting flow from the northern portion of the system (Jefferson high School Pump Station, Burr East Pump Station) into the new Route 9 line at the War Admiral Pump Station
  - Modifications to the Burr East Pump Station
  - Abandoning of the existing Burr East Pump Station Force Main
- Jett's Farm Pump Station and Force Main
  - Downsizing the Jett's Farm Pump Station and installing 2,200 LF of 3" force main from the Jett's Farm Pump Station to the new Route 9 force main from the War Admiral Pump Station
  - Abandoning existing 6" force main from Jett's Farm Pump Station to the residence at 2466 North Mildred Street and installing a grinder pump and 870 LF of 1.5" force main from the residence to MH 37
- Moose Lodge Pump Station and Force Main
  - Downsizing the Moose Lodge Pump Station and installing 1,400 LF of 1.5" force main inside of the existing force main
- Flowing Springs Pump Station and Evitt's Run Interceptor
  - Modifications to the Flowing Springs Pump Station to increase the pump flow
  - Construction of a new gravity sewer line in the existing sewer easement from the Flowing Springs Pump Station discharge to the Charles Town WWTP
- Jefferson Memorial Park Force Main
  - Continuation of the Clarence Drive Pump Station force main down Morison Street, through an existing utility easement, to the Samuel Street Pump Station

- Fairfax Crossing Parallel Line
  - Construction of a parallel 15” sewer line from the new Route 9 line to MH FC 28 on the opposite side of Route 9
- Forrest Avenue Pump Station Relocation
  - Demolition of the Forrest Avenue and 11th Avenue Pump Stations
  - Construction of gravity lines from the existing pump station locations to the new Lakeland Place Pump Station
  - Construction of the Lakeland Place Pump Station to serve the former Forrest Avenue and 11th Avenue Pump Stations and the new Lakeland Place Development

Enclosed are a USGS topographic map and project maps identifying the location of the proposed improvements within the Charles Town Utility Board’s Wastewater Collection System

The Charles Town Utility Board requests the assistance of your office in identifying any concerns with impacts that may be affected by the project. The work will primarily be within previously disturbed areas. Please provide any recommendations you may have to mitigate or avoid these impacts.

A response within 30 days would be appreciated. Should you have any questions or require additional information, please do not hesitate to contact me at 304.788.3370 or e-mail, rdodge@rkk.com

Sincerely yours,
RUMMEL, KLEPPER, & KAHL, LLP

Rhiannon A. Dodge, E.I.T.
Associate Engineer

cc: Charles Town Utility Board

Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
West Virginia Ecological Services Field Office
90 Vance Drive
Elkins, WV 26241-9475
Phone: (304) 636-6586 Fax: (304) 636-7824
http://www.fws.gov/westvirginiafieldoffice/

In Reply Refer To: July 01, 2021
Consultation Code: 05E2WV00-2021-SLI-0693
Event Code: 05E2WV00-2021-E-01762
Project Name: CTUB 2021 Collection System Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). This list can also be used to determine whether listed species may be present for projects without federal agency involvement.

If the official species list you receive identifies any listed, proposed, or candidate species as potentially occurring in the proposed project area, then further section 7 consultation under the ESA is required with the Fish and Wildlife Service. Please submit a project review request to the West Virginia Field Office. To find out what information needs to be submitted with your project review request go to this link: http://www.fws.gov/westvirginiafieldoffice/projectreview.html

Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you should submit to our office.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC site at regular intervals during project planning and

implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq*.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). For information on bald and golden eagles in your project area please contact the West Virginia Division of Natural Resources, Natural Heritage Program at P.O. Box 67 Elkins, WV 26241, or call 304-637-0245.

Additionally, wind energy projects should follow the Service's wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html; and http://www.fws.gov/westvirginiafieldoffice/PDF/Communication%20Tower%20Letter%20(1).pdf

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the ESA.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

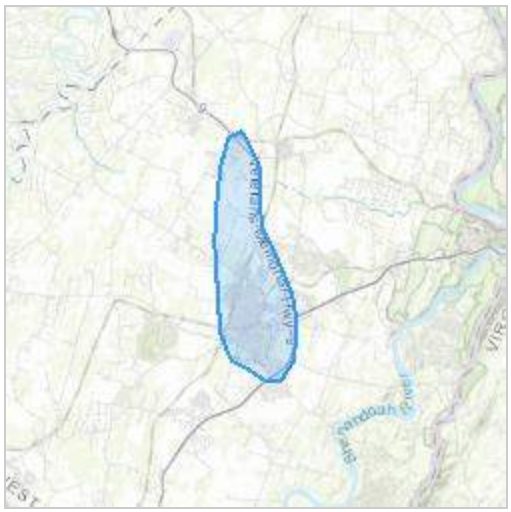
West Virginia Ecological Services Field Office
90 Vance Drive
Elkins, WV 26241-9475
(304) 636-6586

Project Summary

Consultation Code: 05E2WV00-2021-SLI-0693
Event Code: 05E2WV00-2021-E-01762
Project Name: CTUB 2021 Collection System Project
Project Type: WASTEWATER PIPELINE
Project Description: • Burr East Pump Station
o Redirecting flow from the northern portion of the system from Jefferson high School Pump Station, Burr East Pump Station into the new Route 9 line at the War Admiral Pump Station
o Modifications to the Burr East Pump Station
o Abandoning of the existing Burr East Pump Station Force Main
• Jett's Farm Pump Station and Force Main
o Downsizing the Jett's Farm Pump Station and installing 2,200 LF of 3" force main from the Jett's Farm Pump Station to the new Route 9 force main from the War Admiral Pump Station
o Abandoning existing 6" force main from Jett's Farm Pump Station to the residence at 2466 North Mildred Street and installing a grinder pump and 870 LF of 1.5" force main from the residence to MH 37
• Moose Lodge Pump Station and Force Main
o Downsizing the Moose Lodge Pump Station and installing 1,400 LF of 1.5" force main inside of the existing force main
• Flowing Springs Pump Station and Evitt's Run Interceptor
o Modifications to the Flowing Springs Pump Station to increase the pump flow
o Construction of a new gravity sewer line in the existing sewer easement from the Flowing Springs Pump Station discharge to the Charles Town WWTP
• Jefferson Memorial Park Force Main
o Continuation of the Clarence Drive Pump Station force main down Morison Street, through an existing utility easement, to the Samuel Street Pump Station
• Fairfax Crossing Parallel Line
o Construction of a parallel 15" sewer line from the new Route 9 line to MH FC 28 on the opposite side of Route 9
• Forrest Avenue Pump Station Relocation
o Demolition of the Forrest Avenue and 11th Avenue Pump Stations
o Construction of gravity lines from the existing pump station locations to the new Lakeland Place Pump Station
o Construction of the Lakeland Place Pump Station to serve the former Forrest Avenue and 11th Avenue Pump Stations and the new Lakeland Place Development

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@39.31801575,-77.859869441431,14z



Counties: Jefferson County, West Virginia

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ All activities in this location should consider potential effects to this species. This project is not within a known-use area, but potentially occupied habitat may exist. Please contact the WVFO for additional consultation. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: ▪ No known hibernacula or maternity roost trees occur within the action area. Any 'take' that may occur incidental to this project is not prohibited under the final 4(d) rule. Please submit a Streamlined 4(d) Rule Consultation form to the WVFO. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Crustaceans

NAME	STATUS
Madison Cave Isopod *Antrolana lira* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4162	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

July 2, 2021

Ms. Susan Pierce
Deputy State Historic Preservation Officer
Division of Culture and History
1900 Kanawha Blvd. E
Charleston, WV 25305-0300

Reference: Charles Town Utility Board
2021 Collection System Project

Dear Ms. Pierce,

The Charles Town Utility Board is in the process of performing an environmental review so that it may assess the environmental impacts of a proposed wastewater collection system project to improve the Utility's overall wastewater collection system. In general, the project will consist of improvements to the Burr East Pump Station, Jett's Farm Pump Station and Force Main, Moose Lodge Pump Station and Force Main, Flowing Springs Pump Station and Evitts Run Interceptor, Jefferson Memorial Park Force Main, Fairfax Crossing Parallel Line, and Forrest Avenue Pump Station Relocation. This project will redirect flows to relieve the Old Town Ranson gravity sewer system of high flows and surcharges. It is anticipated that funding for the project will be provided in partnership with SRF. A detailed list of the improvements are as follows:

- Burr East Pump Station
  - Redirecting flow from the northern portion of the system (Jefferson high School Pump Station, Burr East Pump Station) into the new Route 9 line at the War Admiral Pump Station
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Enclosed are a USGS topographic map and project maps identifying the location of the proposed improvements within the Charles Town Utility Board's Wastewater Collection System

The Charles Town Utility Board requests the assistance of your office in identifying any concerns with impacts that may be affected by the project. The work will primarily be within previously disturbed areas. Please provide any recommendations you may have to mitigate or avoid these impacts.

A response within 30 days would be appreciated. Should you have any questions or require additional information, please do not hesitate to contact me at 304.788.3370 or e-mail, rdodge@rkk.com

Sincerely yours,
RUMMEL, KLEPPER, & KAHL, LLP

Rhiannon A. Dodge, E.I.T.
Associate Engineer

cc: Charles Town Utility Board

Enclosure

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

July 2, 2021

Ms. Pam Kindrick
Division of Air Quality
WV Department of Environmental Protection
601 57th Street, SE
Charleston, WV 25304

Reference: Charles Town Utility Board
2021 Collection System Project

Dear Ms. Kindrick,

The Charles Town Utility Board is in the process of performing an environmental review so that it may assess the environmental impacts of a proposed wastewater collection system project to improve the Utility's overall wastewater collection system. In general, the project will consist of improvements to the Burr East Pump Station, Jett's Farm Pump Station and Force Main, Moose Lodge Pump Station and Force Main, Flowing Springs Pump Station and Evitts Run Interceptor, Jefferson Memorial Park Force Main, Fairfax Crossing Parallel Line, and Forrest Avenue Pump Station Relocation. This project will redirect flows to relieve the Old Town Ranson gravity sewer system of high flows and surcharges. It is anticipated that funding for the project will be provided in partnership with SRF. A detailed list of the improvements are as follows:

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A response within 30 days would be appreciated. Should you have any questions or require additional information, please do not hesitate to contact me at 304.788.3370 or e-mail, rdodge@rkk.com.

Sincerely yours,
RUMMEL, KLEPPER, & KAHL, LLP

Rhiannon A. Dodge, E.I.T.
Associate Engineer

cc: Charles Town Utility Board

Enclosure

west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, West Virginia 25304
304 926 0475 FAX: 304 926 0479

Harold D. Ward, Cabinet Secretary
dep.wv.gov

July 5, 2021

Rhiannon A. Dodge, E.I.T.
Rummel, Clepper, & Kahl, LLP
159 Plaza Drive
Keyser, WV 26726

RE: Charles Town Utility Board
2021 Collection System Project
Jefferson County, WV

Dear Ms. Dodge:

This letter responds to your correspondence of July 2, 2021, concerning the project referenced above. The West Virginia Division of Air Quality (WVDAQ) will only provide feedback on issues relating to air quality. If you determine that your project activity may have other environmental impacts, then you should consult with the appropriate environmental agency for that issue (e.g. the Division of Water and Waste Management should be consulted on potential water quality issues, for instance, if over one (1) acre will be disturbed, a construction stormwater general permit is required).

Based upon current regulatory requirements, the project referenced above as outlined in your letter does not appear to require any pre-construction permits, authorizations, or air quality analyses by WVDAQ except to the extent any of the following apply:

1. It is necessary to burn land clearing debris to complete the project; in which case, approval by the WVDEP Secretary or his or her authorized representative is required to conduct such burning (see 45CSR6) or;

2. The project entails the renovation, remodeling, or demolition, either partially or totally, of a structure, building, or installation, irrespective of the presence or absence of asbestos-containing materials and is subject to 45CSR34 (the asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40CFR61, Subpart M). If such is the case, a formal Notification of Abatement, Demolition, or Renovation must be completed and timely filed with the WVDEP Secretary's authorized representative and approval received before commencement of the activities addressed in the Notification.

3. Backup or emergency electrical generators may be subject to federal and state requirements and require an air permit in accordance with 45CSR13.

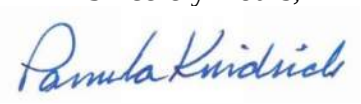
If the project involves demolition, and/or excavation and transportation of soil/aggregates or the handling of materials that can cause problems such as nuisance dust emissions or entrainment or creation of objectionable odors, adequate air pollution control measures must be applied to prevent statutory air pollution problems as addressed by 45CSR4 and 45CSR17. Copies of all the WVDAQ rules cited in this letter may be reviewed on the agency's website at http://www.dep.wv.gov/daq. To review the rules, click on "Summary of Rules" after accessing the website.

You may obtain the latest published air quality data summaries and statistics for the WV Division of Air Quality's ambient air monitoring sites on our website (shown above). Simply click on the image for the Air Quality Annual Report. You may also find a document summarizing, in some detail, the attainment status of the 55 counties in West Virginia relative to National Ambient Air Quality Standards (NAAQS) on our website by clicking on the link for "Publications".

As of July 1, 2021, Jefferson County is considered an attainment area for all criteria pollutants.

If you have any questions or need further assistance or information, please contact this office at (304) 926-0475.

Sincerely Yours,



Pam Kindrick
Planning Section

PKK/lmc

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

July 2, 2021

Ms. Barbara Sargent
Environmental Resources Specialist
Division of Natural Resources
Wildlife Resources Section
Elkins Operations Center
738 Ward Road, PO Box 67
Elkins, WV 26241

Reference: Charles Town Utility Board
2021 Collection System Project

Dear Ms. Sargent,

The Charles Town Utility Board is in the process of performing an environmental review so that it may assess the environmental impacts of a proposed wastewater collection system project to improve the Utility's overall wastewater collection system. In general, the project will consist of improvements to the Burr East Pump Station, Jett's Farm Pump Station and Force Main, Moose Lodge Pump Station and Force Main, Flowing Springs Pump Station and Evitts Run Interceptor, Jefferson Memorial Park Force Main, Fairfax Crossing Parallel Line, and Forrest Avenue Pump Station Relocation. This project will redirect flows to relieve the Old Town Ranson gravity sewer system of high flows and surcharges. It is anticipated that funding for the project will be provided in partnership with SRF. A detailed list of the improvements are as follows:

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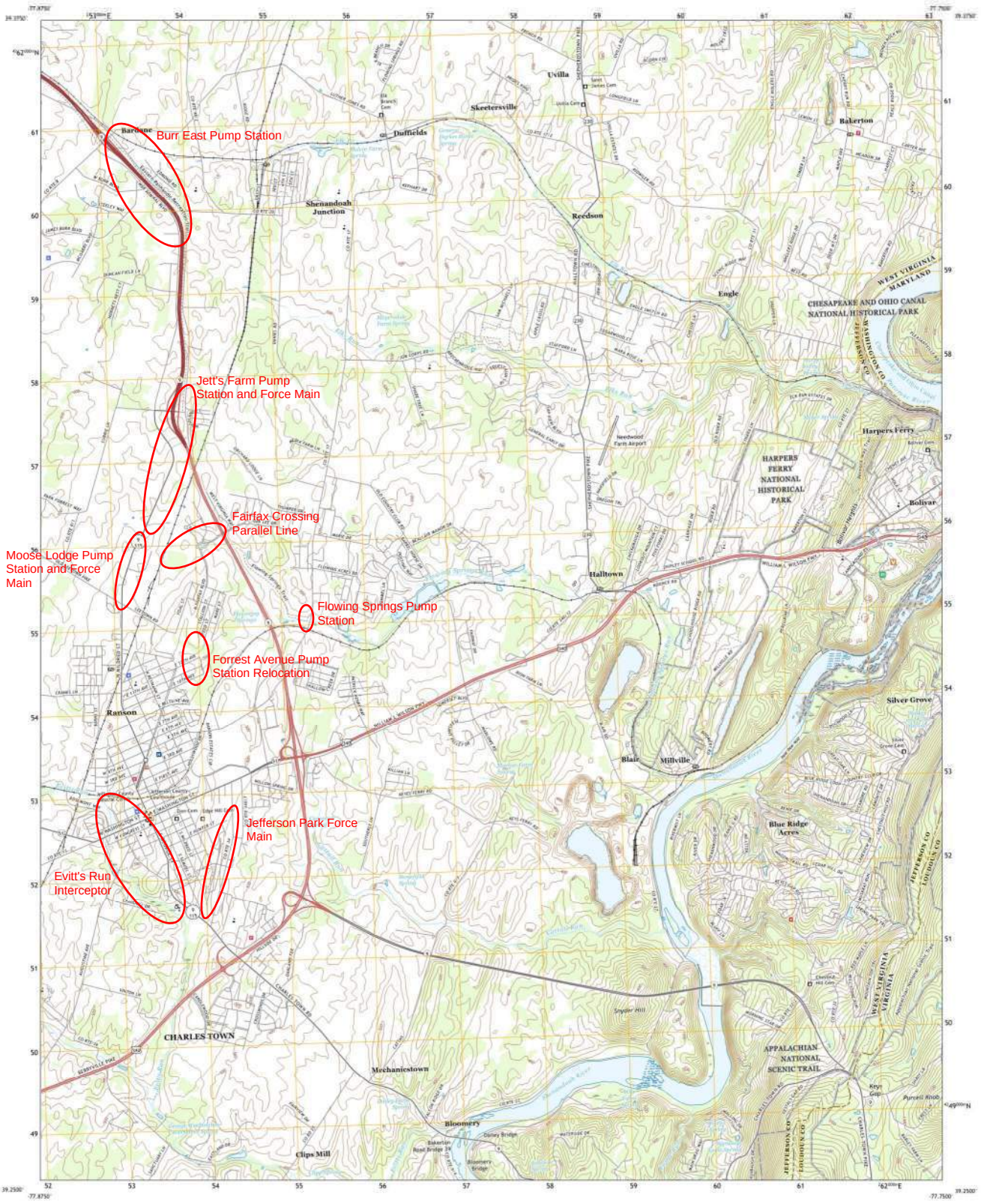
A response within 30 days would be appreciated. Should you have any questions or require additional information, please do not hesitate to contact me at 304.788.3370 or e-mail, rdodge@rkk.com.

