Dewberry

Preliminary Engineering Report

Pittsylvania County Public Works Pump Stations Improvements and Brockway Sewer Improvements Pittsylvania County, VA

August 2021

Prepared By:
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PITTSYLVANIA COUNTY PUBLIC WORKS PRELIMINARY ENGINEERING REPORT

C.1 Description of Project Components

The proposed project includes two components: improvements to aging pump stations in the system; and decommissioning of the Brockway pump station and extension of sewer to serve the existing customers. Two exhibits are attached as page 5 and 8, and an overall project cost is provided below for reference:

- Exhibit 1: Pump Stations Improvements
- Exhibit 2: Brockway Pump Station Decommissioning and Sewer Improvements

Construction Cost + Contingency	$2,283,864
Engineering + Survey	$282,439
Miscellaneous Project Soft Cost	$260,871
Project Total	**$2,827,174**

Pump Stations Improvements

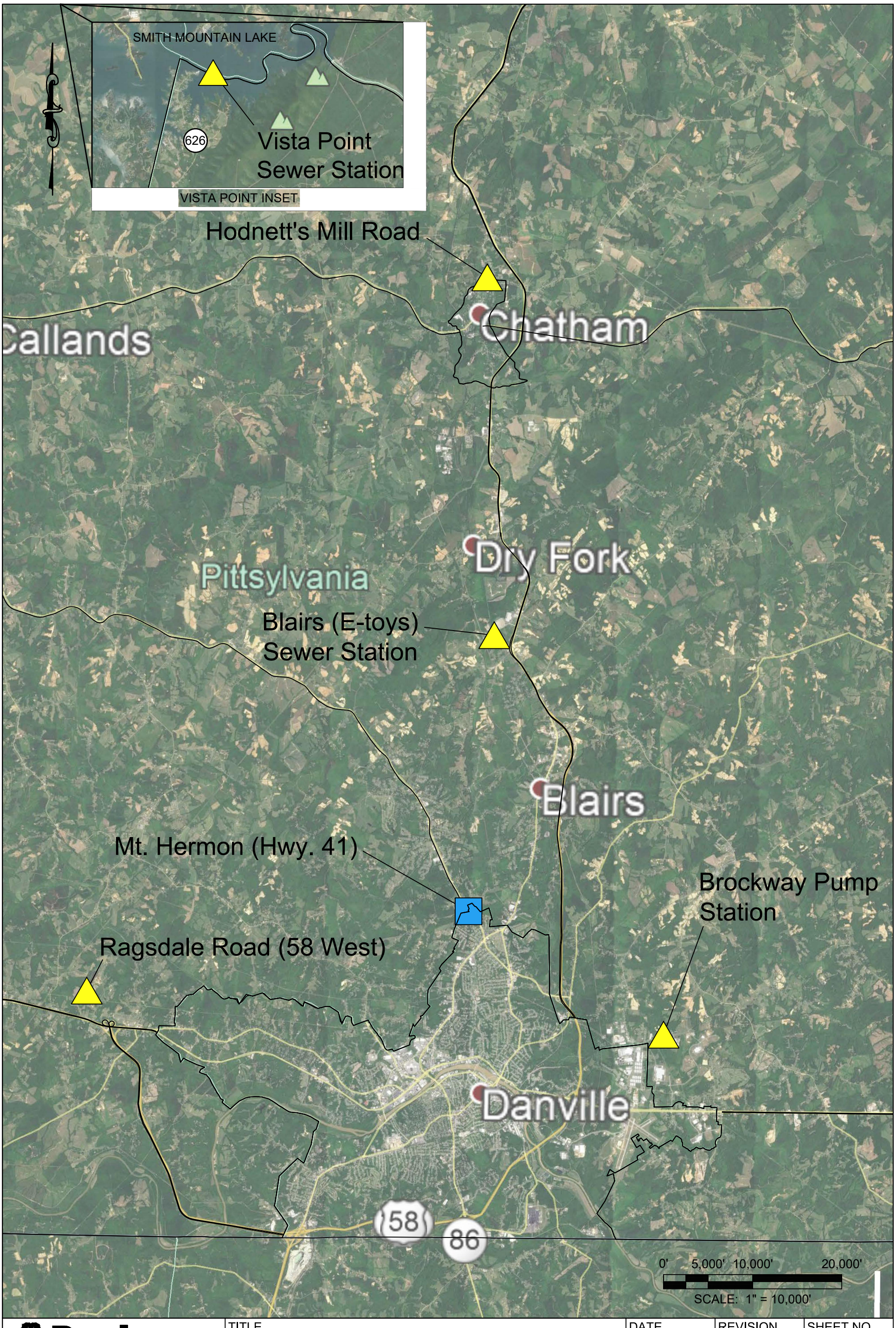
Pittsylvania County Public Works (PCPW) owns and operates fifteen (15) sewer pump stations and five (5) water booster pump stations within the service area. These pump stations range in age, installation dating from 1978 to 2011, and the overall condition and reliability of the existing infrastructure was previously undocumented. To address critical deficiencies and plan for management of these assets, PCPW hired Dewberry to inspect each of these stations, document deficiencies, develop a weighted reliability decision matrix for ranking each pump station, and develop recommendations for critical capital improvement needs, as well as establish cost projections to be used by PCPW in a 5-year capital improvements plan. The findings from this investigation were documented in a 2019 report titled "PCSA Pump Stations Condition Assessment", which can be provided for reference to EDA as necessary.

