



THE CITY OF  
**LYNCHBURG**

**PHYSICAL DEVELOPMENT COMMITTEE**  
**City Council Committee**

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Tuesday, October 14, 2025 | 3:00 PM  
2nd Floor Training Room- City Hall  
900 Church Street  
Lynchburg, VA 24504

**AGENDA**

- I. Welcome** *Councilmember Jacqueline Timmer, Chair*
  - I.1. A Minute for Planning - Community Development
- II. Information Items**
  - II.2. Property Toolkit: Derelict Program
  - II.3. Water Resources Major Project Updates
  - II.4. Candler's Mountain Road Sewer Odor Issues
- III. General Business**
  - III.5. Deed of Lease Agreement for Airport Hangar
  - III.6. Naming of a Private Street as Waters Edge Circle
  - III.7. Virginia Enterprise Zone Boundary Amendment for City of Lynchburg Zones #2 and #46
  - III.8. Industrial Water and Sewer Contract
- IV. Roll Call**
- V. Next Regular Meeting**



## AGENDA ITEM SUMMARY

### MEETING DATE

October 14, 2025

### PRESENTED BY

William Martin, Community Development  
Director

### AGENDA ITEM # II.2

Property Toolkit: Derelict Program

### RECOMMENDATION

Information Only

### SUMMARY

Staff will provide an update on how code compliance efforts and the property toolkit are being used to address blighted properties and encourage redevelopment.

### PRIOR ACTION(S)

### FISCAL IMPACT

N/A

### CONTACT(S)

William Martin, Community Development Director

### ATTACHMENT(S)

1. Presentation

### REVIEWED BY

William Martin, Community Development Director

Date: September 25, 2025

Kent White, Assistant City Manager

Date: October 07, 2025

*Alicia L. Finney*

Date: October 07, 2025

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Alicia Finney, Clerk of Council

