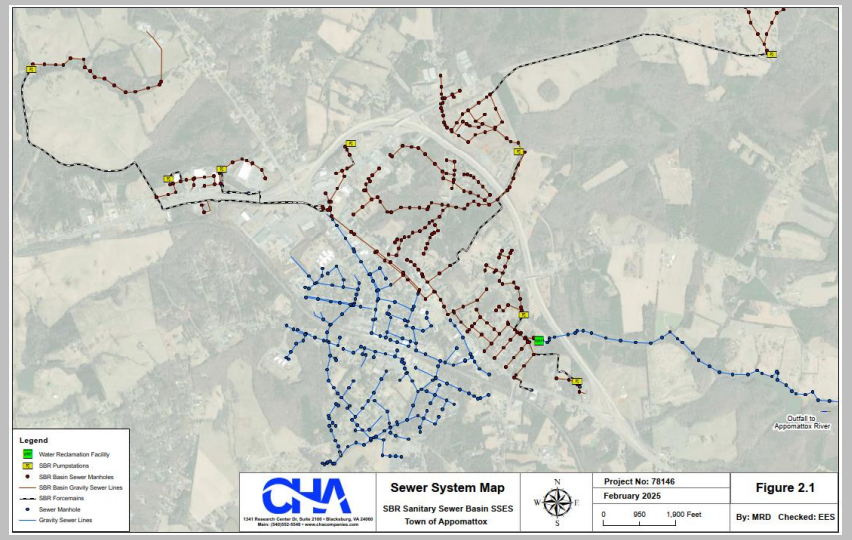
TOWN OF APPOMATTOX USA



SANITARY SEWER EVALUATION SURVEY

SEQUENCING BATCH REACTOR (SBR) SANITARY SEWER BASIN

June 2025

01.

PAST SANITARY SEWER PROJECTS

Trickling Filter Sanitary Sewer Basin.

Past Sanitary Sewer Projects

- CHA has been working with the Town to reduce rainfall-derived inflow and infiltration (I&I) in the Town's sanitary sewer collection system since 2016.
  - Inflow is stormwater runoff entering the collection system through defective manhole frames/covers and cleanout caps.
  - Infiltration is groundwater entering the collection system through sewer pipe defects (e.g., leaking pipe joints, cracks in the pipe, etc.).
  - I&I can exceed the collection system capacity and cause wet weather sanitary sewer overflows (SSOs).
  - I&I can also overwhelm wastewater treatment plant processes.
- CHA helped the Town secure funding through the USDA Rural Development Program.

Past Sanitary Sewer Projects

- CHA managed multiple I&I mitigation projects in the Trickling Filter Sanitary Sewer Basin (south of Confederate Boulevard).
  - Comprehensive Sanitary Sewer Rehabilitation (pipe and manhole lining)
    - Prioritized rehabilitation throughout the area south of Confederate Boulevard
  - Targeted Sanitary Sewer Replacement Projects (open cut, pipe bursting)
    - Morton Lane, other locations where poor pipe and manhole conditions prevented rehabilitation
  - Over $3,000,000 of construction projects completed in 2023
  - Significantly reduced I&I, benefitting the new sanitary sewer lift station that replaced the original trickling filter wastewater treatment plant

02.