Given the age of many of the stations and the minimal replacement of parts over the years of operation, PCPW comprehensively investigated the pump stations in the service area to develop an appropriate capital improvements plan for long term reliability. In addition to a condition and reliability assessment, PCPW desires an integrated SCADA system for remote monitoring with limited control capability at pump stations providing critical service. Currently, select stations have an autodialer for communication in the event of an overflow, but at many locations they are not functional. PCPW currently has no means to identify malfunction and high-level alarms at these stations outside of physical inspection. To develop a properly integrated SCADA system, components including software options, remote terminal units (RTUs) and telemetry were also included in the comprehensive condition assessment. This was the first priority capital improvement, and with COVID-19 relief funds allocated to Pittsylvania County, this remote monitoring SCADA system for all sewer pump stations was purchased and is currently being installed. The focus is now on critical reliability improvements to the pump stations.

Provided on the following pages are the ages of all of the pump stations, the reliability matrix that came out of the pump stations condition assessment, and a map showing the locations of the pump stations included in this project.

Table C.1-1: Pump Station Installation Dates

Pump Station Name	Installation Date
Water Stations	
Mount Hermon (HWY 41)	1982
Vista Point (Water)	1983
US 29 North	1987
58 West (Page Road)	1990
Dry Fork Road	2011
Sewer Stations	
Brockway	1978
Vista Point (Sewer)	1983
Chatham North Industrial Park	1989
Hodnetts Mill Road	1990
Tightsqueeze (Times Fiber)	1993
Mount Hermon (Laurel Woods)	1994
Blairs (eToys)	2000
Ringgold East Industrial Park	2002
Chatham Middle School	2002
Deercrest Lane	2003
Pine Lake Road	2003
Ragsdale Road	2003
Cross Creek Subdivision	2005
Inca Lane (VIR)	2005
Witcher Road	2009



Dewberry Dewberry Engineers Inc. 551 Piney Forest Road Danville, VA 24540-3353 434.797.4497	TITLE SEWAGE LIFT STATIONS OVERALL MAP	DATE 10/26/2020	REVISION ADD00	SHEET NO. EXHIBIT 1
	PROJECT PCSA PUMP STATIONS CONDITIONS ASSESSMENT PITTSYLVANIA COUNTY VIRGINIA	PROJ. NO. 50090774	DRAWING NO. 00000001	