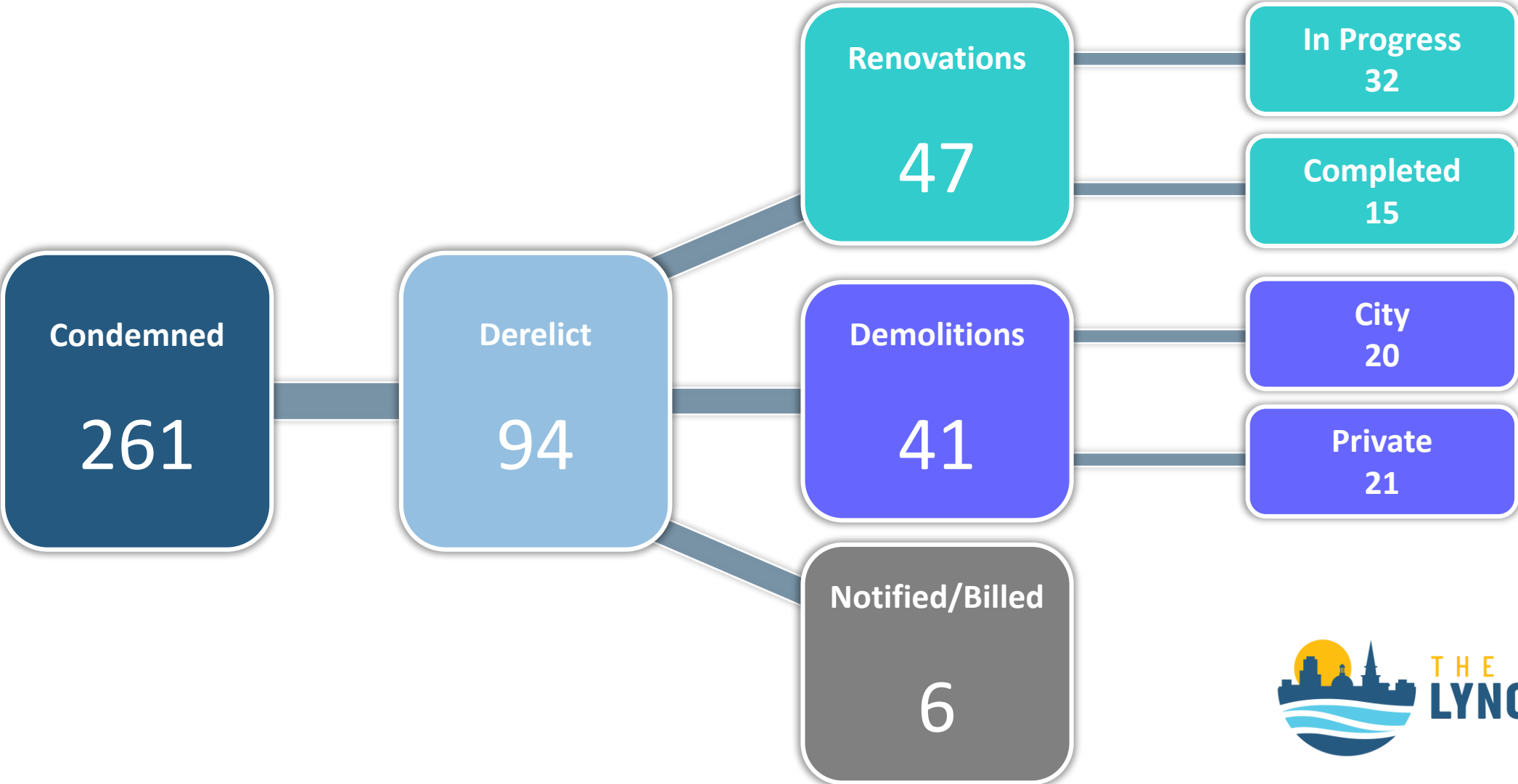
# PROPERTY TOOLKIT

PHYSICAL DEVELOPMENT COMMITTEE

OCTOBER 14, 2025



# PROPERTY TOOLKIT



# PROPERTY TOOLKIT - RESIDENTIAL

## Renovations

2611 DUDLEY ST



2023

\$13,300

1640 BLACKBURN ST



2023

\$41,100



2025

\$226,900



2025

\$144,200

## Demolitions

2711 CONCORD TPKE



2023

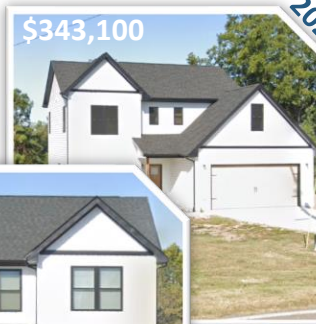
\$27,400

1020 PANSY ST



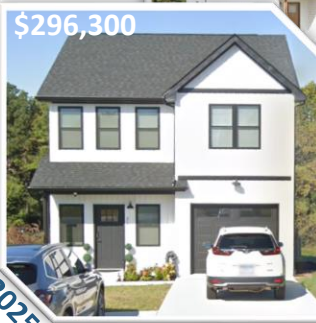
2023

\$29,800



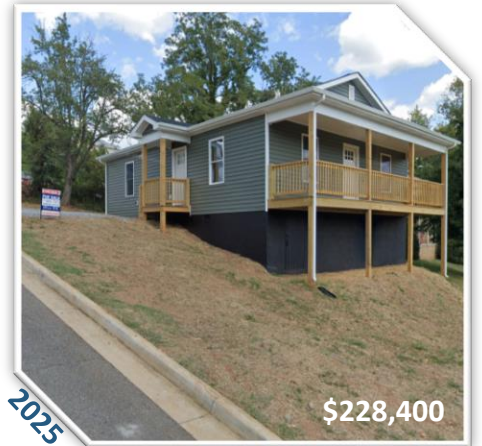
2025

\$343,100



2025

\$296,300

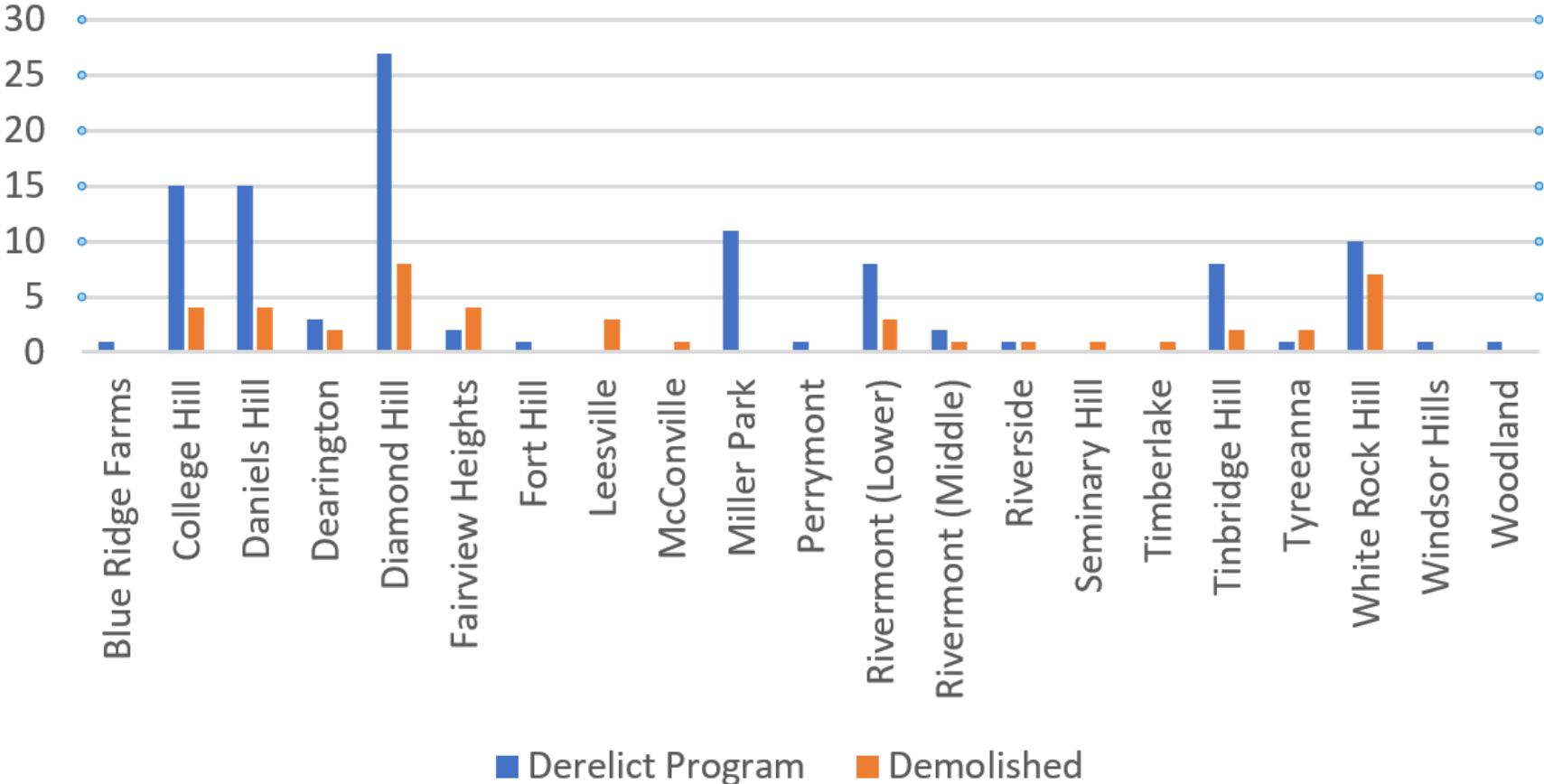


2025

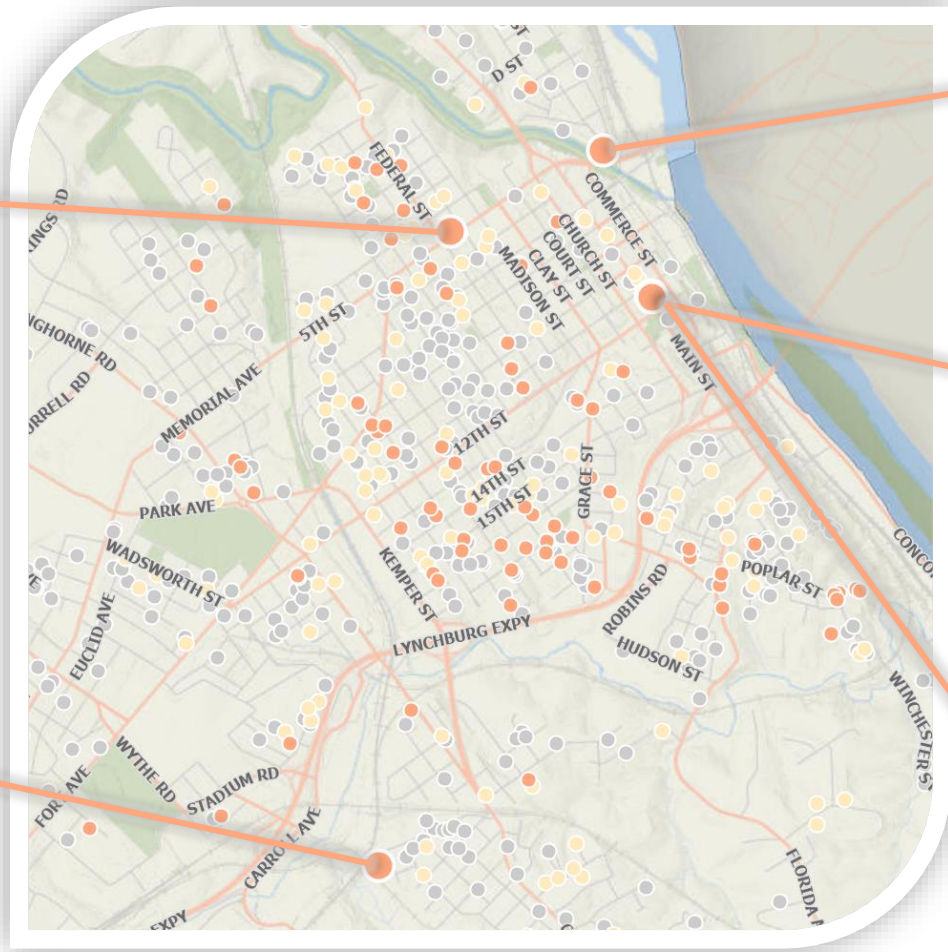
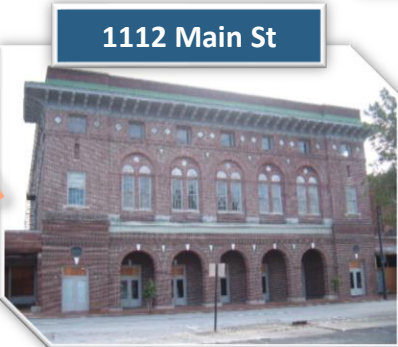
\$228,400

# PROGRAM FIGURES BY NEIGHBORHOOD

## Demo & Derelict Totals by Neighborhood



# PROPERTY TOOLKIT – COMMERCIAL



# REVITALIZATION

Public Safety / Quality of Life / Economic Development = Strong Neighborhoods

- Removal of blighted conditions
- Neighborhood beautification
- Increased property values
- Housing opportunities



1020 Pansy St.



1620 Taylor St.



# GRAFFITI

## Section 26 – Nuisances Article IV. – Graffiti Control

### Section 26-71. – Definition

Graffiti shall mean the unauthorized application by any means of any writing, painting, drawing, etching, scratching or marking of an inscription, word, figure, or design of any type on any public or private building or other real estate or personal property owned, operated or maintained by a governmental entity or agency or instrumentality thereof or by any private person, firm, or corporation.