Sincerely yours,
RUMMEL, KLEPPER, & KAHL, LLP

Rhiannon A. Dodge, E.I.T.
Associate Engineer

cc: Charles Town Utility Board

Enclosure


U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
US Topo
CHARLES TOWN QUADRANGLE
WEST VIRGINIA - VIRGINIA - MARYLAND
7.5-MINUTE SERIES
Burr East Pump Station
Jett's Farm Pump Station and Force Main
Fairfax Crossing Parallel Line
Moose Lodge Pump Station and Force Main
Flowing Springs Pump Station
Forrest Avenue Pump Station Relocation
Jefferson Park Force Main
Evitt's Run Interceptor
Uvilla
Skeetersville
Duffields
Shenandoah Junction
Reedson
Bakerton
Engle
CHESAPEAKE AND OHIO CANAL NATIONAL HISTORICAL PARK
Harpers Ferry
HARPERS FERRY NATIONAL HISTORICAL PARK
Bolivar
Halltown
Ranson
Silver Grove
Blair
Millville
Blue Ridge Acres
CHARLES TOWN
Mechanicstown
Bloomery
Clips Mill
APPALACHIAN NATIONAL SCENIC TRAIL
Produced by the United States Geological Survey
SCALE 1:24 000
CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
ROAD CLASSIFICATION
CHARLES TOWN, WV, VA, MD
2019

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX P
WETLAND MAP

U.S. Fish and Wildlife Service
National Wetlands Inventory

CTUB 2021 Collection System Project



August 10, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX Q
FEMA PANELS

NOTES TO USERS

…is for use in administering the National Flood Insurance Program. It does …ssarily identify all areas subject to flooding, particularly from local drainage …of small size. The **community map repository** should be consulted for …updated or additional flood hazard information.

…n more detailed information in areas where **Base Flood Elevations** …and/or **floodways** have been determined, users are encouraged to consult …d Profiles and Floodway Data and/or Summary of Stillwater Elevations …ontained within the Flood Insurance Study (FIS) report that accompanies …M. Users should be aware that BFEs shown on the FIRM represent …whole-foot elevations. These BFEs are intended for flood insurance rating …s only and should not be used as the sole source of flood elevation …on. Accordingly, flood elevation data presented in the FIS report should be …n conjunction with the FIRM for purposes of construction and/or floodplain …ment.

…ies of the **floodways** were computed at cross sections and interpolated … cross sections. The floodways were based on hydraulic considerations …ard to requirements of the National Flood Insurance Program. Floodway …nd other pertinent floodway data are provided in the Flood Insurance …port for this jurisdiction.

…areas not in Special Flood Hazard Areas may be protected by **flood …structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood …e Study report for information on flood control structures for this …on.

…**jection** used in the preparation of this map was Universal Transverse … (UTM) Zone 18. **Horizontal datum** was NAD 83, GRS80 spheroid. …ces in datum, spheroid, projection or UTM zones used in the production of …or adjacent jurisdictions may result in slight positional differences in map … across jurisdiction boundaries. These differences do not affect the …of this FIRM.

…evations on this map are referenced to the North American Vertical Datum … These flood elevations must be compared to structure and ground …ns referenced to the same **vertical datum**. For information regarding …on between the National Geodetic Vertical Datum of 1929 and the North …n Vertical Datum of 1988, visit the National Geodetic Survey website at …w.ngs.noaa.gov/ or contact the National Geodetic Survey at the following

…Reference System Division …Geodetic Survey, NOAA …pring Metro Center …st-West Highway …pring, Maryland 20910 …3-3191

…n current elevation, description, and/or location information for **bench** …hown on this map, please contact the Information Services Branch of the … Geodetic Survey at **(301) 713-3242**, or visit its website at …w.ngs.noaa.gov/.

…AP SOURCE: Digital data was obtained from Jefferson County, the West … Statewide Addressing and Mapping Board (WV SAMB), and the West … Dept. of Environmental Protection (WV DEP). Corporate boundaries and …mes were obtained from Jefferson County. The 1:4800 scale 2003 …to base map imagery was obtained from the WV SAMB, as was the …to based hydrographic vector data. County boundaries were digitized by …DEP from U.S. Geological Survey 1:24000 scale topographic map digital …aphics (DRGs).

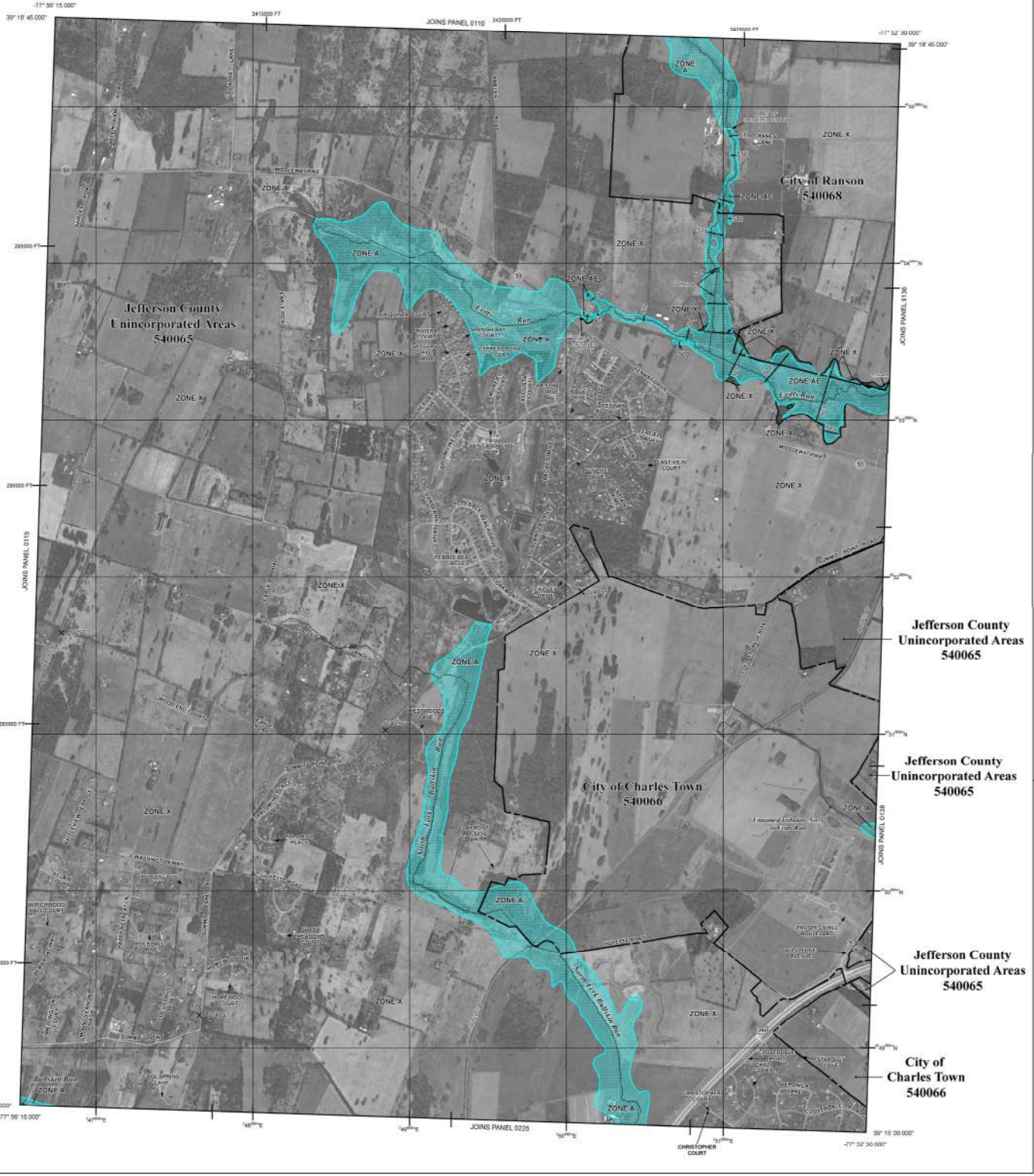
…n the above mentioned digital orthophotographs, this map reflects more …and up-to-date **stream channel configurations** than those shown on the … FIRM for this jurisdiction. The floodplains and floodways that were …ed from the previous FIRM may have been adjusted to conform to these …eam channel configurations. As a result, the Flood Profiles and Floodway …ndex in the Flood Insurance Study report (which contains authoritative …d data) may reflect stream channel distances that differ from what is shown …ap.

…te limits shown on this map are based on the best data available at the …ublication. Because changes due to annexations or de-annexations may …urred after this map was published, map users should contact appropriate …ty officials to verify current corporate limit locations.

…efer to the separately printed **Map Index** for an overview map of the …howing the layout of map panels; community map repository addresses; …sting of Communities table containing National Flood Insurance Program …r each community as well as a listing of the panels on which each …ity is located.

…the **FEMA Map Service Center** at 1-800-358-9616 for information on … products associated with this FIRM. Available products may include …ly issued Letters of Map Change, a Flood Insurance Study report, and /or …ersions of this map. The FEMA Map Service Center may also be reached … 1-800-358-9620 and its website at http://msc.fema.gov/.

…ve **questions about this map** or questions concerning the National Flood …e Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or …FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of special flood hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 (EL 987) — Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- (A) — (A) — Cross section line
- (23) — (23) — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4278000 M — 1000-meter Universal Transverse Mercator grid values, zone 17
- 600000 FT — 5000-foot grid ticks: West Virginia State Plane coordinate system (FIPSZONE 4701), Lambert Conformal Conic projection
- DX5510 x — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
DECEMBER 18, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0120E

FIRM
FLOOD INSURANCE RATE M

JEFFERSON COUNT
WEST VIRGINIA
AND INCORPORATED AR

PANEL 120 OF 245
(SEE MAP INDEX FOR FIRM PANEL L

CONTAINS:

COMMUNITY	NUMBER	PANEL
CHARLES TOWN, CITY OF	540068	0120
JEFFERSON COUNTY	540065	0120
RANSON, CITY OF	540068	0120

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NU
540370

EFFECTIVE
DECEMBER 18

Federal Emergency Management

NOTES TO USERS

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...Reference System Division
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...pring Metro Center
...et-West Highway
...pring, Maryland 20910
...3-3191

...n current elevation, description, and/or location information for **bench** ...hown on this map, please contact the Information Services Branch of the ... Geodetic Survey at **(301) 713-3242**, or visit its website at ...w.ngs.noaa.gov/.

...AP SOURCE: Digital data was obtained from Jefferson County, the West ... Statewide Addressing and Mapping Board (WV SAMB), and the West ...Dept. of Environmental Protection (WV DEP). Corporate boundaries and ...mes were obtained from Jefferson County. The 1:4800 scale 2003 ...to base map imagery was obtained from the WV SAMB, as was the ...to based hydrographic vector data. County boundaries were digitized by ...DEP from U.S. Geological Survey 1:24000 scale topographic map digital ...aphics (DRGs).

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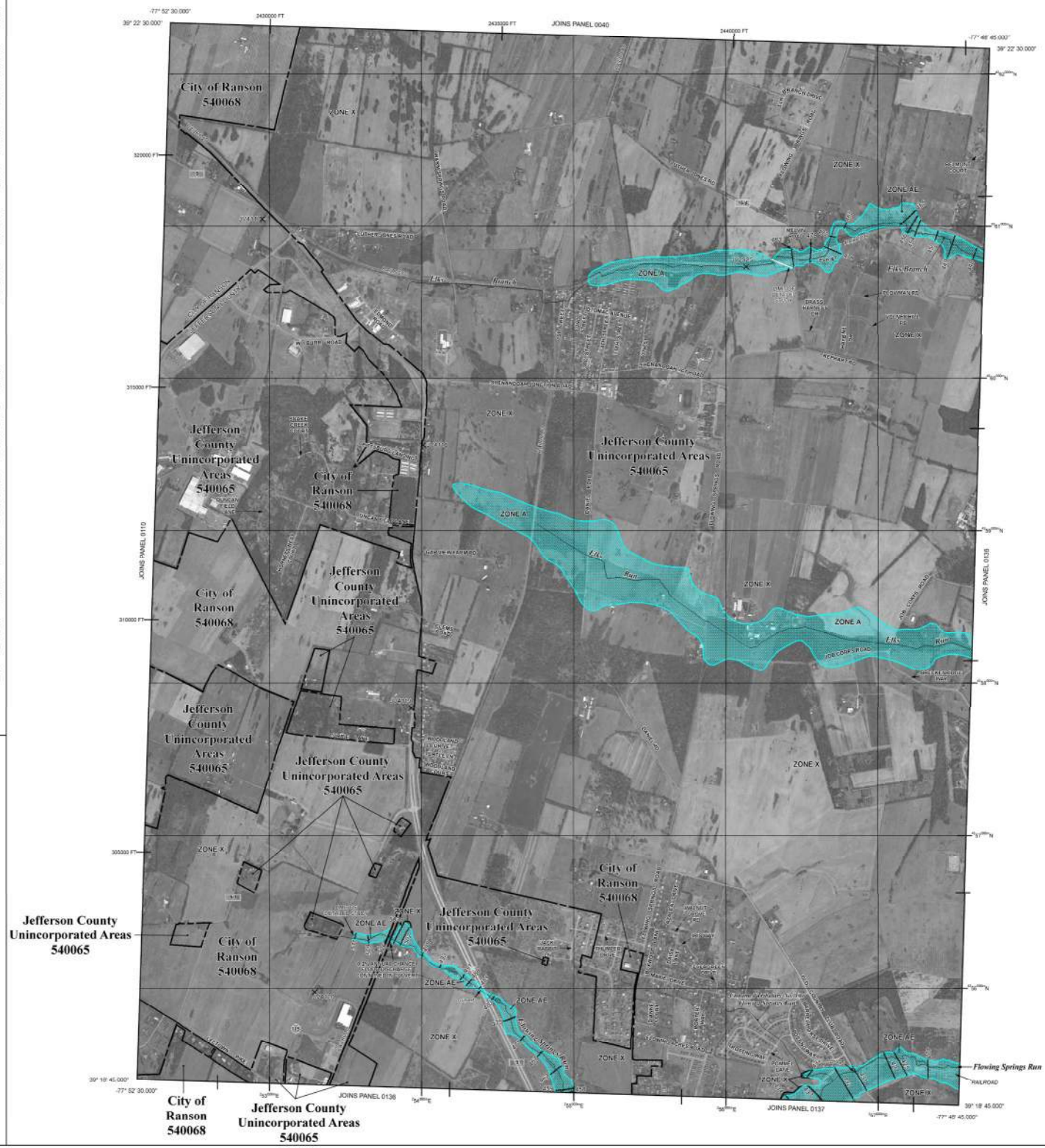
...the **FEMA Map Service Center** at 1-800-358-9616 for information on ...products associated with this FIRM. Available products may include ...ly issued Letters of Map Change, a Flood Insurance Study report, and /or ...rsions of this map. The FEMA Map Service Center may also be reached ...1-800-358-9620 and its website at http://msc.fema.gov/.

...ve **questions about this map** or questions concerning the National Flood ...e Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or ...FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT ... INUNDATION BY THE 1% ANNUAL CHANCE FLO...

The 1% annual chance flood (100-year flood), also known as the base flood, is t... has a 1% chance of being equaled or exceeded in any given year. The Special Flood Haza... area subject to flooding by the 1% annual chance flood. Areas of special Flood H... Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the ... elevation of the 1% annual chance flood.

- **ZONE A** — No Base Flood Elevations determined.
- **ZONE AE** — Base Flood Elevations determined.
- **ZONE AH** — Flood depths of 1 to 3 feet (usually areas of ponding); ... Elevations determined.
- **ZONE AO** — Flood depths of 1 to 3 feet (usually sheet flow on sloping terra... depths determined. For areas of alluvial fan flooding, velo... determined.
- **ZONE AR** — Special Flood Hazard Area formerly protected from the 1% an... flood by a flood control system that was subsequently decertifie... indicates that the former flood control system is being restored... protection from the 1% annual chance or greater flood.
- **ZONE A99** — Area to be protected from 1% annual chance flood by a Fe... protection system under construction; no Base Flood ... determined.
- **ZONE V** — Coastal flood zone with velocity hazard (wave action); no ... Elevations determined.
- **ZONE VE** — Coastal flood zone with velocity hazard (wave action); ... Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must ... of encroachment so that the 1% annual chance flood can be carried without substant... in flood heights.