PUMP STATION RELIABILITY DECISION MATRIX -- MECHANICAL & ELECTRICAL

Attribute	Access & Site	Security (Fencing, lighting, etc.)	Equipment Shelter/ Building	Wet well, Hatches & Mechanical	Hoist	Pump Age/Total Run Hours	% Reserve Capacity - P1 (pump run hrs./day and drawdown test)	% Reserve Capacity - P2 (pump run hrs./day and drawdown test)	Pump Performance - P1	Pump Performance - P2	Criticality of Service	Incoming Power Service	Pump Controls	Telemetry	Back-up Power Availability / Emergency Pump Connection	Other	Weighted Criticality Score
Reliability Weight (1-5)	**3**	**4**	**3**	**2**	**2**	**4**	**4**	**4**	**5**	**5**	**4**	**4**	**4**	**5**	**5**	**3**	
Inca Lane (VIR)	2	1	1	2	1	2	1	1	1	1	2	1	1	3	2	2	92
Witcher Road	1	1	3	1	1	1	1	1	1	1	2	1	1	4	2	1	91
Ringgold East Industrial Park	1	4	3	2	1	2	3	1	3	1	2	1	3	4	2	1	135
Brockway Pump Station	5	5	4	4	2	5	2	4	2	4	2	4	4	4	4	3	**222**
Cross Creek Subdivision	2	3	2	2	1	1	1	1	1	1	2	3	3	3	2	1	112
Mount Hermon (Laurel Woods)	3	4	3	3	2	3	2	2	2	1	5	1	3	4	2	3	162
Blairs (eToys)	2	4	3	3	2	2	2	2	3	5	3	1	3	4	3	3	**177**
Chatham Middle School	2	3	3	2	1	2	3	3	4	4	2	1	3	4	2	2	165
Tightsqueeze (Times Fiber)	1	3	3	2	1	3	1	1	3	4	2	3	4	4	2	1	154
Chatham North Industrial Park	3	3	3	4	2	4	2	2	1	1	3	1	4	5	3	2	162
Hodnetts Mill Road	3	4	3	4	2	3	3	3	4	4	4	4	2	5	4	3	**216**
Vista Point	1	3	5	4	2	5	2	2	4	4	3	3	2	5	2	3	**194**
Deercrest Lane	4	3	3	3	2	3	2	2	2	2	2	1	4	4	2	1	152
Pine Lake Road	4	3	3	2	2	3	2	2	3	3	3	1	4	4	2	2	167
Ragsdale Road	3	3	3	2	2	3	3	3	2	2	5	1	5	5	4	4	**195**
Mt. Hermon (HWY 41) – WATER	5	5	4	2	2	5	3	3	3	3	5	4	3	4	4	3	**226**
US HWY 29 North – WATER	2	3	3	4	2	4	2	2	3	3	3	3	2	3	3	2	169
Dry Fork Road – WATER	2	3	1	1	1	1	1	1	1	1	4	1	1	4	3	2	112
Vista Point - WATER	1	2	1	4	3	4	2	2	4	4	3	1	3	4	2	3	167
58 West (Page Road) - WATER	2	2	2	2	2	2	1	1	1	1	2	3	2	3	3	1	115

Based on the weighted criticality scores, there are six pump stations that are considered to have a poor rating with regard to the ability of these stations to meet minimum expected reliability standards. These stations are generally characterized with a weighted criticality scores above 177, and include Highway 41 Water Booster Station (1982), Brockway Sewer Pump Station (1978), Hodnett's Mill Sewer Pump Station (1990), Ragsdale Sewer Pump Station (2003), Vista Point Sewer Pump Station (1983), and Blairs (eToys) Sewer Pump Station (2000). The itemized list of improvements for each of these stations can be found in the unit price cost estimates beginning on page 10.