# GRAFFITI

- Sections 26-72 - 74
- Unlawful – Class 1 Misdemeanor
- Parental responsibility for damage to property
- City may undertake or contract for removal of Graffiti
  - City to seek written permission of property owner to abate
  - If permission is not granted, the City may issue a Notice to Abate
  - If not abated by Owner, City may abate
- Cost for removal is at expense of the City



# GRAFFITI

- Staff have identified up to 50 instances of Graffiti (More to Come)
  - Private Property
  - Bridges
  - Signs
  - Fences
  - Equipment Cabinets
  - Utility Poles



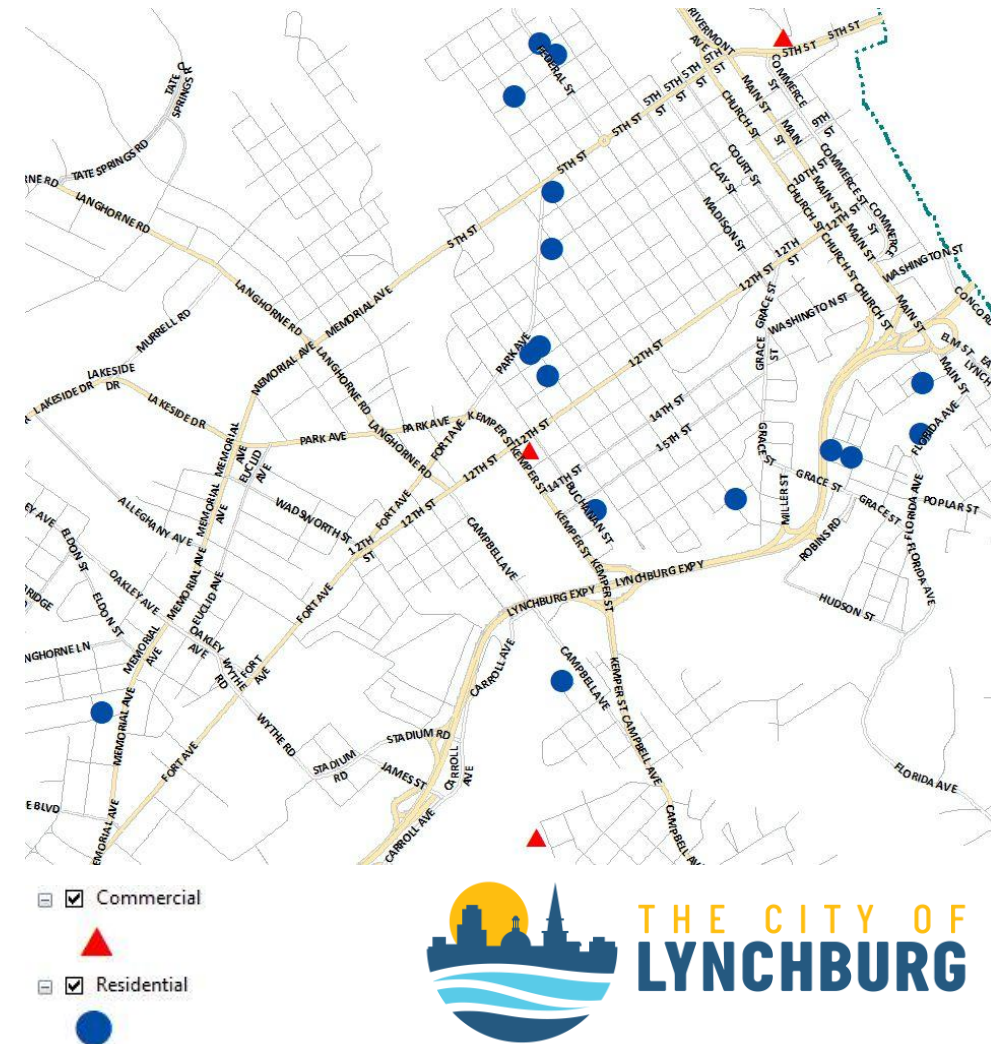
# GRAFFITI

- Moving Forward - Eradicate Graffiti in the City
  - Partner with Public Works to remove from public property
  - Cite private property owners under Nuisance Ordinance
  - Create reimbursable grant program for graffiti removal



# YEAR 1 – FY26

- Proceed with demolition of 18 properties
- Eradicate Graffiti
- Incentivize Private Sector
  - Create Builders Guild
  - Design Book
  - Service Line Incentives
  - Permit Fees
  - Deed Research
- Dashboard