OTHER FLOOD AREAS

- **ZONE X** — Areas of 0.2% annual chance flood; areas of 1% annual chanc... average depths of less than 1 foot or with drainage areas ... square mile, and areas protected by levees from 1% annual cha...

OTHER AREAS

- **ZONE X** — Areas determined to be outside the 0.2% annual chance floodpl...
- **ZONE D** — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREA

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard ...

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of dif... Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone... in feet*

* Referenced to the North American Vertical Datum of 1988

- (A) — (A) — Cross section line
- (23) — (23) — Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North Ame... of 1983 (NAD 83)
- 4278000 M — 1000-meter Universal Transverse Mercator grid values, ...
- 600000 FT — 5000-foot grid ticks: West Virginia State Plane ... system (FIPSZONE 4701), Lambert Conformal Conic ... projection
- DX5510 — Bench mark (see explanation in Notes to Users sec... FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
DECEMBER 18, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Comm... History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance ag... the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0130E

FIRM
FLOOD INSURANCE RATE M...

JEFFERSON COUNT...
WEST VIRGINIA
AND INCORPORATED AR...

PANEL 130 OF 245
(SEE MAP INDEX FOR FIRM PANEL L...

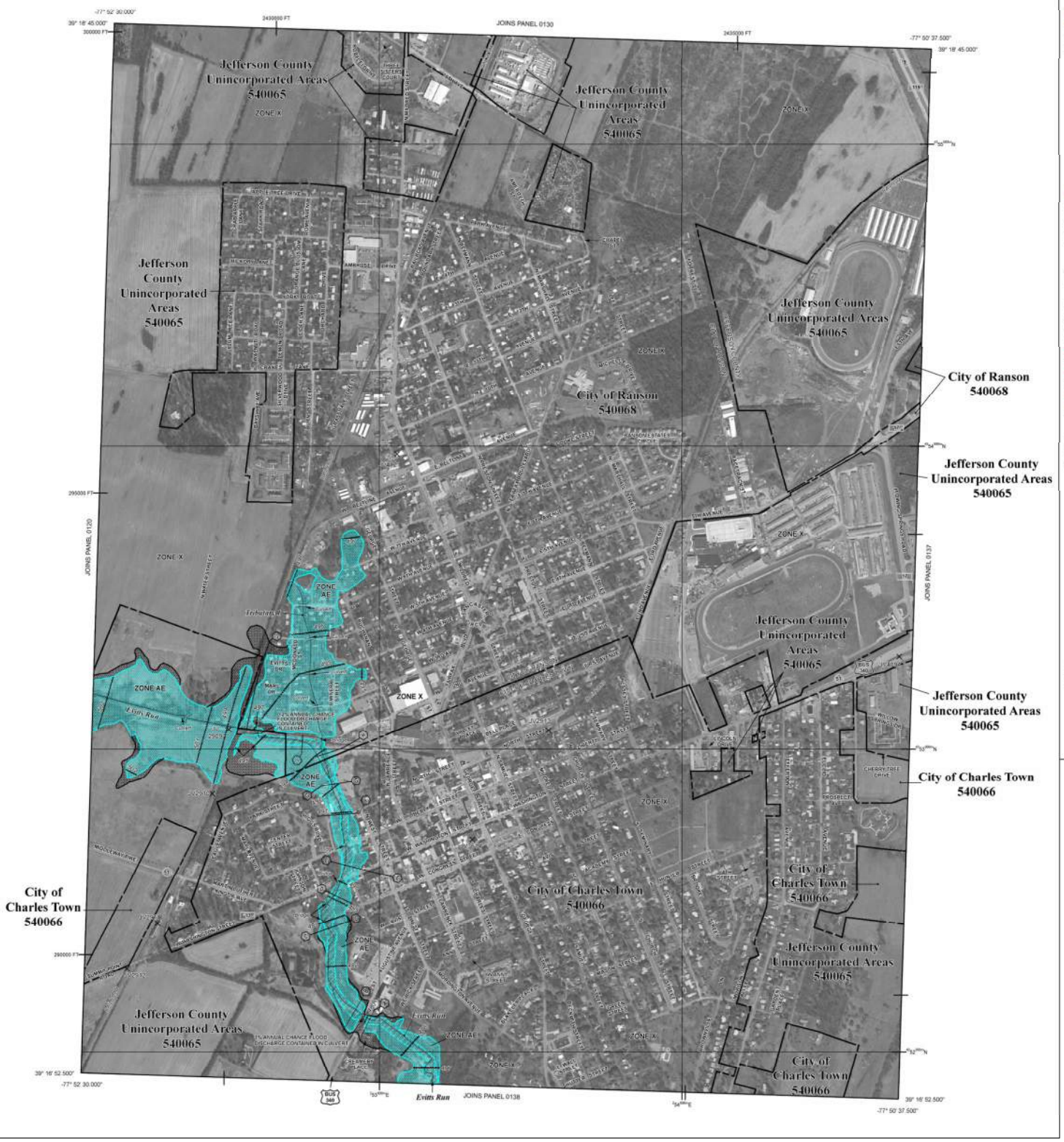
CONTAINS:

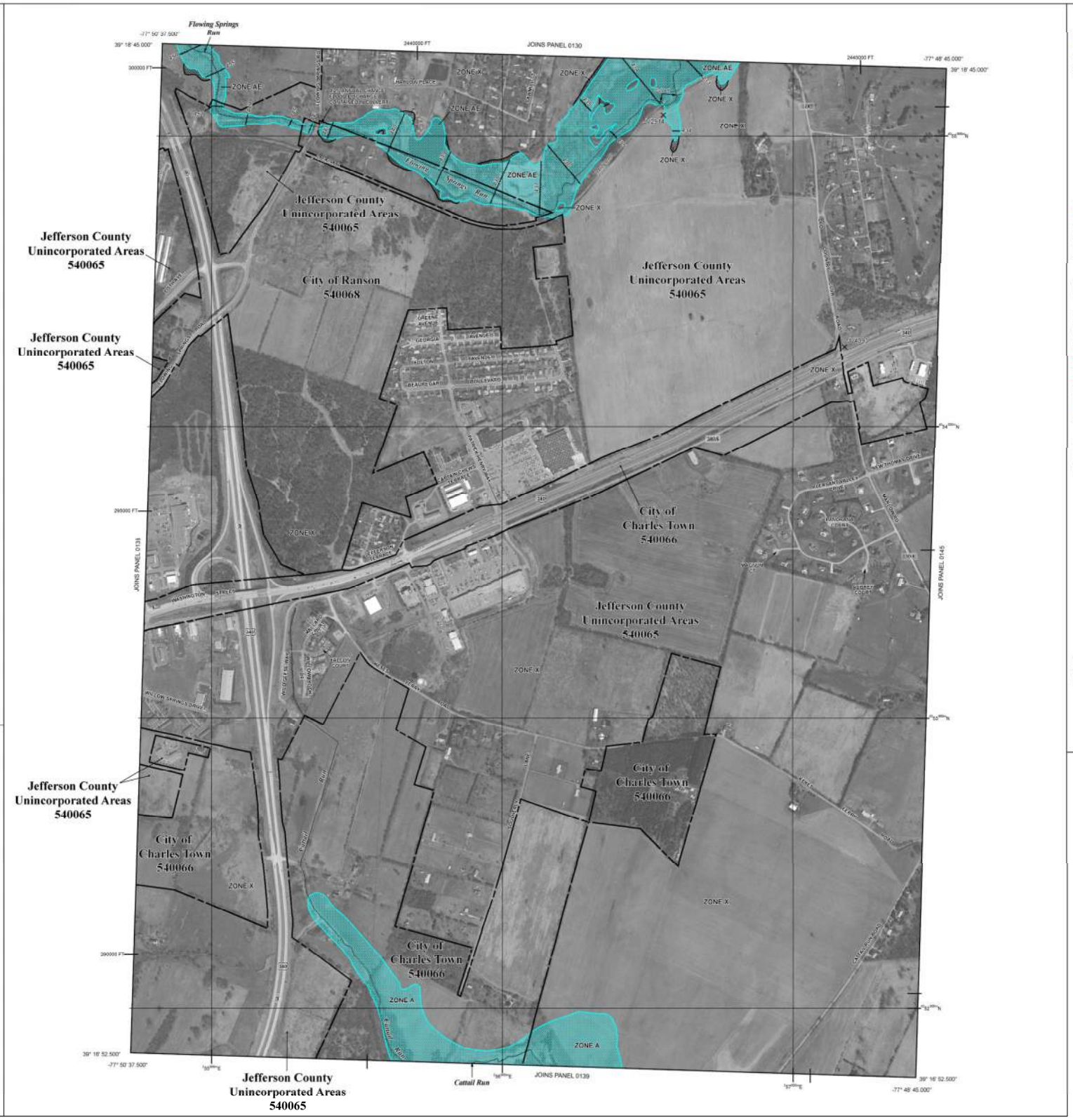
COMMUNITY	NUMBER	PANEL
JEFFERSON COUNTY	540065	0130
Ranson, CITY OF	540066	0130

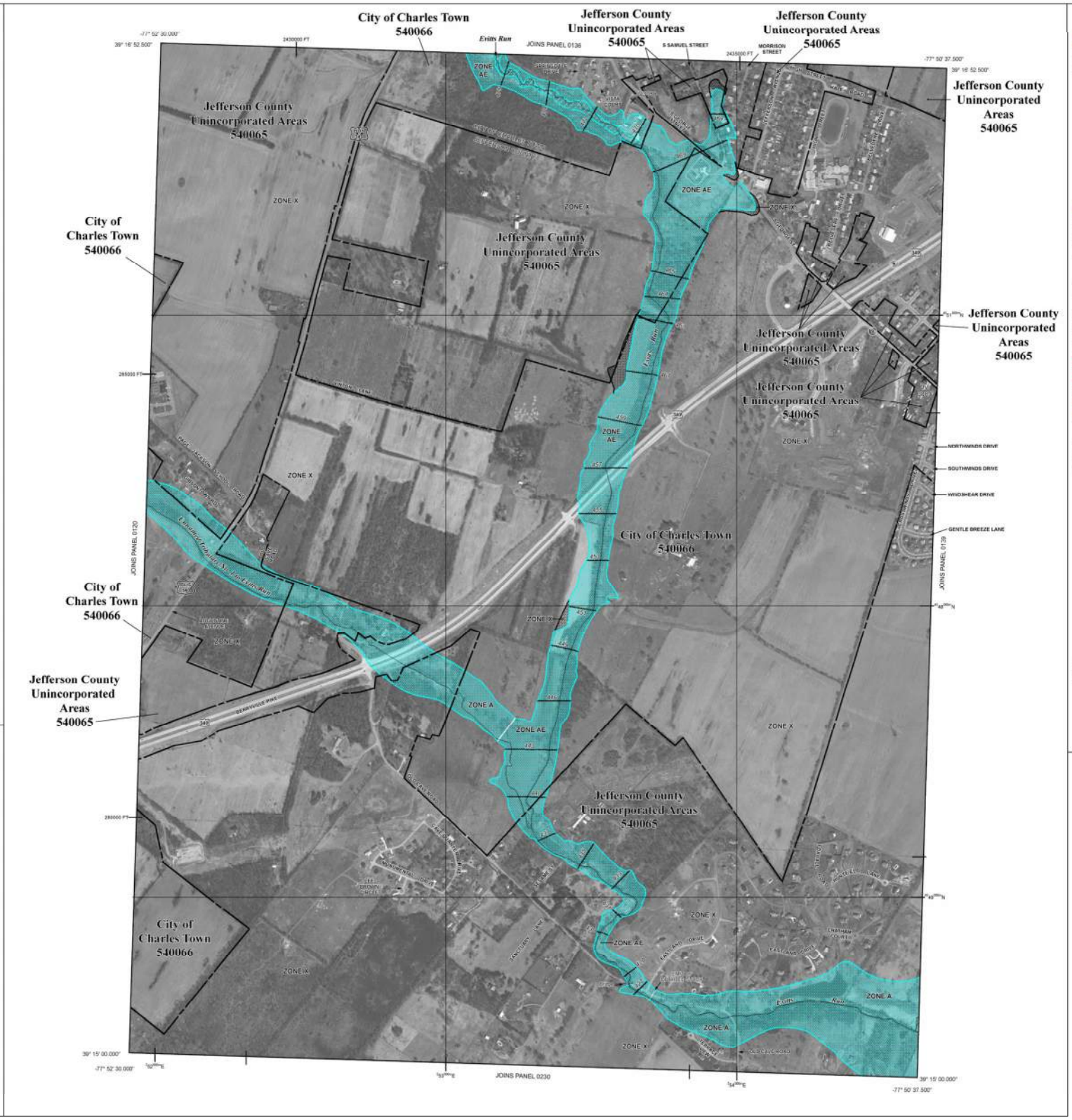
Notice to User: The **Map Number** shown belo... need when placing map orders; the Commun... shown above should be used on insurance appl... the subject community.

MAP NU...
54037C...
EFFECTIVE
DECEMBER 1...

Federal Emergency Management ...


JOINS PANEL 0130
Jefferson County Unincorporated Areas 540065
Jefferson County Unincorporated Areas 540065
Jefferson County Unincorporated Areas 540065
Jefferson County Unincorporated Areas 540065
City of Ranson 540068
City of Ranson 540068
Jefferson County Unincorporated Areas 540065
Jefferson County Unincorporated Areas 540065
Jefferson County Unincorporated Areas 540065
City of Charles Town 540066
City of Charles Town 540066
City of Charles Town 540066
City of Charles Town 540066
Jefferson County Unincorporated Areas 540065
Jefferson County Unincorporated Areas 540065
City of Charles Town 540066
JOINS PANEL 0120
JOINS PANEL 0137
JOINS PANEL 0138
ZONE X
ZONE AE
Evitts Run
Tributary of Evitts Run
1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
-77° 52' 30.000"
39° 16' 45.000"
-77° 50' 37.500"
39° 16' 52.500"
2430000 FT
295000 FT
290000 FT
300000 FT


Flowing Springs Run
JOINS PANEL 0130
JOINS PANEL 0138
JOINS PANEL 0145
JOINS PANEL 0139
Cattail Run
Jefferson County Unincorporated Areas 540065
City of Ranson 540068
City of Charles Town 540066
ZONE AE
ZONE A
ZONE X


City of Charles Town
540066
Jefferson County
Unincorporated Areas
540065
Evitts Run
JOINS PANEL 0136
S SAMUEL STREET
MORRISON STREET
ZONE AE
ZONE X
ZONE A
JOINS PANEL 0120
JOINS PANEL 0139
JOINS PANEL 0230
NORTHWINDS DRIVE
SOUTHWINDS DRIVE
WINDSHEAR DRIVE
GENTLE BREEZE LANE
BEARDSHARE WAY
OLD CHARLES TOWN ROAD
-77° 52' 30.000"
-77° 50' 37.500"
39° 16' 52.500"
39° 15' 00.000"

NOTES TO USERS

…is for use in administering the National Flood Insurance Program. It does …ssarily identify all areas subject to flooding, particularly from local drainage …of small size. The **community map repository** should be consulted for …updated or additional flood hazard information.

…n more detailed information in areas where **Base Flood Elevations** …and/or **floodways** have been determined, users are encouraged to consult …d Profiles and Floodway Data and/or Summary of Stillwater Elevations …ontained within the Flood Insurance Study (FIS) report that accompanies …M. Users should be aware that BFEs shown on the FIRM represent …whole-foot elevations. These BFEs are intended for flood insurance rating …s only and should not be used as the sole source of flood elevation …on. Accordingly, flood elevation data presented in the FIS report should be …n conjunction with the FIRM for purposes of construction and/or floodplain …ment.

…ies of the **floodways** were computed at cross sections and interpolated …cross sections. The floodways were based on hydraulic considerations …ard to requirements of the National Flood Insurance Program. Floodway …nd other pertinent floodway data are provided in the Flood Insurance …port for this jurisdiction.

…areas not in Special Flood Hazard Areas may be protected by **flood …structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood …e Study report for information on flood control structures for this …on.

…jection used in the preparation of this map was Universal Transverse …(UTM) Zone 18. **Horizontal datum** was NAD 83, GRS80 spheroid. …ces in datum, spheroid, projection or UTM zones used in the production of …or adjacent jurisdictions may result in slight positional differences in map …across jurisdiction boundaries. These differences do not affect the …of this FIRM.