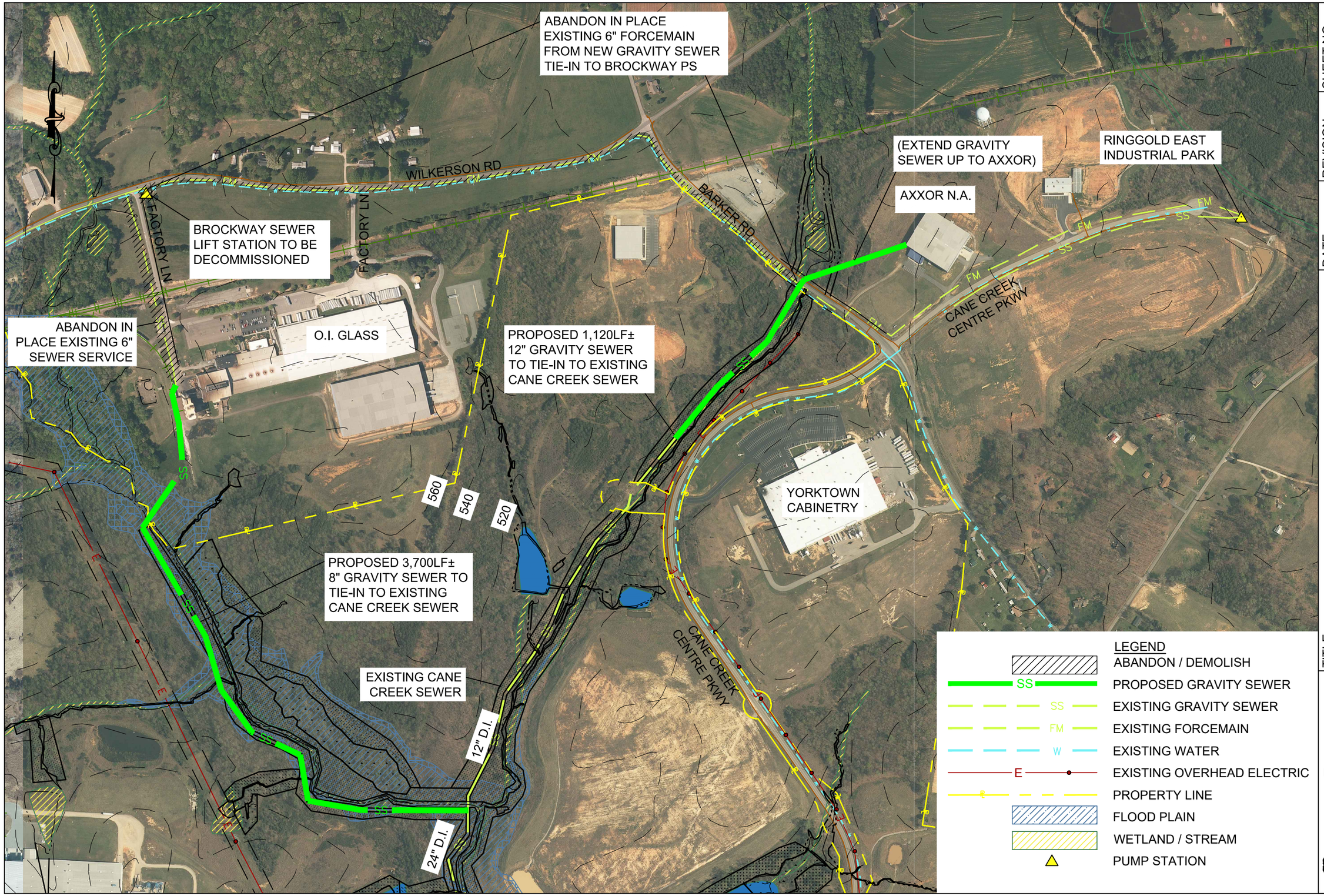
In addition to these stations, there are others that have individual deficiencies that by themselves are placing the entire station at high risk of failure and release of raw sewage to the environment; or for a water booster station, a loss of service resulting in interruption of potable water. These individual deficiencies are generally associated with an attribute having a weighted score of 20 or above. These improvements consist of the following:

- Chatham Middle School Pump Servicing
- Tightsqueeze (Times Fiber) Pump #2 Servicing
- Vista Point Water Well Pump Replacement
- Dry Fork Road Water Booster Station Telemetry (note that the SCADA project only included sewer stations)
- Vista Point Water Well Pump Station Telemetry (note that the SCADA project only included sewer stations)
- New backup generators at Laurel Woods, Chatham Middle, Tightsqueeze, Chatham North, Deercrest, Pine Lake, and Dry Fork Water for resiliency and continuation of service during power outages.
- Site fencing and security at all water stations for increased safety and resiliency.