# NEXT STEPS – YEARS 2 - 5

- Strategic Property Acquisition
  - CIP
  - Tax Delinquent Sales
  - Sale of City Property
- Property Stabilization
- Continue Private Sector Incentives for Home Ownership & Owner Improvements



# CAPITAL PROJECTS UPDATE

Water Resources

October 14, 2025



# LYHBEYOND: BLACKWATER CSO TUNNEL

- **Total cost:** \$104 million
- **Funding:** Fully funded
- **Construction start:** July 2024
- **Anticipated construction finish:** Aug. 2027
- **Phase:** Construction
  - Tunnel drill-and-blast operation ongoing; approaching halfway mark
  - Pump Station Electrical/Control Building and CSO 52 Diversion Structure underway
- **Current progress:**
  - On-time: Yes
  - On-budget: Yes



# COLLEGE LAKE DAM REMOVAL & STREAM RESTORATION

- **Total cost:** \$22.5 million
- **Funding:** Fully funded
- **Construction start:** January 2024
- **Construction finish:** October 2025  
(plantings in spring 2026)
- **Phase:** Stream and wetland restoration
- **Current progress:**
  - On-time: Two-month delay (weather & challenging site conditions)
  - On-budget: Yes





# DOWNTOWN RENEWAL: MAIN STREET EAST

- **Total cost:** \$10.7 million
  - Water: \$4.3 million
  - Sewer: \$1.4 million
  - Stormwater: \$800,000
  - General: \$4.2 million
- **Funding:** Fully funded
- **Construction start:** August 2024
- **Anticipated construction finish:** June 2026
- **Phase:** Construction
  - Utility, concrete, streetscape work continues between Commerce St and Expressway
- **Current progress:**
  - On-time: Yes
  - On-budget: Yes



# RICHLAND HILLS SEWER EXTENSION, PHASE 1

- **Total cost:** \$8 million (ARPA eligible: \$6.6 million)
- **Funding:** Fully funded
- **Construction start:** November 2024
- **Anticipated construction finish:** July 2026
- **Phase:** Construction
  - Richland Dr and Suncrest Dr sewer line work ongoing
- **Current progress:**
  - On-time: Yes
  - On-budget: Yes





# COLLEGE HILL UTILITY IMPROVEMENTS

## 6<sup>th</sup> & MADISON PROJECT

- **Total cost:** \$5.54 million
- **Funding:** Fully funded
- **Construction start:** December 2024
- **Anticipated construction finish:** December 2025 (ahead of schedule)
- **Phase:** Construction
  - **Project includes:** 4,500 linear feet water line; 1,400 lf sewer line; 300 lf storm line
  - Waterline work complete; sewer, storm remain
- **Current progress:**
  - On-time: Yes
  - On-budget: Yes

# FILLMORE STREET WATERLINE PROJECT

- **Total cost:** TBD
- **Funding:** Fully funded (pending bid opening)
- **Anticipated construction start:** December 2025
- **Anticipated construction finish:** June 2027
- **Phase:** Pre-construction
  - **Impacted areas:** Fillmore (5<sup>th</sup>-12<sup>th</sup>); Pierce & Buchanan (Park-12<sup>th</sup>); parts of 6<sup>th</sup>, 7<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>
  - **Project includes:** 7,000 linear feet new waterline; 290 lf new sewer line; 4,670 lf sewer lining; 610 lf new storm lines



# LEAD SERVICE LINE INVENTORY

- **Cost for current phase:** \$10 million for investigations and replacements
- **Future costs:** TBD – anticipate \$20+ million over 10 years based on regulatory requirements and current known info
- **Funding:** Current investigation program funded by \$6.4 million loan + \$3.6 million principal forgiveness from VDH & VRA
- **LCRR Initial Inventory:** Submitted to VDH in October 2024; VDH has approved; second round of public notifications coming in December
- **“Unknown” service lines:** 2,916 publicly owned; 16,830 privately owned
- **Anticipated finish:** EPA’s Lead & Copper Rule Improvements (LCRI) has a 2037 deadline for replacing all lead and “galvanized requiring replacement” service lines
- **Phase:** Self-reporting ongoing; new consultant aiding with investigating unknown service lines
- **Current phase progress:**
  - On-time: Yes
  - On-budget: Yes

# CANDLER'S MOUNTAIN ROAD SEWER ODORS

October 14, 2025

Physical Development Committee



# PURPOSE & ACTION



## Purpose:

Provide a report on odor issues along Candler's Mountain Road in the vicinity of Liberty University