…evations on this map are referenced to the North American Vertical Datum …. These flood elevations must be compared to structure and ground …s referenced to the same **vertical datum**. For information regarding …on between the National Geodetic Vertical Datum of 1929 and the North …n Vertical Datum of 1988, visit the National Geodetic Survey website at …w.ngs.noaa.gov/ or contact the National Geodetic Survey at the following

…ference System Division …Geodetic Survey, NOAA …ring Metro Center …t-West Highway …ring, Maryland 20910 …3-3191

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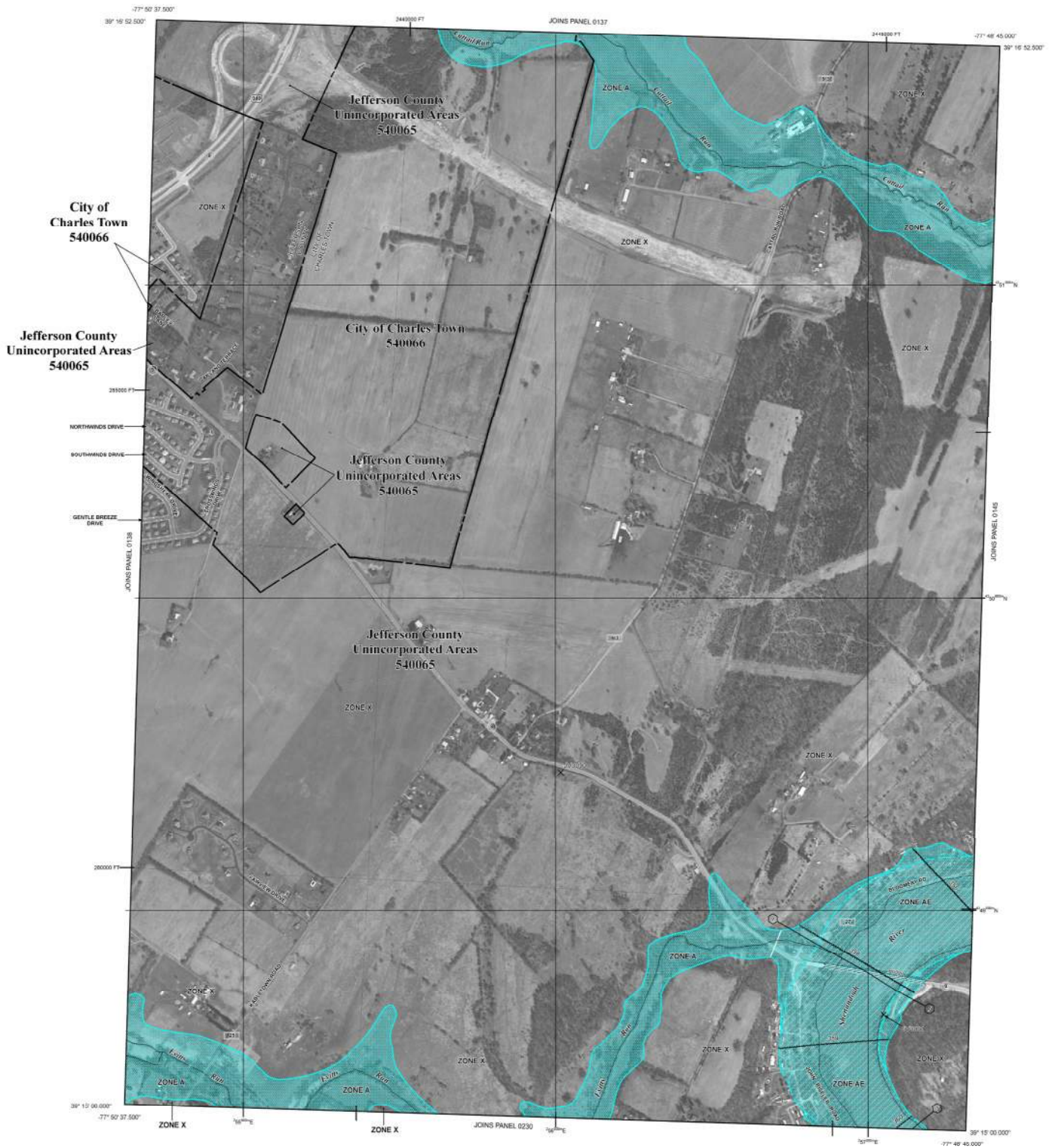

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT … INUNDATION BY THE 1% ANNUAL CHANCE FLO…

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ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terra… depths determined. For areas of alluvial fan flooding, velo… determined.

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ZONE A99 — Area to be protected from 1% annual chance flood by a Fe… protection system under construction; no Base Flood … determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no … Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); … Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must … of encroachment so that the 1% annual chance flood can be carried without substant… in flood heights.

OTHER FLOOD AREAS

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Boundary dividing Special Flood Hazard Areas of dif… Flood Elevations, flood depths or flood velocities.

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DX5510 x — Bench mark (see explanation in Notes to Users sec… FIRM panel)

M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
DECEMBER 18, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Comm… History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance ag… the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

PANEL 0139E

FIRM

FLOOD INSURANCE RATE M…

JEFFERSON COUNT…
WEST VIRGINIA
AND INCORPORATED AR…

PANEL 139 OF 245

(SEE MAP INDEX FOR FIRM PANEL L…

CONTAINS:

COMMUNITY	NUMBER	PANEL
CHARLES TOWN, CITY OF	540066	0139
JEFFERSON COUNTY	540065	0139

Notice to User: The **Map Number** shown belo… need when placing map orders; the Commun… shown above should be used on insurance appl… the subject community.

MAP NU…
540370…

EFFECTIVE…
DECEMBER 18…

Federal Emergency Management…

NATIONAL FLOOD INSURANCE PROGRAM

FACILITY PLAN

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

APPENDIX R
PROJECT DISPLAY

X - DENOTES POTENTIAL FUTURE DEVELOPMENTS

1	AMERICAN HERITAGE (HUNTWELL)
2	ASPEN GREEN
3	BEALLAIR
4	BLACKFORD VILLAGE
5	BRECKENRIDGE EAST
6	BRIAR RUN
7	BURR INDUSTRIAL PARK & BARDANE
8	CAMBRIDGE
9	CHARLES TOWN INFILL
10	CLAYHILL FARM
11	DANIELS FOREST
12	FRITTS PROPERTY
13	HARVEST HILLS
14	HUNTFIELD
15	JEFFERSON HEIGHTS NORTH
16	TATE MANOR
17	LAKELAND PLACE/LLOYD'S
18	JEFFERSON ORCHARDS
19	LANGLET
20	LLOYD PROPERTY
21	LOCUST KNOLL
22	MAGNOLIA SPRINGS
23	NORBORNE GLEBE
24	OLD TOWN RANSON - INFILL
25	POTOMAC MARKETPLACE
26	PRESIDENT'S POINTE
27	PROSPECT PLACE
28	RANSON GATEWAY/BOULEVARD
29	SHENANDOAH SPRINGS
30	STOLIPHER
31	WASHINGTON LANDING
32	WINCHESTER COLD STORAGE
33	WINDMILL CROSSING

FLOWING SPRINGS PUMP STATION UPGRADE

FAIRFAX CROSSING PARALLEL GRAVITY SEWER LINE AND ALTERNATIVE OPTIONS

JETTS FARM PUMP STATION AND FORCEMAIN

JETTS FARM PUMP STATION

BURR EAST PUMP STATION FLOW DIVERSION

BURR EAST PUMP STATION

FORREST AVE. PUMP STATION

FORREST AVE. PUMP STATION RELOCATION

JEFFERSON MEMORIAL PARK FORCEMAIN

SAMUEL STREET PUMP STATION

CTUB WASTE WATER TREATMENT PLANT

EVITTS RUN INTERCEPTOR

LLOYDS FLAT PUMP STATION

MOOSE LODGE PUMP STATION

MOOSE LODGE PUMP STATION AND FORCEMAIN

NORTHPORT PUMP STATION

WAR ADMIRAL PUMP STATION

TUSCAWILLA SEWER TREATMENT PLANT

S.R. 340

WV 9

War Admiral Blvd.

E. Washington St.

St. Augustine Ave

Summit Point Rd

Wiltshire Rd.

CHARLES TOWN UTILITY BOARD
2021 COLLECTION SYSTEM PROJECT

CHARLES TOWN UTILITY BOARD
WATER/SEWER SYSTEMS UPGRADE PROJECTS

RUMMEL, KLEPPER & KAHL, LLP

TASK NO. 19

PROFESSIONAL ENGINEERING & SURVEYING SERVICES

2021 COLLECTION SYSTEM PROJECT

August 20, 2021

Being a part of Agreement Between
Charles Town Utility Board and Rummel, Klepper & Kahl, LLP
dated November 13, 2019

This Task No. 19 dated August 20, 2021, to the Agreement between Charles Town Utility Board (CTUB) and Rummel, Klepper, and Kahl, LLP (RK&K) dated November 13, 2019, is to provide professional engineering and surveying services for designing the modifications to the Flowing Springs Pump Station (FSPS) and Evitt's Run Interceptor, as detailed in the August 2021 Facility Plan. Task No. 19 also includes combining all the individual projects detailed in the Facility Plan into a single construction project. Professional engineering services for the construction project will include permitting and bidding phase assistance, along with construction engineering, and inspection phase services throughout construction.

Scope of Services

The following summarizes RK&K's services as part of this Task:

Design Phase Services

1. RK&K will perform the necessary field surveys to locate existing rights-of-way and property lines, utilities, topographic features, and other relevant information in accordance with Section 3.1.11 of the Agreement.
2. RK&K will prepare preliminary plans in accordance with Section 2.2 of the Agreement for the FSPS Upgrades as described in the Facility Plan.
    a. FSPS will be designed around the anticipated 20-year development stated in the 2021 CTUB Sewer Strategic Plan and the existing flows to the FSPS as summarized on the omnisite.
3. RK&K will prepare preliminary plans in accordance with Section 2.2 of the Agreement for the Evitt's Run Interceptor as described in the Facility Plan.
    a. Evitt's Run Interceptor capacity will be designed around the anticipated 20-year development stated in the 2021 CTUB Sewer Strategic Plan and the existing flows in the Evitt's Run Interceptor predicted by the RK&K Sewer Model.
4. RK&K will submit the preliminary design to the CTUB Staff for review, approval, and authorization to proceed to final design plans.
5. RK&K will prepare the plans, specifications, and contract document in accordance with Charles Town Utility Board standards.

6. RK&K will contact environmental review agencies and other stakeholders to obtain clearances for construction of project in accordance with Section 2.3 of the Agreement.

7. RK&K will perform courthouse research (online) along with preparing the necessary easement plat(s) and description(s) for the project.

    a. Easements for the Evitt's Run Interceptor are excluded as it is assumed the sewer line will be placed within existing easements.

8. With concurrence from CTUB Staff on the preliminary design, RK&K will proceed with preparing and submitting final design to the CTUB Staff for review and approval.

9. Upon receipt of CTUB Staff final design comments, RK&K will revise the final design, incorporating review comments, and prepare the necessary bidding related documents.

Bidding Phase Assistance

1. RK&K will assist CTUB staff in advertising project for bid, conducting pre-bid meeting, preparing minutes of meeting, issuing addendums, attending bid opening, preparing bid tabulation, and recommending award of contract in accordance with Section 2.4 of the Agreement.

    a. For this Task Order, RK&K has assumed a single construction project.

2. RK&K will provide conformed drawing files (in dwg format) of the bidding plans to the Charles Town Utility Board for record purposes.

Construction Phase Assistance

1. RK&K will prepare notice of award for submission to Contractor, agreement, review of contract documents (bonds, insurance, etc.) and notice to proceed.

2. RK&K will provide construction phase services in accordance with Section 2.5 of the Agreement.

3. RK&K will provide RPR services in accordance with the Agreement Exhibit A.

4. RK&K will assist CTUB staff with pump station startups in accordance with Section 2.6 of the Agreement.

5. RK&K will provide record drawings of the contractor(s) as-builts in accordance with Section 3.1.2 of the Agreement.

Schedule

Subject to weather and CTUB review time, RK&K anticipates six (6) months to perform the field survey, preparation of drawings, permitting, etc. from issuance of notice to proceed. RK&K anticipates that the bidding phase will be four (4) months followed by an 18-month construction phase, 15-months of which is estimated to be actual construction requiring inspection and construction progress meetings. The extended construction schedule is a result of anticipated sequencing of system phases for demolition, construction and startup which cannot occur simultaneously. Impacts to the schedule may occur outside of RK&K's and CTUB's ability to control (i.e. regulatory, permitting approvals, material availability, etc.).

Estimated Person-Hours per Phase by Category, Engineer's Consultant Costs and Other Direct Costs

A fee derivation is attached as Pages 4 and 5 which includes RK&K's estimated person-hours by category and other direct costs anticipated to complete the work for this project.

Materials and Resources Required of CTUB

- CTUB will be responsible for providing available mapping to facilitate RK&K's design.
- CTUB will be responsible for providing flow meter data for the FSPS.
- CTUB will be responsible for providing portable flow meter data at points throughout the system requested by RK&K.
- CTUB will be responsible for paying any permitting and regulatory agency fees.
- CTUB will be responsible for all construction related materials and equipment.

Estimated Not-To-Exceed Fee

RK&K will provide the scope of services described above at an amount equal to Engineer's Direct Labor Costs times a factor of 2.7 for the services of Engineer's personnel engaged on the Project, plus Reimbursable Expenses.

The total estimated Not-to-Exceed fee to perform the work is $636,200.00 based on the following breakout of costs:

- Design Phase $112,500.00
- Bidding Phase $ 8,300.00
- Construction Admin. $259,100.00
- Resident Project Rep. $256,300.00

Authorization

This Task No. 19, CTUB 2021 Collection System Project, dated August 20, 2021, and being a part of the Agreement between Charles Town Utility Board and Rummel, Klepper & Kahl, LLP for Engineering Services for Water/Sewer Systems Upgrade Projects dated November 13, 2019, is approved by the following duly authorized officials:

Engineer: RUMMEL, KLEPPER & KAHL, LLP

08/20/2021

John W. Cole, PE — Date
Senior Manager, Municipal Engineering

Owner: CHARLES TOWN UTILITY BOARD

Daryl Hennessy — Date
Chairman

FEE DERIVATION FOR RK&K - 08/20/2021

CTUB 2021 COLLECTION SYSTEM PROJECT - DESIGN, PERMITTING, BIDDING AND CONSTRUCTION PHASE SERVICES

		RK&K Labor Task	Manager	Project Engineer	Associate Engineer	Mechanical Engineer	Civil Engineer	Electrical Engineer	Survey Technician	Survey Crew 2-man	CADD Operator / Technician	Construction Inspector	Totals
Preliminary Design Phase	1	Kickoff meeting	4		4	4							12
	2	Site evaluation			16	16		8					40
	3	Survey		4	8				16	40			68
	4	Easements		4					16	24			44
	5	Permit Evaluation			4								4
	6	G Sheets			1						16		17
	7	Sequence	4		16	16					16		52
	8	Flowing Springs PS	4			80		80					164
	9	Evitt's Run (2 sheets)	1		16						24		41
	10	Compile with Jefferson Park, Burr East, Moose Lodge, Jett's Farm, Forrest Ave	1		4	4					16		25
	11	Erosion and Sediment Control	1		1						8		10
	12	Traffic Control	1		1						8		10
	13	Details			1						8		9
	14	Specifications	4		10	40		20					74
	15	Review Meeting	4		4	4							12
	16	Construction Cost Estimate			16	16							32
	17	Quality Control/Quality Assurance	4	4									8
		Subtotal - Labor Hours	**28**	**12**	**102**	**180**	**0**	**108**	**32**	**64**	**96**	**0**	**622**
												Subtotal Labor Costs	**$ 68,200.00**

		RK&K Labor Task	Manager	Project Engineer	Associate Engineer	Mechanical Engineer	Civil Engineer	Electrical Engineer	Survey Technician	Survey Crew 2-man	CADD Operator / Technician	Construction Inspector	Totals
Final Design Phase	1	G Sheets			1						8		9
	2	Sequence	4		8	8					8		28
	4	Flowing Springs PS	8			40		40					88
	5	Evitt's Run (2 sheets)	1		8		8				24		41
	6	Compile with Jefferson Park, Burr East, Moose Lodge, Jett's Farm, Forrest Ave	1		4	4					8		17
	7	Erosion and Sediment Control	1		1						8		10
	8	Traffic Control	1		1						8		10
	9	Details			1						8		9
	10	Specifications	8		10	20		20					58
	11	Permitting			16	8					20		44
	12	Construction Cost Estimate			16	16							32
	13	Bidding and Contract Documents	6		8								14
	14	Review Meeting	4		4	4							12
	15	Quality Control/Quality Assurance	4	4									8
		Subtotal - Labor Hours	**38**	**4**	**78**	**100**	**8**	**60**	**0**	**0**	**92**	**0**	**380**
												Subtotal Labor Costs	**$ 43,300.00**

	RK&K Labor Task	Manager	Project Engineer	Associate Engineer	Mechanical Engineer	Civil Engineer	Electrical Engineer	Survey Technician	Survey Crew 2-man	CADD Operator / Technician	Construction Inspector	Totals
Design Phase	**Total Labor Hours - Design**	66	16	180	280	8	168	32	64	188	0	1,002
											Total Labor Fee - Design	**$ 111,500.00**

	Non-Labor Task		Round Trip	No	Totals	
	Direct Costs	Mileage	160	5	$ 500.00	
		Printing			$ 500.00	
					$ -	
					Total Non-Labor Direct Costs	**$ 1,000.00**
					Total Fee - Design Phase	**$ 112,500.00**