SANITARY SEWER EVALUATION STUDY

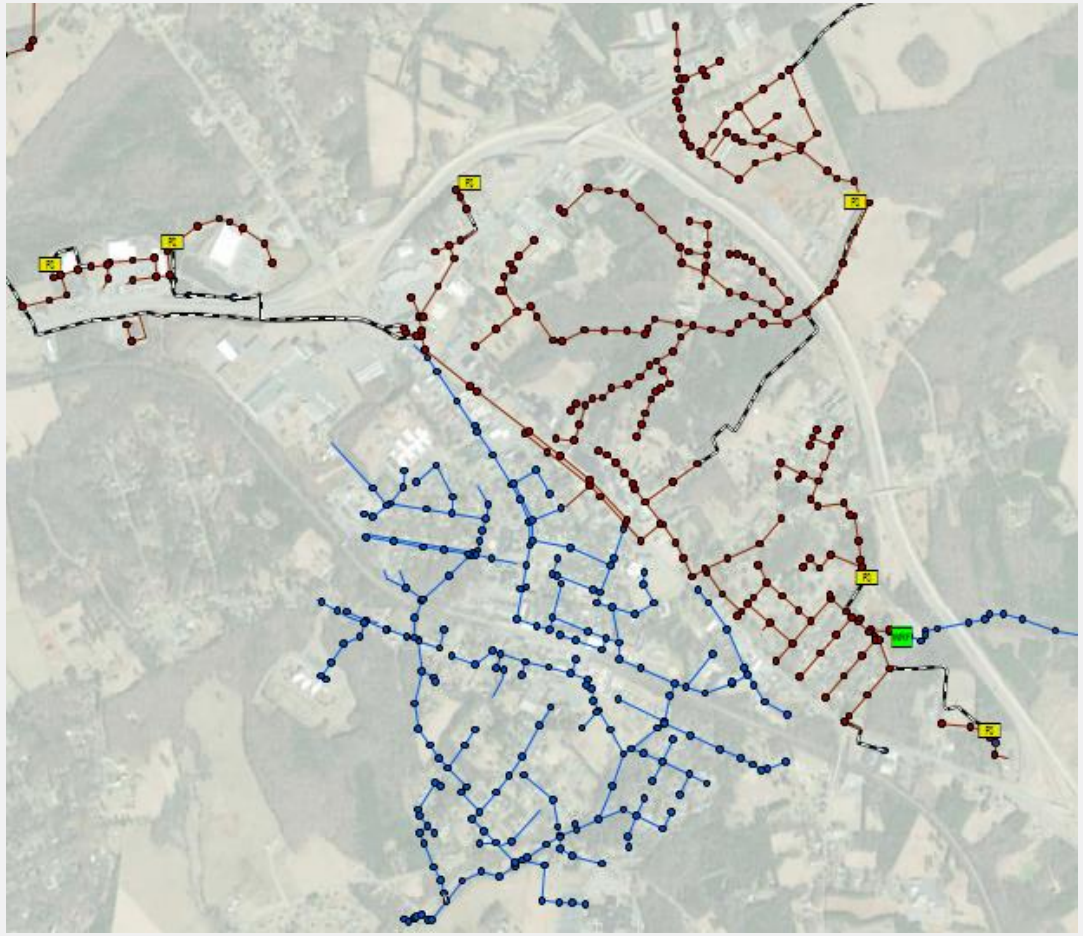
Sequencing Batch Reactor Sanitary Sewer Basin.

Sanitary Sewer Evaluation Study
SBR Sanitary Sewer Basin

- Logical next step - *reduce I&I north of Confederate Boulevard*
  - CHA performed a comprehensive Sanitary Sewer Evaluation Study (SSES) of the Sequencing Batch Reactor (SBR) Water Reclamation Facility (WRF) Sanitary Sewer Basin.
- Field investigations took place in 2022 and 2023.
  - Flow metering
  - Pipe and manhole inspections
  - Smoke testing
  - Pump station evaluation
  - Engineering analysis

Sanitary Sewer Evaluation Study
SBR Sanitary Sewer Basin

- Sequencing Batch Reactor (SBR) Sanitary Sewer Basin
  - 94,000 linear feet of sanitary sewer pipe
  - 341 sanitary sewer manholes
  - 8 sanitary sewer pump stations
  - Known to be in better condition than the older collection system area south of Confederate Boulevard



Sanitary Sewer Evaluation Study
SBR Sanitary Sewer Basin

- CHA conducted comprehensive sanitary sewer flow monitoring in early 2022.
  - Flow metering identifies areas with high I&I during and after significant rainfall events.