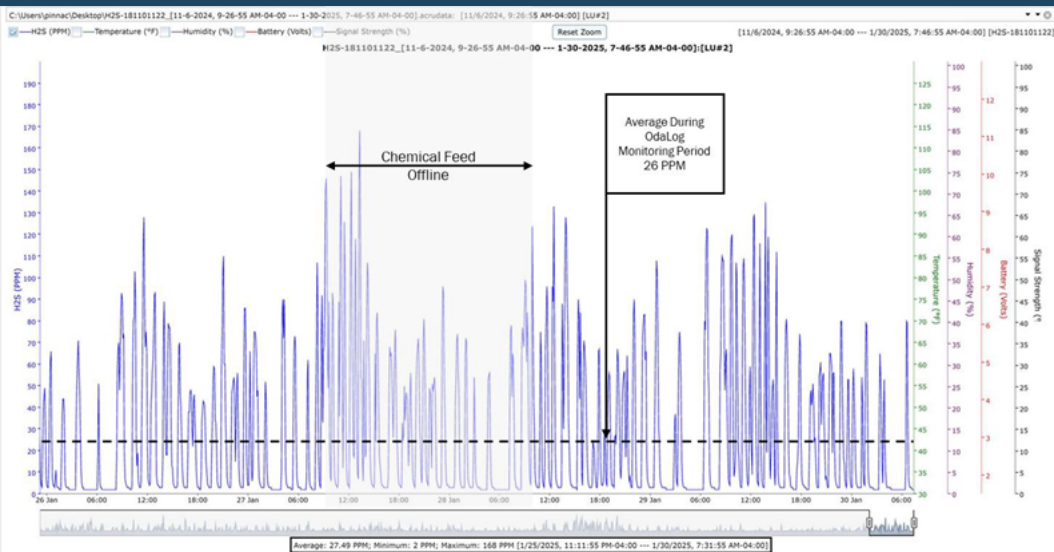
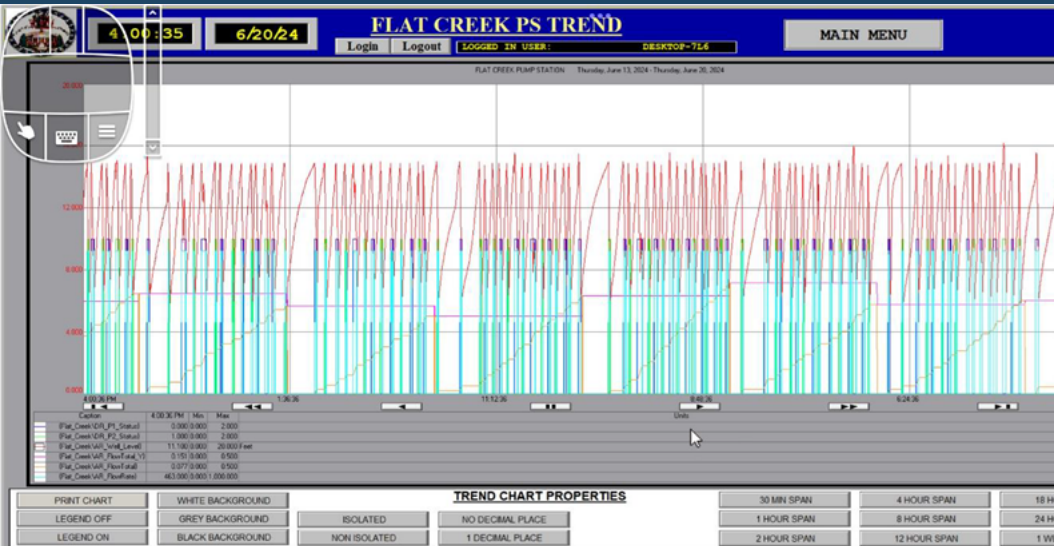
## Action:

Staff will provide an overview of the issue, steps taken to date, and the plan moving forward.