Brockway Pump Station Decommissioning and Sewer Upgrade

As a part of the Pump Stations Condition Assessment noted above, it was recommended that the 1978 Brockway Pump Station be completely overhauled due to age, deterioration, and poor reliability of service. In order to prepare for future development in the Cane Creek Centre and Ringgold East Industrial Park, PCPW has elected to do the following:

- Take the Brockway Pump Station out of service.
- Reroute gravity sewer from OI Glass to the Cane Creek 24" gravity sewer.
- Extend existing gravity sewer along Cane Creek north to Barker Road, and also a line extension north to serve Axxor.
- Tie in existing force main from the Ringgold East Industrial Park pump station (behind Axxor) to proposed gravity sewer at Barker Road.



SHEET NO.	EXHIBIT 2
REVISION	ADD01
DRAWING NO.	00000000
DATE	11/9/2020
PROJ. NO.	50090774

TITLE: BROCKWAY PUMP STATION DECOMMISSION, FORCEMAIN ABANDONMENT, AND PROPOSED GRAVITY SEWER

PROJECT: PCSA SEWER IMPROVEMENTS

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C.2 Statement

The project components described above in Section C.1 and within the attached supplemental report are consistent with the EDA investment project description provided in Section B.2 of Form ED-900 provided in this funding application.

C.3 Drawings

Included above in C.1 is an overall map indicating the locations of the pump stations with proposed improvements, and a separate exhibit showing the decommissioning of the Brockway pump station and related sewer upgrades.

C.4 Feasibility Analysis

All improvements to the existing pump stations will occur within the existing footprint and will not create any additional constructability concerns.

The proposed Brockway sewer upgrade will include extension of ±3,700 linear feet of 8" gravity sewer parallel to Cane Creek and ±1,120 linear feet of 12" gravity sewer along the Cane Creek tributary that parallels Cane Creek Centre Parkway. A wetland delineation was completed in 2007 and a dedicated sanitary sewer easement was designated for location of this sewer. Since the delineation, confirmation and easement has been obtained, just a Nationwide Permit 12 will be required to cover any temporary impacts that construction may have on the creek or wetlands. USACE may have interest in revisiting the site since the confirmation was completed 13 years ago to verify no significant change to the creek and wetlands. The wetland impacts are the only foreseeable significant feasibility concern.

Both projects will provide long term increased reliability to the sewer systems that serve Cane Creek Centre and Ringgold East industries, as well as the surrounding community.

C.5 Method of Construction

Given the scope of work described above, procurement will be a traditional design/bid/build format.

C.6 Construction Contracts

Construction will be awarded to one prime contractor who may elect to hire subcontractors to complete work. The project may be bid as two separate projects: 1. Pump stations; 2. Brockway sewer upgrade.

C.7 Cost Estimate

Table C.7-1: Overall Summary of Project Cost

#	Name	Raw Construction Cost
1	Highway 41 Water Booster Station	$217,800
2	Hodnett's Mill	$273,050
3	Ragsdale Road	$207,200
4	Vista Point Sewer Pump Station	$256,700
5	Blairs (E-Toys)	$274,390
6	Brockway	$484,100
7	Critical Deficiencies (20+ Weighted Score)	$363,000
	Total	**$2,076,240**