Table 2.1 - Patricia Anne Flow Meter Data Summary

Patricia Anne		
Flows During Monitoring Period		
(1) Estimated Current Pipe Capacity (See Note 1)	7560.00	gpm
(2) Average Dry-Weather Flow During Monitoring Period	82.399	gpm
% of Estimated Current Pipe Capacity	1.09	%
(3) Peak 15-minute Flow During Monitoring Period (See Note 2)	982.230	gpm
% of Estimated Current Pipe Capacity	13.0	%
Flow Levels During Monitoring Period		
(1) Pipe Diameter	10	inches
(2) Average Dry-Weather Level During Monitoring Period	0.78	inches
% of Pipe Diameter	8	%
(3) Peak Level During Monitoring Period (See Note 2)	2.60	inches
% of Pipe Diameter	26	%
Velocity During Monitoring Period		
(1) Estimated Current Full-Pipe Velocity (See Note 1)	21453.84	fps
(2) Average Dry-Weather Velocity During Monitoring Period	2.21	fps
(3) Peak Velocity During Monitoring Period (See Note 2)	5.89	fps

Sanitary Sewer Evaluation Study
SBR Sanitary Sewer Basin

- CHA inspected nearly 350 sanitary sewer manholes in 2023.
  - Manhole inspections identify defects that allow I&I intrusion.

PS5-A-0001-MH: Seal precast joint

PS5-B-0018-MH: Install water-resistant manhole frame and cover & cementitiously line chimney

Sanitary Sewer Evaluation Study
SBR Sanitary Sewer Basin

- CHA conducted smoke testing in targeted areas in 2023.
  - Smoke testing reveals manhole and cleanout defects at ground level that allow I&I intrusion.

PS6-0020-MH to PS6-0019-MH: PVC cleanout with broken cap

EDA-0014-MH: Unsealed and offset frame

Sanitary Sewer Evaluation Study
SBR Sanitary Sewer Basin

- CHA inspected more than 8,000 linear feet of sanitary sewer pipe using closed-circuit television (CCTV) footage.
  - CCTV footage shows pipe defects that allow infiltration intrusion.

SBR-0006-SBR-0005 – Multiple fractures with roots

SBR-00031-SBR-0030 – Multiple cracks and fractures

Sanitary Sewer Evaluation Study
SBR Sanitary Sewer Basin

- CHA evaluated 6 of the pump stations in the SBR Basin.
  - Identified the need for permanent standby generators to avoid SSOs during power outages.

Sanitary Sewer Evaluation Study
SBR Sanitary Sewer Basin

- Findings:
  - The SSES showed the SBR Basin to be in relatively good condition.
- Recommendations:
  - Rehabilitate 1,650 feet of sanity sewer pipe via cured-in-place pipe lining
  - Rehabilitate 140 manholes
  - Install 6 standby generators
  - Potential overall project cost: $2,000,000
- CHA provided the SSES to the Town in a Preliminary Engineering Report that can be used for funding application(s).

03.