FEE DERIVATION FOR RK&K - 08/20/2021

CTUB 2021 COLLECTION SYSTEM PROJECT - DESIGN, PERMITTING, BIDDING AND CONSTRUCTION PHASE SERVICES

		RK&K Labor Task	Manager	Project Engineer	Associate Engineer	Mechanical Engineer	Civil Engineer	Electrical Engineer	Survey Technician	Survey Crew 2-man	CADD Operator / Technician	Construction Inspector	Totals
Bidding Phase	1	Pre-bid meeting	4		4	4							12
	2	Respond to questions - prepare addendum	2		16	4		4			4		30
	3	Review bids - letter of recommendation	4		16								20
		Subtotal - Labor Hours	**10**	**0**	**36**	**8**	**0**	**4**	**0**	**0**	**4**	**0**	**62**
												Subtotal RK&K Fee - Bidding Services	**$ 7,800.00**
		Non-Labor Task								**Round Trip**	**No**	**Totals**	
		Direct Costs	Mileage							160	1	$ 100.00	
			Printing									$ 400.00	
												Total Non-Labor Direct Costs	**$ 500.00**
												Total Fee - Bidding Phase	**$ 8,300.00**

		RK&K Labor Task	Manager	Project Engineer	Associate Engineer	Mechanical Engineer	Civil Engineer	Electrical Engineer	Survey Technician	Survey Crew 2-man	CADD Operator / Technician	Construction Inspector	Totals
Construction Administration Services	1	Kick off meeting and 15 progress meetings	24		120	96							240
	2	Construction coordination	80		960	240		40					1,320
	3	Shop drawing review	4		80	100		40					224
	4	RFI review and response	4		40	20		20					84
	5	Substantial completion walk-through and punch list			16	16		8					40
	6	As-builts / Record Drawings			20						80	10	110
	7	Equipment Startup			20	60		10					90
	8	Post-Construction assistance / Project Close Out	8		40	8							56
		Subtotal - Labor Hours	**120**	**0**	**1,296**	**540**	**0**	**118**	**0**	**0**	**80**	**10**	**2,164**
												Subtotal RK&K Fee - Construction Administration Phase	**$ 256,300.00**
		Non-Labor Task								**Round Trip**	**No**	**Totals**	
		Direct Costs	Mileage							160	20	$ 1,800.00	
			Printing							120	10	$ 1,000.00	
												Total Non-Labor Direct Costs	**$ 2,800.00**
												Total Fee - Construction Administration	**$ 259,100.00**

		RK&K Labor Task	Manager	Project Engineer	Associate Engineer	Mechanical Engineer	Civil Engineer	Electrical Engineer	Survey Technician	Survey Crew 2-man	CADD Operator / Technician	Construction Inspector	Totals
Construction Inspection Services	1	Field inspection (15 Months)										2,431	2,431
		Subtotal - Labor Hours	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2,431**	**2,431**
												Subtotal RK&K Fee - Inspection Services	**$ 210,040.00**
		Non-Labor Task										**Totals**	
		Direct Costs	Mileage (200 miles per week)							12000	$0.56/mile	$ 6,720.00	
			Lodging (4 nights per week)							240	$96/night	$ 23,040.00	
			Meals							300	$55/day	$ 16,500.00	
												Total Non-Labor Direct Costs	**$ 46,260.00**
												Total Fee - Construction Inspection	**$ 256,300.00**

TOTAL ENGINEERING FEE	**$ 636,200.00**

Debt Capsule Report

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)
						08/01/21								
Bond Series	Original Designation	System Allocation	Loan Program	Public Mkt Purpose	Original Par Amount	Outstanding Par Amount	DSRF Requirement	DSRF Balance	Water Allocation	Sewer Allocation	Interest Rate	Refundable Coupons	FY Final Maturity	Public Mkt Par Call Date
1987 B		Charles Town	WDA		$413,629	$65,310	$10,886	BAM Surety	100.000%	0.000%	0.000%		2027	
1988 B-1		Charles Town	WDA		$295,916	$60,688	$7,588	BAM Surety	0.000%	100.000%	0.000%		2029	
1988 B-2		Charles Town	WDA		$558,000	$114,452	$14,308	BAM Surety	100.000%	0.000%	0.000%		2029	
1989 B		Charles Town	WDA		$117,480	$27,111	$3,013	BAM Surety	100.000%	0.000%	0.000%		2030	
2000 A*		Charles Town	SRF		$3,163,781	$95,444	$0	$20,762	0.000%	100.000%	2.000%		2022	
2002 A		Charles Town	WDA		$1,100,000	$825,681	$72,846	BAM Surety	100.000%	0.000%	5.800%		2040	
2002 B		Charles Town	WVIF		$3,600,000	$1,963,636	$93,507	BAM Surety	100.000%	0.000%	0.000%		2042	
2010 A		Charles Town	DWTRF		$912,458	$490,230	$55,468	BAM Surety	100.000%	0.000%	2.000%		2031	
2010 B		Charles Town	DWTRF		$100,000	$53,727	$6,080	BAM Surety	100.000%	0.000%	2.000%		2031	
2010 C		Charles Town	SRF		$1,250,000	$833,320	$41,668	BAM Surety	0.000%	100.000%	0.000%		2041	
2010 D		Charles Town	SRF		$500,000	$333,320	$16,668	BAM Surety	0.000%	100.000%	0.000%		2041	
2011 A		Charles Town	SRF		$6,634,881	$5,007,458	$250,373	BAM Surety	0.000%	100.000%	0.000%		2041	
2013 A		Charles Town	SRF		$591,977	$466,409	$21,262	BAM Surety	0.000%	100.000%	0.500%		2045	
2014 A		Charles Town	SRF		$4,058,900	$3,391,792	$145,782	BAM Surety	0.000%	100.000%	0.500%		2046	
2015 A		Charles Town	Public Mkt	Refunding (BQ)	$2,750,000	$2,060,000	$211,425	BAM Surety	76.000%	24.000%		3.165%	2033	12/01/21
2015 B		Charles Town	Public Mkt	Refunding (BQ)	$4,355,000	$2,735,000	$429,950	BAM Surety	81.000%	19.000%		3.144%	2029	10/01/21
2016 A		Charles Town	Public Mkt	New Money (NBQ)	$7,695,000	$6,890,000	$432,969	BAM Surety	100.000%	0.000%		3.817%	2046	03/01/26
2016 B		Charles Town	Public Mkt	New Money (NBQ)	$3,895,000	$3,840,000	$257,000	BAM Surety	0.000%	100.000%		3.291%	2046	06/01/26
2018 A-1	1988 B	Jefferson Co	WDA		$425,767	$87,340	$10,921	BAM Surety	0.000%	100.000%	0.000%		2029	
2018 A-3	1998 C	Jefferson Co	WVIF		$662,039	$598,118	$38,302	BAM Surety	0.000%	100.000%	1.000%		2038	
2018 A-4	1999 A	Jefferson Co	SRF		$378,363	$110,355	$12,612	BAM Surety	0.000%	100.000%	0.500%		2030	
2018 A-5	2000 A	Jefferson Co	SRF		$1,154,889	$404,208	$38,496	BAM Surety	0.000%	100.000%	0.500%		2032	
2018 A-6	2008 A	Jefferson Co	SRF		$2,005,000	$1,169,560	$66,836	BAM Surety	0.000%	100.000%	2.000%		2039	
2018 A-7	2014 A	Jefferson Co	DWTRF		$985,350	$807,755	$35,390	BAM Surety	100.000%	0.000%			2046	
2018 B**		Jefferson Co	Public Mkt	Refunding (BQ)	$3,065,000	$2,715,000	$306,500	BAM Surety	0.000%	100.000%		3.305%	2033	06/01/23
2020 A		Charles Town	Public Mkt	Refunding (BQ)	$4,575,000	$4,400,000	$304,047	BAM Surety	Variable	Variable		2.350%	2043	06/01/25
Totals:					$55,243,430	$39,545,913	$2,883,897							

** No Current DSR Requirement as Revenue Fund Balance Exceeds Outstanding Principal.*

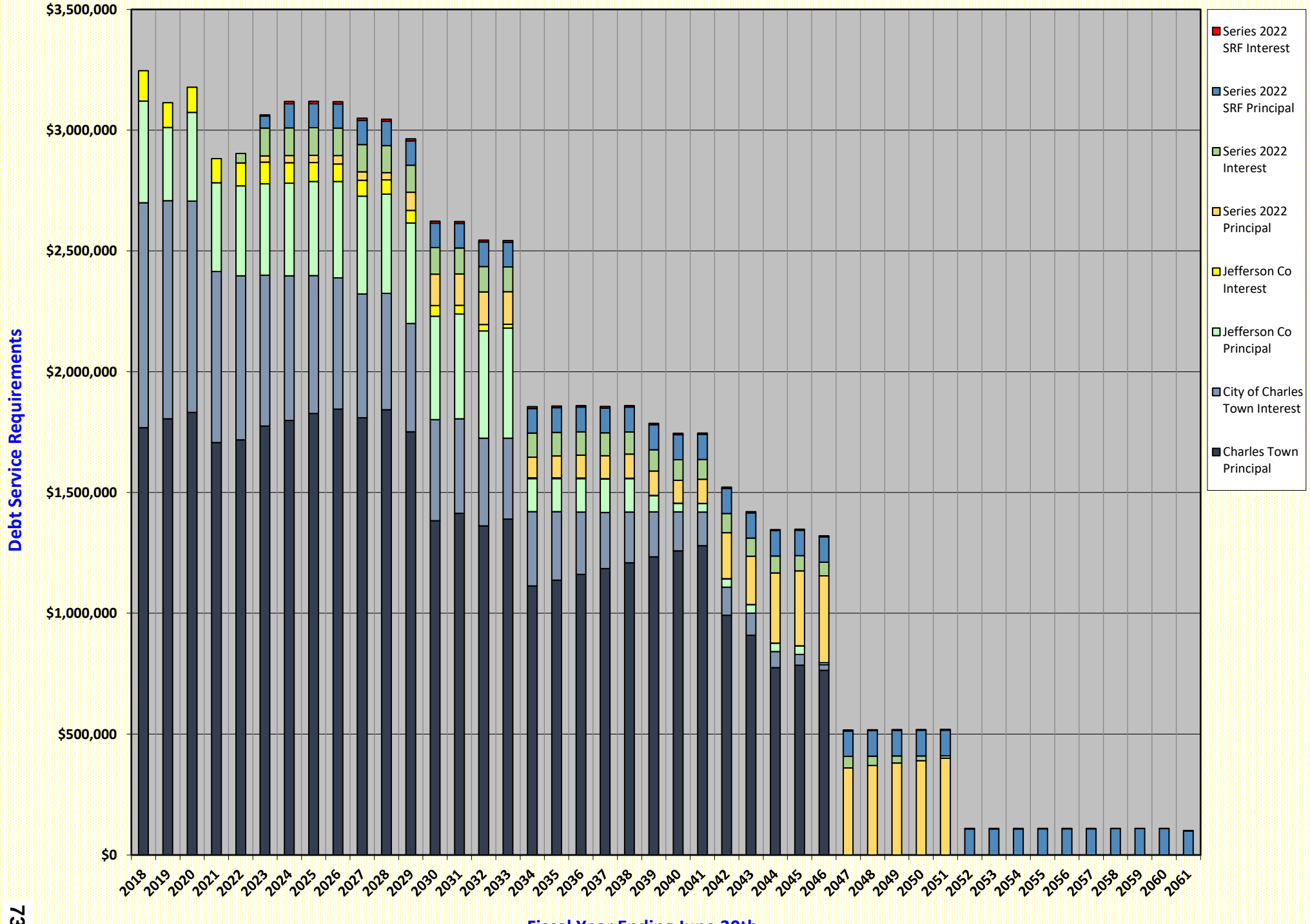
City of Charles Town, WV - Aggregate Refunding Analysis
(Series 2015A & Series 2015B Refunding)

	Refunded Bond Payments			New Bond Payments			Net Savings
Fiscal Year	Principal Portion	Interest Portion	Total	Principal Portion	Interest Portion	Total	Savings
2022	$0	$67,838	$67,838	$0	$50,741	$50,741	$17,097
2023	$500,000	$128,175	$628,175	$530,000	$82,100	$612,100	$16,075
2024	$520,000	$112,875	$632,875	$545,000	$71,350	$616,350	$16,525
2025	$535,000	$95,175	$630,175	$555,000	$60,350	$615,350	$14,825
2026	$550,000	$77,025	$627,025	$555,000	$49,250	$604,250	$22,775
2027	$565,000	$60,300	$625,300	$570,000	$38,000	$608,000	$17,300
2028	$420,000	$45,525	$465,525	$420,000	$28,100	$448,100	$17,425
2029	$440,000	$32,175	$472,175	$435,000	$19,550	$454,550	$17,625
2030	$185,000	$21,888	$206,888	$185,000	$13,350	$198,350	$8,538
2031	$190,000	$15,325	$205,325	$190,000	$9,600	$199,600	$5,725
2032	$195,000	$9,075	$204,075	$190,000	$5,800	$195,800	$8,275
2033	$205,000	$3,075	$208,075	$195,000	$1,950	$196,950	$11,125
Totals	$4,305,000	$668,450	$4,973,450	$4,370,000	$430,141	$4,800,141	$173,309

Net Savings Amount	
Gross Savings:	$173,309
Present Value Savings:	$168,401
Present Value Savings %:	3.91%

Interest Rate Reduction	
Prior Bonds Average Rate:	3.16%
Series 2021 REF Interest Rate:	1.38%
Interest Rate Reduction:	1.78%

(City of Charles Town Combined Waterworks and Sewerage System Debt Service Structure)



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Debt Service Structure Report - Combined Systems