Construction Subtotal	$2,076,240
Contingency (10%)	$207,624
Total Construction Cost	$2,283,864
Engineering + Survey	$282,439
Geotechnical	$15,000
Wetland Delineation and Permitting	$20,000
Inspection	$100,871
Finance Assistance	$85,000
Legal and Administrative	$40,000
Project Total	**$2,827,174**

Mount Hermon HWY 41 Booster Station - (MCC above grade only)					
LI	**Description**	**Qty**	**Unit**	**Unit Price**	**Total Price**
1	Mobilization	1	LS	$19,800	$19,800
2	Decommission Underground Controls and MCC.	1	LS	$12,000	$12,000
3	Service/Replace Existing Auxiliary Drywell Equipment	1	LS	$15,000	$15,000
4	Pre-Engineered Above-Ground Building	120	SF	$325	$39,000
5	Pump Control Panel	1	LS	$22,000	$22,000
6	Spare Parts	1	LS	$10,000	$10,000
7	Electrical	1	LS	$60,000	$60,000
8	Site Lighting	1	LS	$10,000	$10,000
9	Site Improvements & Restoration	1	LS	$30,000	$30,000
				Total	$217,800
				Contingency (10%)	$21,780
				Total Construction	$239,580
				Engineering	$26,136
				Inspection	$10,890
				Permitting	$6,500
				Project Total	$283,106

Hodnett's Mill					
LI	**Description**	**Qty**	**Unit**	**Unit Price**	**Total Price**
1	Mobilization	1	LS	$17,800	$17,800
2	Bypass pumping	1	LS	$18,000	$18,000
3	Pump Down and Clean WW and VV	1	LS	$3,000	$3,000
4	Rehab Interior of WW and VV	1	LS	$5,000	$5,000
5	Demo Existing Equipment	1	LS	$3,750	$3,750
6	Aluminum Equipment Rack and Rain Shield	1	LS	$9,500	$9,500
7	Duplex Submersible Pumps	2	EA	$12,000	$24,000
8	Miscellaneous Piping, new GVs and CV	1	LS	$35,000	$35,000
9	Pump Controls	1	LS	$17,500	$17,500
10	Spare Parts	1	LS	$6,500	$6,500
11	Replace Generator	1	LS	$50,000	$50,000
12	Electrical	1	LS	$35,000	$35,000
13	Site Lighting	1	LS	$12,500	$12,500
14	Fencing and Security	350	LF	$30	$10,500
15	Stormwater Improvements	1	LS	$15,000	$15,000
16	Site Restoration	1	LS	$10,000	$10,000
				Total	$273,050
				Contingency (10%)	$27,305
				Total Construction	$300,355
				Engineering	$32,766
				Inspection	$13,653
				Permitting	$4,500
				Project Total	$351,274

Ragsdale					
LI	**Description**	**Qty**	**Unit**	**Unit Price**	**Total Price**
1	Mobilization	1	LS	$14,700	$14,700
2	Bypass pumping	1	LS	$18,000	$18,000
3	Pump Down and Clean WW and VV	1	LS	$1,500	$1,500
4	Rehab Interior of WW and VV	1	LS	$10,500	$10,500
5	Demo Existing Equipment	1	LS	$10,000	$10,000
6	Aluminum Metal Equipment Rack and Rain Shield	1	LS	$9,500	$9,500
7	Service Duplex Submersible Pumps	2	EA	$2,750	$5,500
8	Miscellaneous Piping, new GVs and CVs	1	LS	$25,000	$25,000
9	Spare Parts	1	LS	$6,500	$6,500
10	Generator	1	LS	$45,000	$45,000
11	Electrical	1	LS	$22,000	$22,000
12	Site Lighting	1	LS	$8,000	$8,000
13	Fencing and Security	500	LF	$30	$15,000
14	Access Drive Improvements	1	LS	$5,500	$5,500
15	Site Restoration	1	LS	$12,000	$12,000
				Total	$207,200
				Contingency (10%)	$20,720
				Total Construction	$227,920
				Engineering	$24,864
				Inspection	$10,360
				Permitting	$1,500
				Project Total	$264,644