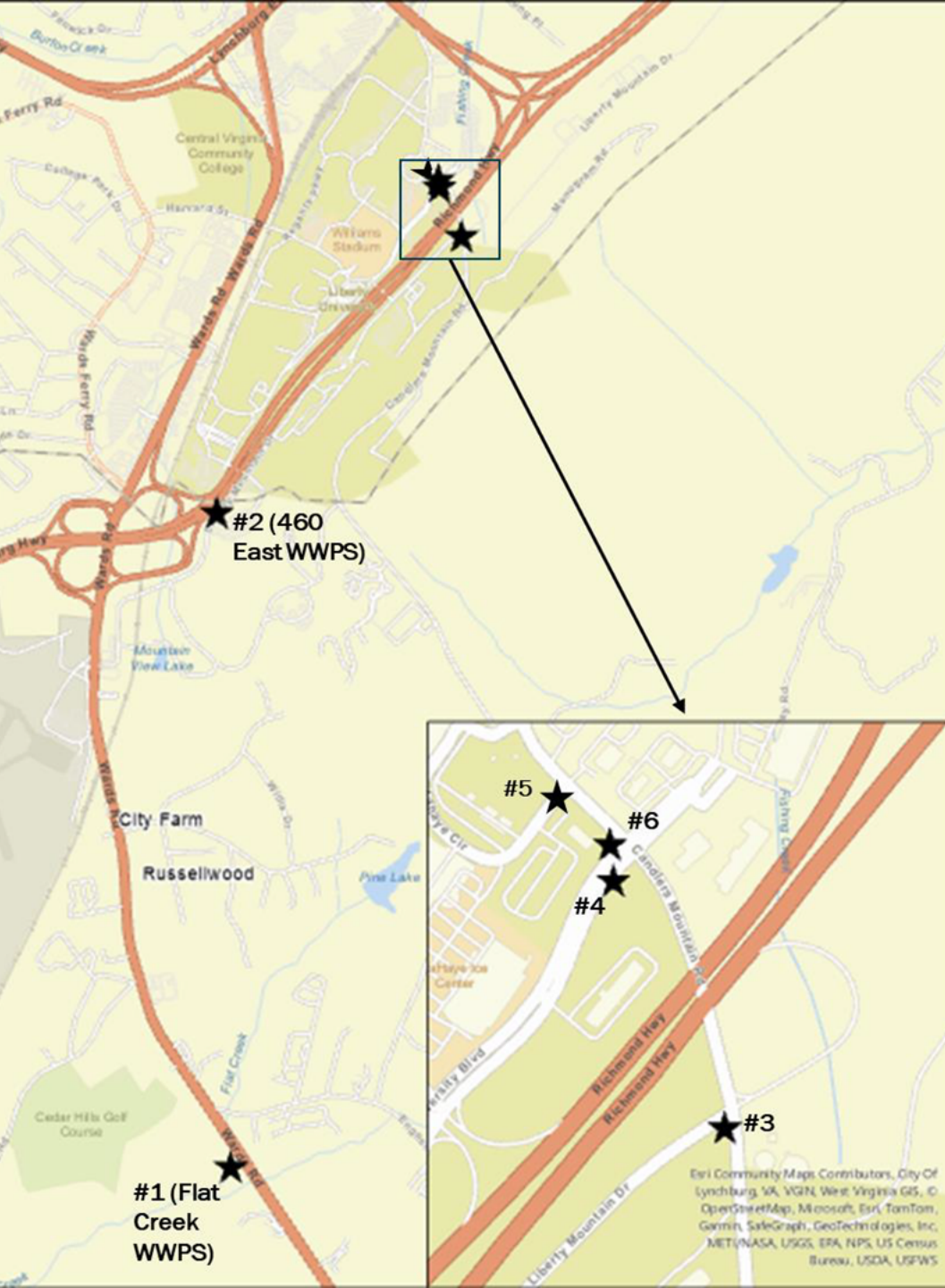
# GENERAL BACKGROUND

Lynchburg Water Resources has been working on the issue since January, 2024, efforts to date include:

- Installation of five Odalog devices to continuously and remotely measure levels of Hydrogen Sulfide (H2S) gas
- Installation of chemical feed systems to try and reduce the levels of H2S – to date we have tested 6 different chemicals at 2 different locations and monitored results
- Worked collaboratively with CCUSA
- Hired Brown and Caldwell in May, 2024 to conduct a comprehensive study to identify source and make recommendations
- Installed carbon inserts in manholes
- Isolated leachate from Region 2000 landfill
- Aerated sewage at pump station



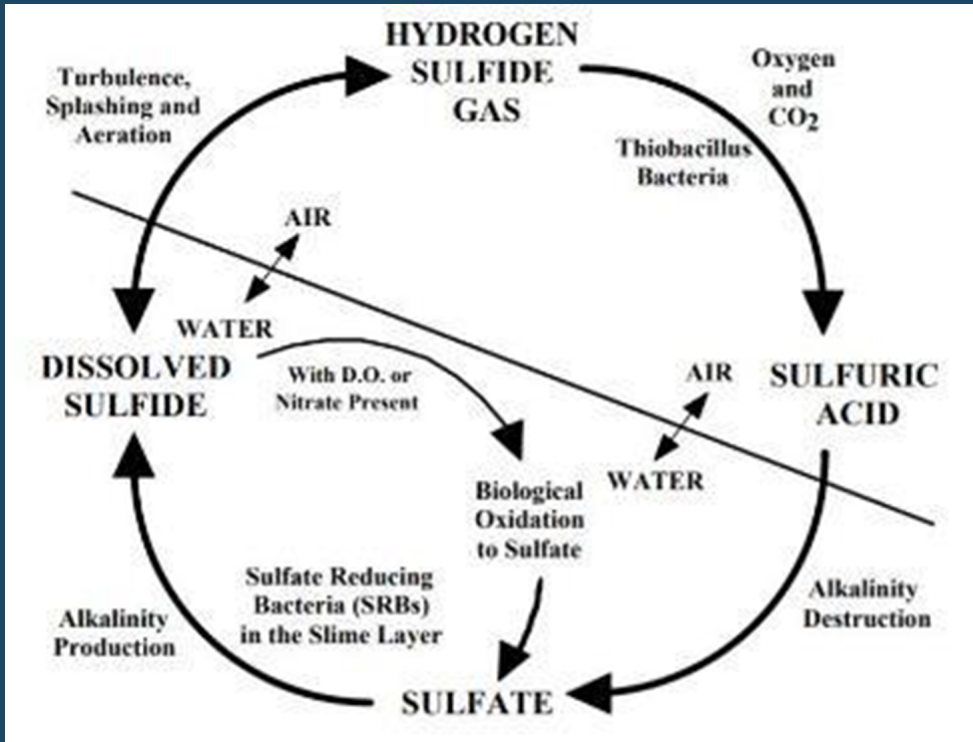
# RESULTS



- Source has been determined to be long detention time of sewage in the CCUSA 20,900 linear foot Flat Creek force main that generates high sulfide concentrations which are released as H<sub>2</sub>S downstream of connection point
- Alternatives evaluated include:
  - Liquid Treatment (chemical addition) \*\$817,000
  - Carbon Inserts \*\$31,000
  - Outfall Sewer Improvements \*\$1,129,000 (\*20-year Present Worth)
- **Liquid Treatment** is the recommended option, but has varying results. **Carbon Inserts** are short-term solution only. **Sewer Improvements** – just moves the problem.