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)
	---------- Charles Town Systems ---------- (Updated for Estimated Series 2021 REF Bonds)				---------- Jefferson Co Systems ----------				---------- Series 2022 EST Bonds ---------- (R &R Project - Public Market)			---------- Series 2022 EST ---------- (Flowing Springs Project - SRF)					
FY Ending June 30	Principal Portion	Interest Portion	Admin Fees Portion	Total Payments	Principal Portion	Interest Portion	Admin Fees Portion	Total Payments	Principal Portion	Interest Portion	Total Payments	Principal Portion	Interest Portion	Admin Fees Portion	Total Payments	Grand Total Payments	MADS Coverage Total Payments*
2018	$1,767,914	$931,395	$61,381	$2,760,690	$420,739	$125,830	$14,498	$561,067								$3,321,756	$3,245,878
2019	$1,804,831	$903,169	$60,748	$2,768,747	$303,267	$102,256	$14,498	$420,021								$3,188,768	$3,113,523
2020	$1,831,867	$874,716	$58,341	$2,764,924	$366,756	$104,231	$11,465	$482,452								$3,247,376	$3,177,570
2021	$1,706,985	$707,924	$57,111	$2,472,019	$367,231	$99,819	$11,465	$478,515								$2,950,534	$2,881,959
2022	$1,717,487	$679,422	$47,934	$2,444,843	$372,711	$94,965	$11,465	$479,140		$38,488	$38,488					$2,962,471	$2,903,072
2023	$1,775,261	$624,405	$38,755	$2,438,421	$378,193	$89,982	$11,465	$479,640	$25,000	$115,463	$140,463	$49,639	$4,984	$2,550	$57,174	$3,115,697	$3,062,927
2024	$1,798,587	$598,145	$38,105	$2,434,837	$383,680	$84,407	$11,465	$479,552	$30,000	$114,963	$144,963	$99,464	$9,783	$5,101	$114,347	$3,173,699	$3,119,028
2025	$1,827,026	$571,073	$37,452	$2,435,551	$389,171	$78,691	$11,465	$479,326	$30,000	$114,363	$144,363	$99,713	$9,534	$5,101	$114,347	$3,173,587	$3,119,569
2026	$1,845,585	$542,439	$36,796	$2,424,820	$399,666	$72,346	$11,465	$483,477	$35,000	$113,763	$148,763	$99,962	$9,284	$5,101	$114,347	$3,171,406	$3,118,045
2027	$1,809,268	$512,153	$36,136	$2,357,557	$405,165	$65,696	$11,465	$482,326	$35,000	$113,063	$148,063	$100,212	$9,034	$5,101	$114,347	$3,102,292	$3,049,590
2028	$1,842,200	$481,981	$35,473	$2,359,654	$410,670	$58,893	$11,465	$481,028	$30,000	$112,363	$142,363	$100,463	$8,783	$5,101	$114,347	$3,097,392	$3,045,353
2029	$1,751,125	$448,519	$34,807	$2,234,451	$416,181	$51,935	$11,465	$479,581	$75,000	$111,763	$186,763	$100,714	$8,532	$5,101	$114,347	$3,015,141	$2,963,768
2030	$1,383,357	$418,358	$34,138	$1,835,852	$427,620	$44,273	$11,226	$483,119	$130,000	$110,263	$240,263	$100,966	$8,280	$5,101	$114,347	$2,673,581	$2,623,116
2031	$1,414,206	$391,066	$33,465	$1,838,737	$433,677	$35,794	$10,511	$479,982	$130,000	$107,663	$237,663	$101,219	$8,027	$5,101	$114,347	$2,670,729	$2,621,652
2032	$1,361,678	$362,684	$32,788	$1,757,151	$444,950	$26,173	$9,055	$480,178	$135,000	$105,063	$240,063	$101,472	$7,774	$5,101	$114,347	$2,591,739	$2,544,794
2033	$1,390,002	$334,474	$32,109	$1,756,586	$456,227	$15,498	$7,600	$479,324	$135,000	$102,363	$237,363	$101,726	$7,520	$5,101	$114,347	$2,587,620	$2,542,810
2034	$1,113,475	$307,159	$31,426	$1,452,060	$136,758	$3,768	$7,600	$148,125	$85,000	$99,663	$184,663	$101,981	$7,266	$5,101	$114,347	$1,899,195	$1,855,069
2035	$1,137,109	$283,230	$30,739	$1,451,078	$137,291	$3,234	$7,600	$148,124	$90,000	$97,963	$187,963	$102,236	$7,010	$5,101	$114,347	$1,901,512	$1,858,072
2036	$1,160,914	$258,251	$30,049	$1,449,215	$137,830	$2,695	$7,600	$148,124	$95,000	$96,163	$191,163	$102,492	$6,755	$5,101	$114,347	$1,902,848	$1,860,099
2037	$1,184,897	$232,026	$29,356	$1,446,279	$138,374	$2,152	$7,600	$148,125	$95,000	$94,263	$189,263	$102,748	$6,498	$5,101	$114,347	$1,898,014	$1,855,958
2038	$1,209,068	$209,563	$28,659	$1,447,291	$138,921	$1,604	$7,600	$148,125	$100,000	$91,413	$191,413	$103,005	$6,241	$5,101	$114,347	$1,901,175	$1,859,816
2039	$1,233,439	$186,264	$27,959	$1,447,662	$67,611	$1,195	$5,073	$73,879	$100,000	$88,413	$188,413	$103,263	$5,983	$5,101	$114,347	$1,824,300	$1,786,168
2040	$1,258,021	$162,116	$27,255	$1,447,393	$34,367	$1,024	$2,545	$37,936	$95,000	$85,413	$180,413	$103,522	$5,725	$5,101	$114,347	$1,780,089	$1,745,187
2041	$1,279,981	$139,221	$26,547	$1,445,750	$34,539	$852	$2,545	$37,936	$100,000	$82,563	$182,563	$103,781	$5,466	$5,101	$114,347	$1,780,596	$1,746,402
2042	$992,094	$115,787	$4,682	$1,112,563	$34,712	$679	$2,545	$37,936	$190,000	$79,563	$269,563	$104,040	$5,206	$5,101	$114,347	$1,534,409	$1,522,081
2043	$909,408	$91,267	$3,967	$1,004,642	$34,886	$505	$2,545	$37,936	$200,000	$75,050	$275,050	$104,301	$4,946	$5,101	$114,347	$1,431,976	$1,420,362
2044	$775,231	$66,312	$3,249	$844,792	$35,062	$330	$2,545	$37,937	$290,000	$70,300	$360,300	$104,562	$4,685	$5,101	$114,347	$1,357,377	$1,346,482
2045	$785,093	$44,798	$1,380	$831,272	$35,236	$154	$2,545	$37,936	$310,000	$63,413	$373,413	$104,823	$4,423	$5,101	$114,347	$1,356,967	$1,347,941
2046	$764,064	$22,517	$273	$786,853	$8,837	$11	$636	$9,484	$360,000	$56,050	$416,050	$105,086	$4,161	$5,101	$114,347	$1,326,735	$1,320,725
2047									$360,000	$47,500	$407,500	$105,349	$3,898	$5,101	$114,347	$521,847	$516,746
2048									$370,000	$38,500	$408,500	$105,612	$3,634	$5,101	$114,347	$522,847	$517,746
2049									$380,000	$29,250	$409,250	$105,876	$3,370	$5,101	$114,347	$523,597	$518,496
2050									$390,000	$19,750	$409,750	$106,141	$3,105	$5,101	$114,347	$524,097	$518,996
2051									$400,000	$10,000	$410,000	$106,407	$2,839	$5,101	$114,347	$524,347	$519,246
2052												$106,673	$2,573	$5,101	$114,347	$114,347	$109,246
2053												$106,940	$2,306	$5,101	$114,347	$114,347	$109,246
2054												$107,208	$2,039	$5,101	$114,347	$114,347	$109,246
2055												$107,476	$1,770	$5,101	$114,347	$114,347	$109,246
2056												$107,745	$1,501	$5,101	$114,347	$114,347	$109,246
2057												$108,015	$1,232	$5,101	$114,347	$114,347	$109,246
2058												$108,285	$961	$5,101	$114,347	$114,347	$109,246
2059												$108,556	$690	$5,101	$114,347	$114,347	$109,246
2060												$108,827	$419	$5,101	$114,347	$114,347	$109,246
2061												$99,501	$147	$5,102	$104,750	$104,750	$99,648
Totals	$40,830,173	$11,500,436	$921,080	$53,251,689	$7,350,329	$1,168,988	$241,015	$8,760,332	$4,800,000	$2,484,800	$7,284,800	$4,000,000	$196,385	$196,385	$4,392,770	$73,689,591	$72,331,111

** Does Not Include Administrative Expenses or DSRF Deposit Requirements as are Operating Expenses.*

MAX P&I: $3,119,569

Debt Service Structure Report - City of Charles Town ***Waterworks and Sewerage Systems***

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
FY Ending June 30	Series 1987 B Bonds	Series 1988 B-1 Bonds	Series 1988 B-2 Bonds	Series 1989 B Bonds	Series 1998 Bonds	Series 2000 A Bonds	Series 2002 A Bonds	Series 2002 B Bonds	Series 2010 A Bonds	Series 2010 B Bonds	Series 2010 C Bonds	Series 2010 D Bonds
2018	$10,885	$7,588	$14,308	$3,012	$26,600	$192,320	$72,268	$93,506	$55,468	$6,080	$41,668	$16,668
2019	$10,885	$7,588	$14,308	$3,012	$26,601	$192,320	$72,235	$93,506	$55,466	$6,078	$41,668	$16,668
2020	$10,885	$7,588	$14,308	$3,012	$6,650	$192,320	$72,199	$93,506	$55,467	$6,078	$41,668	$16,668
2021	$10,885	$7,588	$14,308	$3,012		$192,320	$72,162	$93,506	$55,467	$6,079	$41,668	$16,668
2022	$10,885	$7,588	$14,308	$3,012		$96,160	$72,122	$93,506	$55,468	$6,079	$41,668	$16,668
2023	$10,885	$7,588	$14,308	$3,012			$72,079	$93,506	$55,467	$6,079	$41,668	$16,668
2024	$10,885	$7,588	$14,308	$3,012			$72,036	$93,506	$55,466	$6,080	$41,668	$16,668
2025	$10,885	$7,588	$14,308	$3,012			$71,988	$93,506	$55,466	$6,079	$41,668	$16,668
2026	$10,885	$7,588	$14,308	$3,012			$71,938	$93,506	$55,467	$6,079	$41,668	$16,668
2027	$10,885	$7,588	$14,308	$3,012			$71,886	$93,506	$55,466	$6,078	$41,668	$16,668
2028		$7,588	$14,308	$3,012			$71,831	$93,506	$55,466	$6,078	$41,668	$16,668
2029		$7,572	$14,296	$3,012			$71,772	$93,506	$55,466	$6,079	$41,668	$16,668
2030				$3,012			$71,710	$93,506	$55,467	$6,079	$41,668	$16,668
2031							$71,643	$93,506	$41,601	$4,559	$41,667	$16,667
2032							$71,573	$93,506			$41,664	$16,664
2033							$71,500	$93,506			$41,664	$16,664
2034							$71,422	$93,506			$41,664	$16,664
2035							$71,339	$93,506			$41,664	$16,664
2036							$71,252	$93,506			$41,664	$16,664
2037							$71,160	$93,506			$41,664	$16,664
2038							$71,062	$93,506			$41,664	$16,664
2039							$70,959	$93,506			$41,664	$16,664
2040							$70,849	$93,506			$41,664	$16,664
2041								$93,506			$41,665	$16,665
2042								$93,506				
2043												
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2059												
2060												
2061												
Totals	$108,850	$91,040	$171,684	$39,160	$59,851	$865,441	$1,648,983	$2,337,662	$762,667	$83,584	$999,992	$399,992

Note: Debt Service *Does Not* *Include Administrative Expenses or DSRF Deposit Requirements as are Operating Expenses.*

Debt Service Structure Report - City of Charles Town ***Waterworks and Sewerage Systems***

(A)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)	(V)	(W)	(X)	(Y)	(Z)	(AA)	(AB)
			(Public Mkt)		*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	
FY Ending June 30	Series 2011 A Bonds	Series 2013 A Bonds	Series 2013 B Bonds	Series 2014 A Bonds	Series 2014 C Bonds	Series 2014 D Bonds	Series 2014 E Bonds	Series 2015 A Bonds	Series 2015 B Bonds	Series 2016 A Bonds	Series 2016 B Bonds	Series 2020 A Bonds	Series 2021 REF EST Bonds	Series 2022 EST Bonds	Total Payments
2018	$250,373	$21,262	$193,550	$145,781	$65,050	$145,388	$151,040	$206,913	$423,125	$428,631	$127,825				$2,699,308
2019	$250,373	$21,263	$191,750	$145,783	$64,175	$147,688	$152,590	$209,163	$426,625	$430,431	$127,825				$2,708,000
2020	$250,373	$21,261	$189,763	$145,781	$68,038	$143,888	$148,990	$206,713	$425,813	$432,791	$152,825				$2,706,583
2021	$250,373	$21,263		$145,782				$209,394	$425,325	$429,731	$157,450	$261,927			$2,414,909
2022	$250,373	$21,261		$145,782				$176,563	$386,175	$431,331	$257,000	$260,219	$50,741	$38,488	$2,435,396
2023	$250,373	$21,262		$145,783						$432,569	$174,400	$441,919	$612,100	$140,463	$2,540,128
2024	$250,373	$21,262		$145,782						$428,429	$173,400	$439,919	$616,350	$144,963	$2,541,694
2025	$250,373	$21,262		$145,782						$429,019	$172,325	$442,819	$615,350	$144,363	$2,542,461
2026	$250,373	$21,262		$145,782						$428,469	$176,250	$440,519	$604,250	$148,763	$2,536,787
2027	$250,373	$21,261		$145,783						$432,769	$179,050	$363,119	$608,000	$148,063	$2,469,483
2028	$250,373	$21,263		$145,782						$429,769	$206,650	$512,119	$448,100	$142,363	$2,466,544
2029	$250,373	$21,261		$145,782						$431,569	$248,050	$338,019	$454,550	$186,763	$2,386,406
2030	$250,373	$21,262		$145,781						$432,969	$247,650	$217,219	$198,350	$240,263	$2,041,977
2031	$250,373	$21,262		$145,781						$432,844	$247,050	$238,719	$199,600	$237,663	$2,042,935
2032	$250,373	$21,262		$145,782						$432,269	$246,250	$209,219	$195,800	$240,063	$1,964,425
2033	$250,373	$21,262		$145,783						$431,244	$250,250	$205,281	$196,950	$237,363	$1,961,839
2034	$250,373	$21,262		$145,781						$429,769	$248,850	$101,344		$184,663	$1,605,297
2035	$250,373	$21,262		$145,781						$432,844	$247,250	$99,656		$187,963	$1,608,301
2036	$250,373	$21,261		$145,782						$430,244	$245,450	$102,969		$191,163	$1,610,328
2037	$250,373	$21,262		$145,782						$432,194	$248,450	$95,869		$189,263	$1,606,186
2038	$250,373	$21,262		$145,782						$431,519	$247,900	$98,900		$191,413	$1,610,044
2039	$250,373	$21,261		$145,782						$430,494	$247,200	$101,800		$188,413	$1,608,116
2040	$250,373	$21,262		$145,783						$429,119	$246,350	$104,569		$180,413	$1,600,550
2041	$250,373	$21,262		$145,781						$432,394	$250,350	$167,206		$182,563	$1,601,765
2042		$21,261		$145,782						$430,144	$249,050	$168,138		$269,563	$1,377,444
2043		$21,262		$145,782						$432,094	$247,600	$153,938		$275,050	$1,275,725
2044		$21,262		$145,782						$428,500	$246,000			$360,300	$1,201,843
2045		$5,316		$145,782						$429,544	$249,250			$373,413	$1,203,304
2046				$109,337						$430,044	$247,200			$416,050	$1,202,631
2047														$407,500	$407,500
2048														$408,500	$408,500
2049														$409,250	$409,250
2050														$409,750	$409,750
2051														$410,000	$410,000
2052															$0
2053															$0
2054															$0
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2057															$0
2058															$0
2059															$0
2060															$0
2061															$0
Totals	$6,008,949	$579,384	$575,063	$4,191,229	$197,263	$436,963	$452,620	$1,008,744	$2,087,063	$12,493,733	$6,365,150	$5,565,403	$4,800,141	$7,284,800	$59,615,409
												MAX P&I:			$2,542,461

Debt Service Structure Report - City of Charles Town <u>Waterworks System Portion</u>

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
FY Ending June 30	Series 1987 B Bonds	Series 1988 B-1 Bonds	Series 1988 B-2 Bonds	Series 1989 B Bonds	Series 1998 Bonds	Series 2000 A Bonds	Series 2002 A Bonds	Series 2002 B Bonds	Series 2010 A Bonds	Series 2010 B Bonds	Series 2010 C Bonds	Series 2010 D Bonds
2018	$10,885		$14,308	$3,012			$72,268	$93,506	$55,468	$6,080		
2019	$10,885		$14,308	$3,012			$72,235	$93,506	$55,466	$6,078		
2020	$10,885		$14,308	$3,012			$72,199	$93,506	$55,467	$6,078		
2021	$10,885		$14,308	$3,012			$72,162	$93,506	$55,467	$6,079		
2022	$10,885		$14,308	$3,012			$72,122	$93,506	$55,468	$6,079		
2023	$10,885		$14,308	$3,012			$72,079	$93,506	$55,467	$6,079		
2024	$10,885		$14,308	$3,012			$72,036	$93,506	$55,466	$6,080		
2025	$10,885		$14,308	$3,012			$71,988	$93,506	$55,466	$6,079		
2026	$10,885		$14,308	$3,012			$71,938	$93,506	$55,467	$6,079		
2027	$10,885		$14,308	$3,012			$71,886	$93,506	$55,466	$6,078		
2028			$14,308	$3,012			$71,831	$93,506	$55,466	$6,078		
2029			$14,296	$3,012			$71,772	$93,506	$55,466	$6,079		
2030				$3,012			$71,710	$93,506	$55,467	$6,079		
2031							$71,643	$93,506	$41,601	$4,559		
2032							$71,573	$93,506				
2033							$71,500	$93,506				
2034							$71,422	$93,506				
2035							$71,339	$93,506				
2036							$71,252	$93,506				
2037							$71,160	$93,506				
2038							$71,062	$93,506				
2039							$70,959	$93,506				
2040							$70,849	$93,506				
2041								$93,506				
2042								$93,506				
2043												
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2058												
2059												
2060												
2061												
Totals	$108,850	$0	$171,684	$39,160	$0	$0	$1,648,983	$2,337,662	$762,667	$83,584	$0	$0

Note: Debt Service <u>Does Not</u> Include Administrative Expenses or DSRF Deposit Requirements as are Operating Expenses.