Vista Point Sewer					
LI	**Description**	**Qty**	**Unit**	**Unit Price**	**Total Price**
1	Mobilization	1	LS	$22,700	$22,700
2	Bypass pumping	1	LS	$7,000	$7,000
3	Demo Pumps and Controls	1	LS	$10,000	$10,000
4	New Concrete Wet well and Valve Vault	1	LS	$22,000	$22,000
5	New Hatches	2	EA	$5,500	$11,000
6	Pre-engineered MCC building	80	SF	$350	$28,000
7	Duplex Submersible Pumps	2	EA	$9,000	$18,000
8	Miscellaneous Piping, GVs and CVs	1	LS	$22,500	$22,500
9	Pump Controls	1	LS	$25,000	$25,000
10	Spare Parts	1	LS	$2,000	$2,000
11	Generator	1	LS	$45,000	$45,000
12	Electrical	1	LS	$25,000	$25,000
13	Site Lighting	1	LS	$8,500	$8,500
14	Site Restoration & Improvements	1	LS	$10,000	$10,000
				Total	$256,700
				Contingency (10%)	$25,670
				Total Construction	$282,370
				Engineering	$30,804
				Inspection	$12,835
				Permitting	$4,500
				Project Total	$330,509

Blairs (eToys)					
LI	**Description**	**Qty**	**Unit**	**Unit Price**	**Total Price**
1	Mobilization	1	LS	$17,890	$17,890
2	Bypass pumping	1	LS	$18,000	$18,000
3	Pump Down and Clean WW and VV	1	LS	$2,000	$2,000
4	Demo Existing Equipment	1	LS	$12,500	$12,500
5	New Valve Vault Hatch	1	EA	$4,500	$4,500
6	Aluminum Equipment Rack and Rain Shield	1	LS	$9,500	$9,500
7	Duplex Submersible Pumps	2	EA	$12,000	$24,000
8	Miscellaneous Piping, new GVs and CVs	1	LS	$35,000	$35,000
9	Pump Controls	1	LS	$25,000	$25,000
10	Spare Parts	1	LS	$2,000	$2,000
11	Generator	1	LS	$45,000	$45,000
12	Electrical	1	LS	$20,000	$20,000
13	Site Lighting	1	LS	$8,500	$8,500
14	Fencing and Security	450	LF	$30	$13,500
15	Site Restoration & General Improvements	1	LS	$37,000	$37,000
				Total	$274,390
				Contingency (10%)	$27,439
				Total Construction	$301,829
				Engineering	$32,927
				Inspection	$13,720
				Permitting	$1,500
				Project Total	$349,975

Brockway Pump Station Decommissioning and Sewer Upgrade					
LI	**Description**	**Unit**	**Qty**	**Unit Price**	**Total Price**
1	Mobilization	LS	1	$40,000	$40,000
2	Clear and Grub R-O-W	LS	1	$22,000	$22,000
3	Erosion and Sediment Control	LS	1	$25,000	$25,000
4	Site Improvements & Restoration	LS	1	$16,000	$16,000
5	Bypass Pumping/Pump & Haul	LS	2	$4,000	$8,000
6	Demo Existing PS, FM, and Equipment & Flowable Fill Under RR	LS	1	$24,000	$24,000
7	8" Gravity Sewer	LF	3,700	$45	$166,500
8	12" Gravity Sewer	LF	1,120	$55	$61,600
9	Manholes (<10 ft)	EA	10	$5,000	$50,000
10	Manholes (>10 ft)	EA	7	$7,750	$54,250
11	Conventional Jack and Bore 16" Casing	LF	75	$200	$15,000
				Total	$482,350
				Contingency (5%)	$24,118
				Total Construction	$506,468
				Engineering*	$10,000
				Geotechnical*	$9,000
				CONA & Inspection	$16,500
				Plats *	$2,500
				Permitting*	$5,000
				Finance Assistance	$20,400
				Project Total	$569,868