PRIORITY SANITARY SEWER REPLACEMENT PROJECT

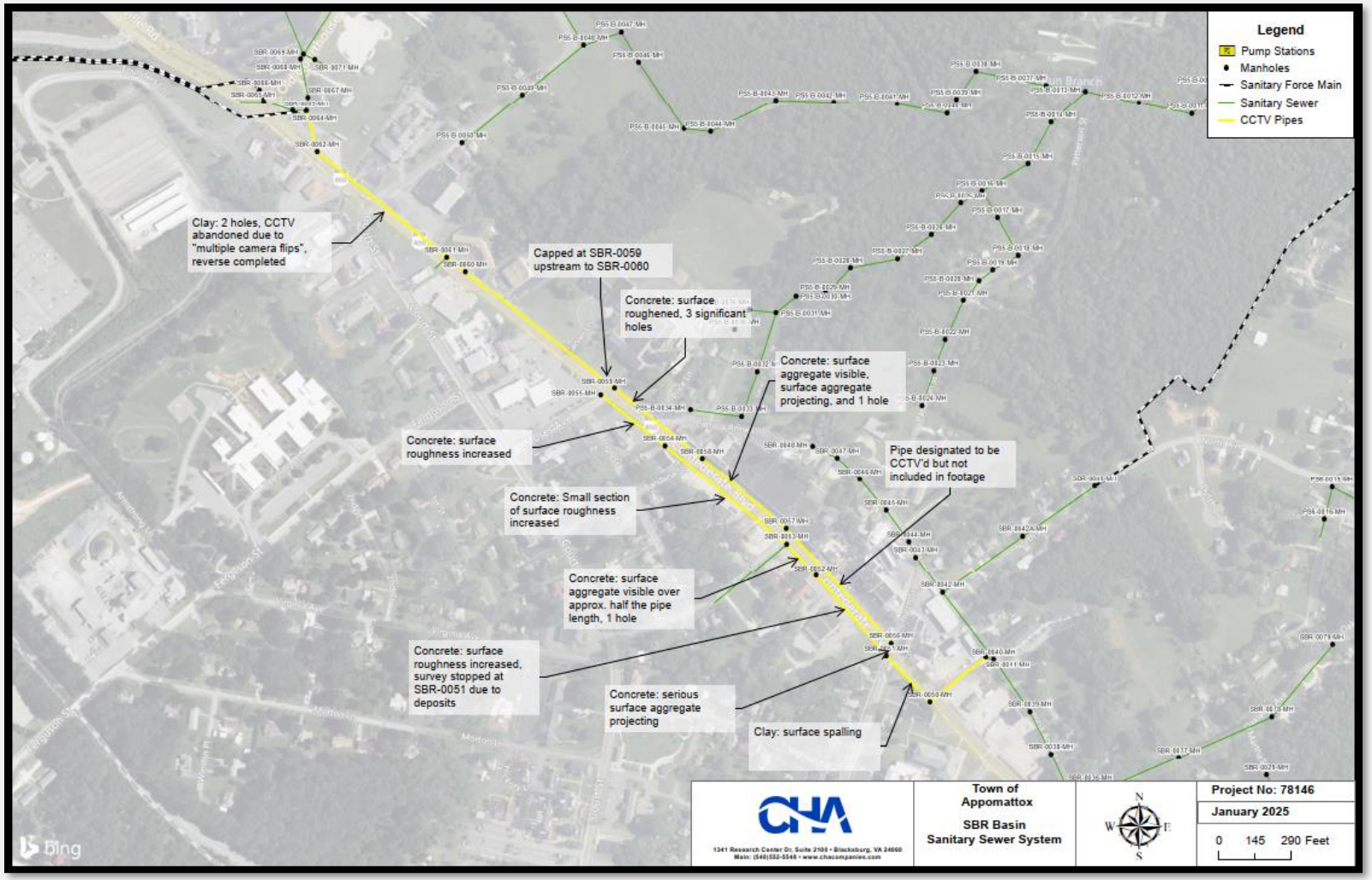
Confederate Boulevard.

Confederate Boulevard Sanitary Sewer Replacement Project

- CCTV inspection of the existing sanitary sewer pipes in Confederate Boulevard showed severe deterioration associated with corrosive sewer gases created by the turbulence at pump station discharges.

- CHA recommended prioritizing renewal of approximately 4,000 linear feet of sanitary sewer pipe and the associated 11 sanitary sewer manholes in Confederate Boulevard as soon as possible.

Confederate Boulevard Sanitary Sewer Replacement Project



Confederate Boulevard Sanitary Sewer Replacement Project

- CHA recommended prioritizing renewal of approximately 4,000 linear feet of sanitary sewer pipe and the associated 11 sanitary sewer manholes in Confederate Boulevard as soon as possible.
- Potential overall project cost: approximately $2,100,000
- CHA provided the proposed Confederate Boulevard Sanitary Sewer Replacement project evaluation to the Town in a Preliminary Engineering Report that can be used for funding application(s).
- CHA provided a separate memorandum presenting potential funding options for the proposed project.
- CHA stands ready to assist the Town with this important project.

Confederate Boulevard Sanitary Sewer Replacement Project

Pursue funding as soon as possible.

SBR Basin Sanitary Sewer Projects

Pursue funding after completing the Confederate Boulevard Sanitary Sewer Replacement project.

Earl Smith, PE
CHA Consulting, Inc.
esmith@chasolutions.com

Open Discussion on Recommendations