Debt Service Structure Report - City of Charles Town ***<u>Waterworks System Portion</u>***

(A)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)	(V)	(W)	(X)	(Y)	(Z)	(AA)	(AB)
			(Public Mkt)		*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	
FY Ending June 30	Series 2011 A Bonds	Series 2013 A Bonds	Series 2013 B Bonds	Series 2014 A Bonds	Series 2014 C Bonds	Series 2014 D Bonds	Series 2014 E Bonds	Series 2015 A Bonds	Series 2015 B Bonds	Series 2016 A Bonds	Series 2016 B Bonds	Series 2020 A Bonds	Series 2021 REF EST Bonds	Series 2022 EST Bonds	Total Payments
2018			$73,549		$65,050		$151,040	$157,254	$342,731	$428,631					$1,473,782
2019			$72,865		$64,175		$152,590	$158,964	$345,566	$430,431					$1,480,081
2020			$72,110		$68,038		$148,990	$157,102	$344,908	$432,791					$1,479,394
2021								$159,139	$344,513	$429,731		$183,729			$1,372,532
2022								$134,188	$312,802	$431,331		$185,394	$39,965		$1,359,060
2023										$432,569		$185,554	$485,630		$1,359,090
2024										$428,429		$186,654	$489,090		$1,359,466
2025										$429,019		$187,674	$489,340		$1,361,278
2026										$428,469		$190,614	$478,520		$1,352,799
2027										$432,769		$115,434	$482,590		$1,285,935
2028										$429,769		$258,694	$352,750		$1,285,414
2029										$431,569		$252,054	$358,010		$1,285,764
2030										$432,969		$129,454	$151,170		$943,367
2031										$432,844		$149,214	$152,310		$945,677
2032										$432,269		$122,199	$149,410		$868,957
2033										$431,244		$119,724	$149,480		$865,454
2034										$429,769		$15,249			$609,946
2035										$432,844		$12,069			$609,758
2036										$430,244		$14,956			$609,959
2037										$432,194		$12,746			$609,606
2038										$431,519		$13,589			$609,676
2039										$430,494		$14,405			$609,364
2040										$429,119		$16,195			$609,669
2041										$432,394		$83,933			$609,833
2042										$430,144		$85,885			$609,535
2043										$432,094		$67,733			$499,826
2044										$428,500					$428,500
2045										$429,544					$429,544
2046										$430,044					$430,044
2047															$0
2048															$0
2049															$0
2050															$0
2051															$0
2052															$0
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2056															$0
2057															$0
2058															$0
2059															$0
2060															$0
2061															$0
Totals	$0	$0	$218,524	$0	$197,263	$0	$452,620	$766,645	$1,690,521	$12,493,733	$0	$2,603,148	$3,778,265	$0	$27,353,308
												MAX P&I:			$1,372,532

Debt Service Structure Report - City of Charles Town <u>Sewerage System Portion</u>

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
FY Ending June 30	Series 1987 B Bonds	Series 1988 B-1 Bonds	Series 1988 B-2 Bonds	Series 1989 B Bonds	Series 1998 Bonds	Series 2000 A Bonds	Series 2002 A Bonds	Series 2002 B Bonds	Series 2010 A Bonds	Series 2010 B Bonds	Series 2010 C Bonds	Series 2010 D Bonds
2018		$7,588			$26,600	$192,320					$41,668	$16,668
2019		$7,588			$26,601	$192,320					$41,668	$16,668
2020		$7,588			$6,650	$192,320					$41,668	$16,668
2021		$7,588				$192,320					$41,668	$16,668
2022		$7,588				$96,160					$41,668	$16,668
2023		$7,588									$41,668	$16,668
2024		$7,588									$41,668	$16,668
2025		$7,588									$41,668	$16,668
2026		$7,588									$41,668	$16,668
2027		$7,588									$41,668	$16,668
2028		$7,588									$41,668	$16,668
2029		$7,572									$41,668	$16,668
2030											$41,668	$16,668
2031											$41,667	$16,667
2032											$41,664	$16,664
2033											$41,664	$16,664
2034											$41,664	$16,664
2035											$41,664	$16,664
2036											$41,664	$16,664
2037											$41,664	$16,664
2038											$41,664	$16,664
2039											$41,664	$16,664
2040											$41,664	$16,664
2041											$41,665	$16,665
2042												
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2059												
2060												
2061												
Totals	$0	$91,040	$0	$0	$59,851	$865,441	$0	$0	$0	$0	$999,992	$399,992

Note: Debt Service <u>Does Not</u> Include Administrative Expenses or DSRF Deposit Requirements as are Operating Expenses.

Debt Service Structure Report - City of Charles Town <u>Sewerage System Portion</u>

(A)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)	(V)	(W)	(X)	(Y)	(Z)	(AA)	(AB)
			(Public Mkt)		*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	*(Public Mkt)*	
FY Ending June 30	Series 2011 A Bonds	Series 2013 A Bonds	Series 2013 B Bonds	Series 2014 A Bonds	Series 2014 C Bonds	Series 2014 D Bonds	Series 2014 E Bonds	Series 2015 A Bonds	Series 2015 B Bonds	Series 2016 A Bonds	Series 2016 B Bonds	Series 2020 A Bonds	Series 2021 REF EST Bonds	Series 2022 EST Bonds	Total Payments
2018	$250,373	$21,262	$120,001	$145,781		$145,388		$49,659	$80,394		$127,825				$1,225,527
2019	$250,373	$21,263	$118,885	$145,783		$147,688		$50,199	$81,059		$127,825				$1,227,918
2020	$250,373	$21,261	$117,653	$145,781		$143,888		$49,611	$80,904		$152,825				$1,227,189
2021	$250,373	$21,263		$145,782				$50,255	$80,812		$157,450	$78,198			$1,042,376
2022	$250,373	$21,261		$145,782				$42,375	$73,373		$257,000	$74,825	$10,775	$38,488	$1,076,336
2023	$250,373	$21,262		$145,783							$174,400	$256,365	$126,470	$140,463	$1,181,039
2024	$250,373	$21,262		$145,782							$173,400	$253,265	$127,260	$144,963	$1,182,228
2025	$250,373	$21,262		$145,782							$172,325	$255,145	$126,010	$144,363	$1,181,183
2026	$250,373	$21,262		$145,782							$176,250	$249,905	$125,730	$148,763	$1,183,988
2027	$250,373	$21,261		$145,783							$179,050	$247,685	$125,410	$148,063	$1,183,548
2028	$250,373	$21,263		$145,782							$206,650	$253,425	$95,350	$142,363	$1,181,130
2029	$250,373	$21,261		$145,782							$248,050	$85,965	$96,540	$186,763	$1,100,642
2030	$250,373	$21,262		$145,781							$247,650	$87,765	$47,180	$240,263	$1,098,610
2031	$250,373	$21,262		$145,781							$247,050	$89,505	$47,290	$237,663	$1,097,258
2032	$250,373	$21,262		$145,782							$246,250	$87,020	$46,390	$240,063	$1,095,467
2033	$250,373	$21,262		$145,783							$250,250	$85,558	$47,470	$237,363	$1,096,385
2034	$250,373	$21,262		$145,781							$248,850	$86,095		$184,663	$995,351
2035	$250,373	$21,262		$145,781							$247,250	$87,588		$187,963	$998,543
2036	$250,373	$21,261		$145,782							$245,450	$88,013		$191,163	$1,000,369
2037	$250,373	$21,262		$145,782							$248,450	$83,123		$189,263	$996,580
2038	$250,373	$21,262		$145,782							$247,900	$85,311		$191,413	$1,000,368
2039	$250,373	$21,261		$145,782							$247,200	$87,395		$188,413	$998,752
2040	$250,373	$21,262		$145,783							$246,350	$88,374		$180,413	$990,881
2041	$250,373	$21,262		$145,781							$250,350	$83,274		$182,563	$991,932
2042		$21,261		$145,782							$249,050	$82,253		$269,563	$767,909
2043		$21,262		$145,782							$247,600	$86,205		$275,050	$775,899
2044		$21,262		$145,782							$246,000			$360,300	$773,343
2045		$5,316		$145,782							$249,250			$373,413	$773,760
2046				$109,337							$247,200			$416,050	$772,587
2047														$407,500	$407,500
2048														$408,500	$408,500
2049														$409,250	$409,250
2050														$409,750	$409,750
2051														$410,000	$410,000
2052															$0
2053															$0
2054															$0
2055															$0
2056															$0
2057															$0
2058															$0
2059															$0
2060															$0
2061															$0
Totals	$6,008,949	$579,384	$356,539	$4,191,229	$0	$436,963	$0	$242,099	$396,542	$0	$6,365,150	$2,962,255		$7,284,800	$32,262,101
												MAX P&I:			$1,183,988

Debt Service Structure Report - Jefferson County <u>Waterworks and Sewerage Systems</u>

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)
	(Public Mkt)	*(Public Mkt)*									*(Public Mkt)*		
FY Ending June 30	Series 2010 A Bonds	Series 2013 A Bonds	Series 2015 Jr Bonds	Series 2018 A-1 Bonds	Series 2018 A-2 Bonds	Series 2018 A-3 Bonds	Series 2018 A-4 Bonds	Series 2018 A-5 Bonds	Series 2018 A-6 Bonds	Series 2018 A-7 Bonds	Series 2018 B Bonds	Series 2022 EST Bonds	Total Payments
2018	$150,894	$145,100	$56,372	$10,917	$29,952		$12,612	$38,496	$66,836	$35,391			$546,569
2019*	$122,116	$21,050	$28,186	$10,917	$29,952		$12,612	$38,496	$66,834	$35,390	$39,970		$405,523
2020				$10,917		$38,303	$12,612	$38,496	$66,832	$35,390	$268,438		$470,987
2021				$10,917		$38,303	$12,612	$38,496	$66,832	$35,391	$264,500		$467,050
2022				$10,917		$38,303	$12,612	$38,496	$66,832	$35,391	$265,125		$467,675
2023				$10,917		$38,303	$12,612	$38,496	$66,832	$35,391	$265,625	$54,623	$522,798
2024				$10,917		$38,303	$12,612	$38,496	$66,832	$35,390	$265,538	$109,246	$577,334
2025				$10,917		$38,303	$12,612	$38,496	$66,832	$35,390	$265,313	$109,246	$577,108
2026				$10,917		$38,303	$12,612	$38,496	$66,832	$35,390	$269,463	$109,246	$581,258
2027				$10,917		$38,303	$12,612	$38,496	$66,832	$35,389	$268,313	$109,246	$580,108
2028				$10,917		$38,303	$12,612	$38,496	$66,832	$35,391	$267,013	$109,246	$578,809
2029				$10,921		$38,303	$12,612	$38,496	$66,832	$35,390	$265,563	$109,246	$577,362
2030						$38,303	$9,459	$38,496	$66,832	$35,391	$283,413	$109,246	$581,139
2031						$38,303		$38,496	$66,832	$35,390	$290,450	$109,246	$578,717
2032						$38,303		$19,248	$66,832	$35,391	$311,350	$109,246	$580,369
2033						$38,303			$66,832	$35,390	$331,200	$109,246	$580,971
2034						$38,303			$66,832	$35,391		$109,246	$249,772
2035						$38,303			$66,832	$35,390		$109,246	$249,771
2036						$38,303			$66,832	$35,390		$109,246	$249,771
2037						$38,303			$66,832	$35,391		$109,246	$249,772
2038						$38,303			$66,832	$35,391		$109,246	$249,771
2039									$33,416	$35,390		$109,246	$178,052
2040										$35,391		$109,246	$144,637
2041										$35,391		$109,246	$144,637
2042										$35,391		$109,246	$144,637
2043										$35,391		$109,246	$144,637
2044										$35,392		$109,246	$144,638
2045										$35,390		$109,246	$144,637
2046										$8,848		$109,246	$118,094
2047												$109,246	$109,246
2048												$109,246	$109,246
2049												$109,246	$109,246
2050												$109,246	$109,246
2051												$109,246	$109,246
2052												$109,246	$109,246
2053												$109,246	$109,246
2054												$109,246	$109,246
2055												$109,246	$109,246
2056												$109,246	$109,246
2057												$109,246	$109,246
2058												$109,246	$109,246
2059												$109,246	$109,246
2060												$109,246	$109,246
2061												$99,648	$99,648
Totals	$273,009	$166,150	$84,558	$131,008	$59,904	$727,748	$160,803	$558,192	$1,436,894	$999,780	$3,921,270	$4,196,385	$12,715,702

Note: Debt Service <u>Does Not</u> Include Administrative Expenses or DSRF Deposit Requirements as are Operating Expenses.

MAX P&I: $581,258

Debt Service Structure Report - Jefferson County <u>Waterworks System Portion</u>

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)
	(Public Mkt)	*(Public Mkt)*									*(Public Mkt)*		
FY Ending June 30	Series 2010 A Bonds	Series 2013 A Bonds	Series 2015 Jr Bonds	Series 2018 A-1 Bonds	Series 2018 A-2 Bonds	Series 2018 A-3 Bonds	Series 2018 A-4 Bonds	Series 2018 A-5 Bonds	Series 2018 A-6 Bonds	Series 2018 A-7 Bonds	Series 2018 B Bonds	Series 2022 EST Bonds	Total Payments
2018										$35,391			$35,391
2019										$35,390			$35,390
2020										$35,390			$35,390
2021										$35,391			$35,391
2022										$35,391			$35,391
2023										$35,391			$35,391
2024										$35,390			$35,390
2025										$35,390			$35,390
2026										$35,390			$35,390
2027										$35,389			$35,389
2028										$35,391			$35,391
2029										$35,390			$35,390
2030										$35,391			$35,391
2031										$35,390			$35,390
2032										$35,391			$35,391
2033										$35,390			$35,390
2034										$35,391			$35,391
2035										$35,390			$35,390
2036										$35,390			$35,390
2037										$35,391			$35,391
2038										$35,391			$35,391
2039										$35,390			$35,390
2040										$35,391			$35,391
2041										$35,391			$35,391
2042										$35,391			$35,391
2043										$35,391			$35,391
2044										$35,392			$35,392
2045										$35,390			$35,390
2046										$8,848			$8,848
2047													$0
2048													$0
2049													$0
2050													$0
2051													$0
2052													$0
2053													$0
2054													$0
2055													$0
2056													$0
2057													$0
2058													$0
2059													$0
2060													$0
2061													$0
Totals	$0	$0	$0	$0	$0	$0	$0	$0	$0	$999,780	$0	$0	$999,780

Note: Debt Service <u>Does Not</u> Include Administrative Expenses or DSRF Deposit Requirements as are Operating Expenses.

MAX P&I: $35,392

Debt Service Structure Report - Jefferson County <u>Sewerage System Portion</u>

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)
	(Public Mkt)	*(Public Mkt)*									*(Public Mkt)*		
FY Ending June 30	Series 2010 A Bonds	Series 2013 A Bonds	Series 2015 Jr Bonds	Series 2018 A-1 Bonds	Series 2018 A-2 Bonds	Series 2018 A-3 Bonds	Series 2018 A-4 Bonds	Series 2018 A-5 Bonds	Series 2018 A-6 Bonds	Series 2018 A-7 Bonds	Series 2018 B Bonds	Series 2022 EST Bonds	Total Payments
2018	$150,894	$145,100	$56,372	$10,917	$29,952		$12,612	$38,496	$66,836				$511,179
2019*	$122,116	$21,050	$28,186	$10,917	$29,952		$12,612	$38,496	$66,834		$39,970		$370,133
2020				$10,917		$38,303	$12,612	$38,496	$66,832		$268,438		$435,597
2021				$10,917		$38,303	$12,612	$38,496	$66,832		$264,500		$431,660
2022				$10,917		$38,303	$12,612	$38,496	$66,832		$265,125		$432,285
2023				$10,917		$38,303	$12,612	$38,496	$66,832		$265,625	$54,623	$487,408
2024				$10,917		$38,303	$12,612	$38,496	$66,832		$265,538	$109,246	$541,943
2025				$10,917		$38,303	$12,612	$38,496	$66,832		$265,313	$109,246	$541,718
2026				$10,917		$38,303	$12,612	$38,496	$66,832		$269,463	$109,246	$545,868
2027				$10,917		$38,303	$12,612	$38,496	$66,832		$268,313	$109,246	$544,718
2028				$10,917		$38,303	$12,612	$38,496	$66,832		$267,013	$109,246	$543,418
2029				$10,921		$38,303	$12,612	$38,496	$66,832		$265,563	$109,246	$541,972
2030						$38,303	$9,459	$38,496	$66,832		$283,413	$109,246	$545,748
2031						$38,303		$38,496	$66,832		$290,450	$109,246	$543,327
2032						$38,303		$19,248	$66,832		$311,350	$109,246	$544,979
2033						$38,303			$66,832		$331,200	$109,246	$545,581
2034						$38,303			$66,832			$109,246	$214,381
2035						$38,303			$66,832			$109,246	$214,381
2036						$38,303			$66,832			$109,246	$214,381
2037						$38,303			$66,832			$109,246	$214,381
2038						$38,303			$66,832			$109,246	$214,381
2039									$33,416			$109,246	$142,662
2040												$109,246	$109,246
2041												$109,246	$109,246
2042												$109,246	$109,246
2043												$109,246	$109,246
2044												$109,246	$109,246
2045												$109,246	$109,246
2046												$109,246	$109,246
2047												$109,246	$109,246
2048												$109,246	$109,246
2049												$109,246	$109,246
2050												$109,246	$109,246
2051												$109,246	$109,246
2052												$109,246	$109,246
2053												$109,246	$109,246
2054												$109,246	$109,246
2055												$109,246	$109,246
2056												$109,246	$109,246
2057												$109,246	$109,246
2058												$109,246	$109,246
2059												$109,246	$109,246
2060												$109,246	$109,246
2061												$99,648	$99,648
Totals	$273,009	$166,150	$84,558	$131,008	$59,904	$727,748	$160,803	$558,192	$1,436,894	$0	$3,921,270	$4,196,385	$11,715,921

Note: Debt Service <u>Does Not</u> Include Administrative Expenses or DSRF Deposit Requirements as are Operating Expenses.