Critical Deficiencies (Weighted Score of 20+)					
LI	**Description**	**Qty**	**Unit**	**Unit Price**	**Total Price**
1	Chatham Middle School Pump Servicing	2	EA	$2,500	$5,000
2	Tightsqueeze (Times Fiber) Pump #2 Servicing	1	EA	$2,500	$2,500
3	Vista Point Water Well Pump Replacement	1	EA	$1,500	$1,500
4	Generators at Critical Stations (Laurel Woods, Chatham Middle, Tightsqueeze, Chatham North, Deercrest, Pine Lake, Dry Fork Water)	7	EA	$45,000	$315,000
5	Fencing and Security at Water Stations (29 N, Mt. Hermon, Dry Fork)	3	EA	$13,000	$39,000
				Total	$363,000
				Contingency (10%)	$36,300
				Total Construction	$399,300
				Engineering	$36,300
				Inspection	$18,150
				Project Total	$453,750

C.8 Property Acquisition

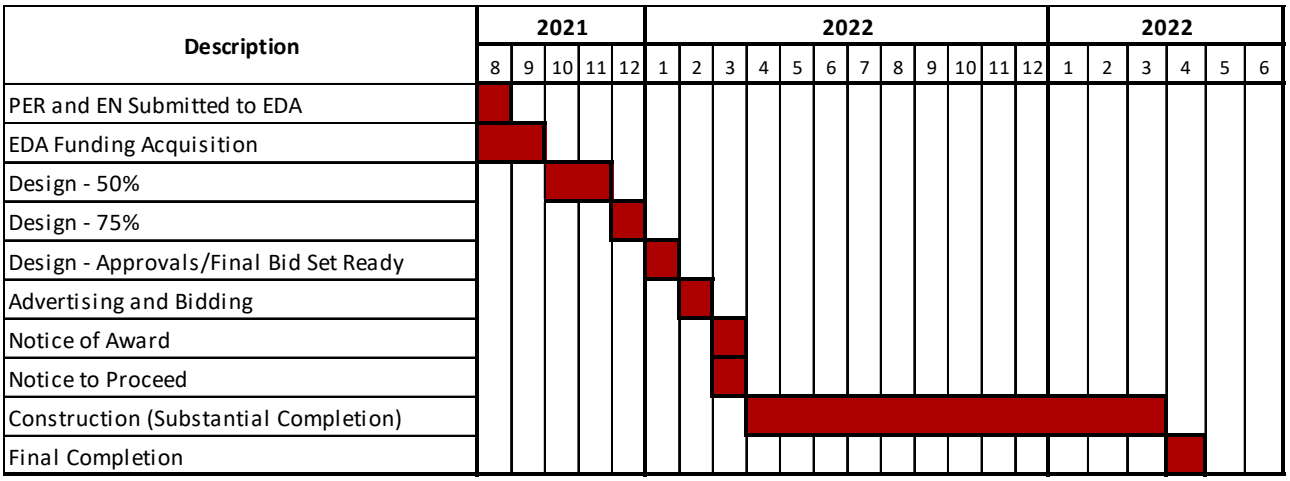
Property acquisition will not be required as all upgrades are within existing County-owned property or within VDOT right-of-way.

C.9 Permits

The following permits will be required for this project:

- DEQ Certificate to Construct (CTC)
- DEQ Certificate to Operate (CTO)
- Pittsylvania County Land Disturbance Permit
- DEQ Stormwater Management and Land Disturbance Permit
- VDOT Land Use Permit
- USACE Nationwide 12 Permit for Sewer Project

C.10 Schedule



C.11 Project Budget

Construction Subtotal	$2,076,240
Contingency (10%)	$207,624
Total Construction Cost	$2,283,864
Engineering + Survey	$282,439
Geotechnical	$15,000
Wetland Delineation and Permitting	$20,000
Inspection	$100,871
Finance Assistance	$85,000
Legal and Administrative	$40,000
Project Total	$2,827,174