MAX P&I: $545,868

City of Charles Town, West Virginia
Combined Waterworks & Sewerage System Refunding Revenue Bonds, Series 2021
(Transaction Timeline)

08/25/21	Board Presentation & Resolution Adoption	I, BC
09/07/21	Present Projects Overview to Council	I, BC
09/20/21	First Reading of Ordinance	I, BC
10/04/21	Second Reading of Ordinance	I, BC
11/01/21	Third Reading of Ordinance, Public Hearing and Adoption of Supplemental Parameters Resolution	I, BC
09/14/21	First Draft of the POS	BC
10/05/21	POS Completion	BC, MA, UC
10/05/21	Send POS to Rating Agency and Bond Insurer	MA
Week of 10/18	Bond Rating Call	ALL
Week of 10/18	Underwriter Due Diligence Call	ALL
10/29/21	Bond Rating Released	
11/02/21	Finalize and Disseminate POS	BC, U
11/09/21	Pricing of Bonds	I, MA, U
11/09/21	Notice of Redemption	BC
11/30/21	Closing of Bonds	ALL
12/09/21	Discharge Series 2015A & 2015B Bonds	BC, MBC

August

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	**25**	26	27	28
29	30	31				

September

S	M	T	W	T	F	S
			1	2	3	4
5	6	**7**	8	9	10	11
12	13	**14**	15	16	17	18
19	**20**	21	22	23	24	25
26	27	28	29	30		

October

S	M	T	W	T	F	S
					1	2
3	**4**	**5**	6	7	8	9
10	11	12	13	14	15	16
17	**18**	**19**	**20**	**21**	**22**	23
24	25	26	27	28	**29**	30
31						

November

S	M	T	W	T	F	S
	1	**2**	3	4	5	6
7	8	**9**	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	**30**				

December

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	**9**	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Key Date

Holiday

I	Issuer - City of Charles Town, West Virginia
BC	Bond Counsel - Steptoe & Johnson
MA	Municipal Advisor - Compass Municipal Advisors, LLC
MBC	Municipal Bond Commission
U	Underwriter - Crews & Associates
UC	Underwriter's Counsel - Jackson Kelly

City of Charles Town
Combined Waterworks and Sewerage System Refunding Revenue Bonds,
Series 2021 A (Bank Qualified)

AUTHORIZING RESOLUTION OF
CITY OF CHARLES TOWN UTILITY BOARD

RESOLUTION RECOMMENDING THE ISSUANCE BY THE CITY OF CHARLES TOWN OF ITS COMBINED WATERWORKS AND SEWERAGE SYSTEM REFUNDING REVENUE BONDS, SERIES 2021 A, IN AN AMOUNT NOT TO EXCEED $6,000,000 WITHIN THE PARAMETERS ESTABLISHED BY THE CITY COUNCIL, FOR THE PURPOSE OF CURRENTLY REFUNDING THE CITY'S OUTSTANDING COMBINED WATERWORKS AND SEWERAGE SYSTEM REFUNDING REVENUE BONDS, SERIES 2015 A (BANK QUALIFIED), AND CURRENTLY REFUNDING THE CITY'S OUTSTANDING COMBINED WATERWORKS AND SEWERAGE SYSTEM REFUNDING REVENUE BONDS, SERIES 2015 B (BANK QUALIFIED), IN ORDER TO ACHIEVE PRESENT VALUE DEBT SERVICE SAVINGS FOR THE CITY.

WHEREAS, in accordance with Chapter 8, Article 20 of the West Virginia Code of 1931, as amended (the "Act"), and pursuant to an Ordinance enacted by the City of Charles Town, a municipal corporation and political subdivision of the State of West Virginia (the "City") on March 16, 1998 (the "Utility Board Ordinance"), the City created the City of Charles Town Utility Board (the "Utility Board") and vested in the Utility Board the responsibility for the supervision, management, control and operation of the combined waterworks and sewerage system of the City (the "System");

WHEREAS, pursuant to the Act, the City is vested with the authority to issue revenue bonds for the purpose of financing and refinancing the cost of additions, betterments and improvements to the System;

WHEREAS, the City has previously issued its Combined Waterworks and Sewerage System Refunding Revenue Bonds, Series 2015 A, dated November 19, 2015, in the original aggregate principal amount of $2,750,000 and Combined Waterworks and Sewerage System Refunding Revenue Bonds, Series 2015 B, dated November 19, 2015, in the original aggregate principal amount of $4,355,000 (collectively, the "Series 2015 Bonds") for the purpose of refunding previous obligations issued by the City in connection with the combination of the City's existing separate waterworks and sewerage systems and the vesting of the Utility Board with the responsibility for supervision, management, control and operation of the same;

WHEREAS, the City is advised and has determined that it may, subject to market conditions, realize present value debt service savings from the current refunding of its Series 2015 Bonds pursuant to the issuance of its Combined Waterworks and Sewerage System Refunding Revenue Bonds, Series 2021 A, in an aggregate principal amount not to exceed $6,000,000 (the "Series 2021 A Bonds"), within the parameters set forth in that certain Supplemental Parameters Resolution proposed to be adopted by the City, the form of which is attached hereto and made a part hereof as **EXHIBIT A** (the "Supplemental Parameters Resolution"); and

WHEREAS, as the entity vested by the City with responsibility for the supervision, management, control and operation of the System, pursuant to its adoption of this Authorizing Resolution, the Utility Board wishes to recommend to the City that it undertake the issuance of its Series 2021 A Bonds within the parameters set forth in the Supplemental Parameters Resolution, for the purpose of achieving present value debt service savings for the City;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY OF CHARLES TOWN UTILITY BOARD:

SECTION 1. The Utility Board hereby recommends to the City that it undertake the issuance of its Series 2021 A Bonds for the purpose of repaying in full the entire outstanding principal of and all accrued interest on the City's outstanding Series 2015 Bonds, on the earliest practical redemption date, and subject to market conditions, in order to achieve present value debt service savings for the City.

SECTION 2. The Utility Board hereby recommends the adoption by the City of a Supplemental Parameters Resolution substantially in the form attached hereto and made a part hereof as Exhibit A, in connection with its issuance of the Series 2021 A Bonds, and that the terms of the Series 2021 A Bonds be within the parameters set forth in the Supplemental Parameters Resolution, which parameters the Utility Board hereby finds to be acceptable and advantageous for the City.

SECTION 3. The Utility Board hereby repeals any resolution or ordinance which it has previously enacted which is inconsistent with the provisions hereof.

SECTION 4. This Authorizing Resolution shall be effective immediately following the adoption hereof.

[Remainder of Page Intentionally Left Blank]

Adopted this 25th day of August, 2021.

CITY OF CHARLES TOWN UTILITY BOARD

By: _____
Its: Chairman

CERTIFICATION

Certified a true copy of a resolution duly adopted by the CITY OF CHARLES TOWN UTILITY BOARD on August 25, 2021, which resolution has not been repealed, rescinded, modified, amended or revoked, as of the date hereof.

By: _____
Secretary

EXHIBIT A

SUPPLEMENTAL PARAMETERS RESOLUTION

[See Transcript at Tab No. 2]

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT	AMOUNT

FUND TOTALS		
50	WATER FUND	66,802.55
60	SEWER FUND	152,548.77
	GRAND TOTAL:	219,351.32

TOTAL PAGES: 4

APPROVED BY: _____

APPROVED BY: _____

This Packet: $ 219,351.32
Security Deposit Refunds: 289.12

Total: $ 219,640.44

Note:

Highlighted invoice to be reimbursed for the R&R Project

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT		AMOUNT
ROSS H BARE	BRECKENRIDGE PS WORK	SEWER FUND	SEWER		250.00
	HUNTFIELD PS WORK	SEWER FUND	SEWER		500.00
				TOTAL:	750.00
SAFEWARE, INC	4 GAS MONITORS	SEWER FUND	SEWER		90.25
				TOTAL:	90.25
SG PLUMBING, INC.	128 BEAUREGARD 7/30/21	WATER FUND	WATER		1,290.00
	312 PATRICK HENRY: 8/06/21	WATER FUND	WATER		1,240.00
				TOTAL:	2,530.00
SHENANDOAH SALES & SERVICE, INC.	2003 FORD F250	WATER FUND	WATER		201.59
	2011 FORD F150	WATER FUND	WATER		392.24
	'06 CRANETRUCK, '06 VACJET	WATER FUND	WATER		14.00
	2006 VACTOR JETTER TRUCK	SEWER FUND	SEWER		325.39
	2006 GMC DUMP TRUCK	SEWER FUND	SEWER		56.30
	2014 FORD F250	SEWER FUND	SEWER		665.41
	2020 GMC SIERRA	SEWER FUND	SEWER		146.95
	'06 CRANETRUCK, '06 VACJET	SEWER FUND	SEWER		14.00
				TOTAL:	1,815.88
MICHAEL CRAIG STARLIPER	HUNTFIELD PS: INSTAL/DISCN	SEWER FUND	SEWER		2,990.00
				TOTAL:	2,990.00
SUEZ WTS SERVICES USA, INC.	BALLAST, LAMP	SEWER FUND	SEWER		3,816.88
				TOTAL:	3,816.88
GERALD TAYLOR CO., INC.	VAC / TRANSPORT	WATER FUND	WATER		529.51
	VAC / TRANSPORT	WATER FUND	WATER		450.45
	VAC / TRANSPORT	WATER FUND	WATER		260.08
	SUPERVAC LIFT STATIONS	SEWER FUND	SEWER		1,429.12
				TOTAL:	2,669.16
TELE-WORKS, INC.	ANNUAL HOSTING FEE	WATER FUND	WATER		6,270.50
	ANNUAL HOSTING FEE	SEWER FUND	SEWER		6,270.50
				TOTAL:	12,541.00
THE CI THORNBURG CO, INC.	5/8"X3/4" ALLY MTR TR/PL	WATER FUND	WATER		4,079.09
	CHLORINE	WATER FUND	WATER		903.00
	ASHLEYBRIN: NEW GRINDER PM	SEWER FUND	SEWER		3,719.82
				TOTAL:	8,701.91
USA BLUEBOOK	GLOVES	WATER FUND	WATER		31.25
	FLWTSTNG DIFFSR, CRCTBRKR	WATER FUND	WATER		125.77
				TOTAL:	157.02
VALLEY CREDIT SERVICE, INC.	JULY COLLECTIONS	WATER FUND	WATER		243.97
	JULY COLLECTIONS	SEWER FUND	SEWER		243.97
	PSD JULY COLLECTIONS	SEWER FUND	SEWER		206.72
				TOTAL:	694.66
WV BUREAU OF PUBLIC HEALTH	B.CARPER CLASS C CERT	SEWER FUND	SEWER		100.00
				TOTAL:	100.00
WV DEPARTMENT OF TRANSPORTATION	PERMIT FOR SEWER LINE	SEWER FUND	SEWER		505.50
				TOTAL:	505.50

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT	AMOUNT
			TOTAL:	189.26
GUTTMAN ENERGY	W/E 8/08/21	WATER FUND	WATER	700.19
	W/E 8/15/21	WATER FUND	WATER	421.24
	W/E 8/08/21	SEWER FUND	SEWER	648.20
	W/E 8/15/21	SEWER FUND	SEWER	565.58
			TOTAL:	2,335.21
GWIN DOBSON & FOREMAN INC	WTP HYDROGEOLOGICAL STUDY	WATER FUND	NON-DEPARTMENTAL	405.00
	WTP CHLORINE ROOM UPGRADES	WATER FUND	NON-DEPARTMENTAL	2,261.30
	WA RETAINER SVCS	WATER FUND	WATER	440.75
	WWTP UPGRADE	SEWER FUND	NON-DEPARTMENTAL	58,949.41
	SHENJCT SWR EVAL	SEWER FUND	NON-DEPARTMENTAL	1,308.45
			TOTAL:	63,364.91
HACH COMPANY	PIPETTIP, FOR 19700-10, ee	WATER FUND	WATER	525.19
	KTO CHEMKEY	WATER FUND	WATER	724.00
	db NITRATE, TNT	SEWER FUND	SEWER	431.50
	CERT OF INSTRUMENT PERF	SEWER FUND	SEWER	101.00
			TOTAL:	1,781.69
JAY'S AUTOMOTIVE LLC	WHEEL ALIGNMENT SEWER TRCK	SEWER FUND	SEWER	99.95
			TOTAL:	99.95
JEFFERSON COUNTY COMMISSION	AMBLNC FEE: WTP & SWR SYST	WATER FUND	WATER	45.00
	AMBLNC FEE: EVITTS RUN EST	SEWER FUND	SEWER	90.00
	AMBLNC FEE: WTP & SWR SYST	SEWER FUND	SEWER	45.00
			TOTAL:	180.00
JOHN P PLACE, INC.	PARK PS BACK CVR UPGRD KT	SEWER FUND	SEWER	3,496.41
			TOTAL:	3,496.41
KABLE EXCAVATING, LLC	MV EXCVTR: BELVDR TO WS	SEWER FUND	SEWER	220.00
			TOTAL:	220.00
KAPPE ASSOCIATES, INC.	BALLAST & LAMP	SEWER FUND	SEWER	4,267.00
			TOTAL:	4,267.00
J.C. KUNKLE & ASSOCIATES, A.C.	PROFF SVCS 5/24 - 8/20/21	WATER FUND	WATER	1,325.00
	PROFF SVCS 5/24 - 8/20/21	SEWER FUND	SEWER	6,475.00
			TOTAL:	7,800.00
MISS UTILITY OF WV, INC.	MESSAGE FEES: JULY	WATER FUND	WATER	226.80
			TOTAL:	226.80
PACE ANALYTICAL SERVICES, LLC	TESTING: CAVALAND QRTRLY	WATER FUND	WATER	13.50
	TESTING: ROCKWOOL MONTHLY	SEWER FUND	SEWER	214.27
	TESTING: CT WEEKLY	SEWER FUND	SEWER	173.19
	TESTING: TUSC MNTHLY	SEWER FUND	SEWER	85.85
	TESTING: CT WEEKLY	SEWER FUND	SEWER	173.19
	TESTING: CT WEEKLY	SEWER FUND	SEWER	173.19
	TESTING: CT QRTLY SLDG	SEWER FUND	SEWER	176.00
	TESTING: TUSC MONTHLY	SEWER FUND	SEWER	85.85
	TESTING: CT WEEKLY	SEWER FUND	SEWER	173.19
	TESTING: WV0022349/IU02	SEWER FUND	SEWER	214.27
			TOTAL:	1,482.50

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT	AMOUNT
APPARATAUS REPAIR & ENGINEERING, INC	COIL, A/B, 115/120 60 HZ	WATER FUND	WATER	283.96
			TOTAL:	283.96
APPLE VALLEY TIRE	SEWER TRUCK NEW TIRES	SEWER FUND	SEWER	530.40
			TOTAL:	530.40
ASSURED PARTNERS	1ST QTR PCKG DWN PYMNT	WATER FUND	WATER	24,535.60
	1ST QTR PRFSNL INSTLMNT	WATER FUND	WATER	1,866.72
	1ST ATR EXCSS DWN PYMNT	WATER FUND	WATER	1,382.51
	1ST QTR PCKG DWN PYMNT	SEWER FUND	SEWER	24,535.59
	1ST QTR PRFSNL INSTLMNT	SEWER FUND	SEWER	1,866.72
	1ST ATR EXCSS DWN PYMNT	SEWER FUND	SEWER	1,382.51
			TOTAL:	55,569.65
CEM	PM SVC VISIT: LAB EQUIPMEN	SEWER FUND	SEWER	2,600.00
			TOTAL:	2,600.00
CHARLES TOWN SEWER	JULY FUNDING	SEWER FUND	NON-DEPARTMENTAL	13,404.89
			TOTAL:	13,404.89
CHARLES TOWN WATER	JULY FUNDING	WATER FUND	NON-DEPARTMENTAL	11,270.75
			TOTAL:	11,270.75
CITIBANK, N.A.	PRONOUNCEMENT	WATER FUND	NON-DEPARTMENTAL	1,282.58
			TOTAL:	1,282.58
CORE & MAIN	HARCO 2PO 90DIF/IPSIMP	WATER FUND	WATER	376.88
	HARCO 2 60-100-02 DIJOINT	WATER FUND	WATER	1,595.68
	TAPCAP,WRPARND STRAP, PVCS	SEWER FUND	SEWER	331.48
			TOTAL:	2,304.04
COYNE CHEMICAL	ZETAG 8868FS	SEWER FUND	SEWER	7,405.74
			TOTAL:	7,405.74
CRYSTAL SPRINGS	MONTHLY SVC@ WWTP	WATER FUND	WATER	17.84
	MONTHLY SVC@ 661 S GEORGE	WATER FUND	WATER	44.35
	MONTHLY SVC@ 661 S GEORGE	SEWER FUND	SEWER	44.34
			TOTAL:	106.53
DEPT OF ENVIRONMENTAL PROTECTION	GROUNDWATER ANNUAL FEE	SEWER FUND	SEWER	525.00
			TOTAL:	525.00
WV DEPT OF HEALTH & HUMAN SERVICES	FLOURIDE TESTING	WATER FUND	WATER	15.00
	BACTERIOLOGICAL TESTING	WATER FUND	WATER	100.00
	BACTERIOLOGICAL TESTING	WATER FUND	WATER	20.00
	BACTERIOLOGICAL TESTING	WATER FUND	WATER	120.00
			TOTAL:	255.00
EJ USA, INC.	MANHOLE RISER	SEWER FUND	SEWER	424.79
			TOTAL:	424.79
FERGUSON US HOLDINGS, INC	HYMAX GRIP PLG COUP ADT	WATER FUND	WATER	582.00
			TOTAL:	582.00
FRONTIER COMMUNICATIONS	304-876-9970-121914-4	WATER FUND	WATER	94.63
	304-876-2120-111514-4	WATER FUND	WATER	94.63