# NEXT STEPS

- Water Resources has been spent approximately \$260,000 to date.
- Meeting to be scheduled with CCUSA to discuss report, expectations to address the problem, and our costs to date.





3454 W Clay Street  
Richmond, VA 23230

T: 804.554.3630

# Technical Memorandum

Prepared for: City of Lynchburg Department of Water Resources

Project Title: Liberty University Odor Investigation

Project No.: 196250

## Technical Memorandum

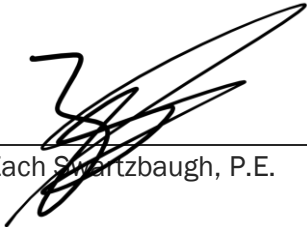
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Date: May 9, 2025

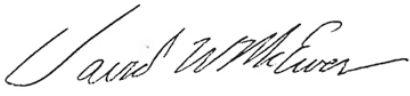
To: Greg Poff, Deputy Director

From: Zach Swartzbaugh, P.E.

Copy to: Steve Dunn, Plant Superintendent

Prepared by:   
Zach Swartzbaugh, P.E.

Reviewed by: \_\_\_\_\_  
Tyler Padden, P.E.

Reviewed by:   
David McEwen, PE

### Limitations:

*This document was prepared solely for the City of Lynchburg in accordance with professional standards at the time the services were performed and in accordance with the contract between the City of Lynchburg and Brown and Caldwell dated May 28, 2024. This document is governed by the specific scope of work authorized by the City of Lynchburg; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by the City of Lynchburg and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.*

# Table of Contents

List of Figures .....	iv
List of Tables.....	iv
List of Abbreviations.....	vi
Executive Summary.....	1
Section 1: Introduction and Background .....	3
1.1 Study Area and Historical Odor Complaints .....	3
1.2 Hydrogen Sulfide Generation and Control.....	4
1.2.1 H <sub>2</sub> S Exposure Health Concerns.....	6
1.3 Data Review .....	6
1.3.1 Region 2000 Regional Landfill Leachate Sampling.....	7
1.3.2 CCUSA WWPS Flow Data.....	7
1.3.3 Flat Creek WWPS Forcemain .....	8
1.3.4 Candler's Mountain Road Outfall Sewer.....	9
1.4 Mitigation Efforts to Date .....	10
Section 2: Odor Emissions Assessment.....	12
2.1 Sample Sites .....	12
2.2 H <sub>2</sub> S Monitoring.....	14
2.2.1 H <sub>2</sub> S Monitoring Results .....	14
2.3 Reduced Sulfur Compound Results.....	17
2.4 Liquid-Phase Field Sampling.....	19
2.5 Additional Sampling.....	21
2.6 Sampling Summary.....	23
Section 3: Odor Control Alternatives Development.....	24
3.1 Liquid-Phase Treatment .....	24
3.2 Vapor-Phase Treatment.....	25
3.3 Operational Modifications .....	27
3.4 Sewer Design Modifications.....	29
3.5 Odor Control Alternatives Summary.....	31
Section 4: Alternatives Analysis.....	32
4.1 Alternative 1 – Liquid-Phase Treatment.....	32
4.2 Alternative 2 – Carbon Manhole Inserts.....	34
4.3 Alternative 3 – Outfall Sewer Improvements .....	35
4.4 Present Worth Analysis.....	38
4.5 Alternative Analysis Summary.....	39
Section 5: Conclusions and Recommendations.....	40
Attachment A: Vortex Insert Literature (Ipex).....	A-1





## List of Figures

---

Figure 1-1. Study Area and Wastewater Collection System Connectivity .....	3
Figure 1-2. CCUSA WWPS Schematic.....	4
Figure 1-3. Sulfide Production Cycle in Wastewater Sewers .....	5
Figure 1-4. Reduced sulfide compound speciation in wastewater as a function of pH .....	5
Figure 1-5. Generally Accepted H <sub>2</sub> S Toxicity Spectrum.....	6
Figure 1-6. Flat Creek WWPS SCADA Output.....	8
Figure 1-7. Candler's Mountain Road Outfall Sewer Profile .....	10
Figure 2-1. Air and Liquid Phase Sample Sites .....	13
Figure 2-2. Sample Site Flow Schematic .....	14
Figure 2-3. OdaLog H <sub>2</sub> S Monitoring Data – Liberty University Campus.....	16
Figure 2-4. OdaLog H <sub>2</sub> S Monitoring Data – CCUSA WWPS and FM .....	16
Figure 2-5. OdaLog H <sub>2</sub> S Monitoring Data – FM Response.....	17
Figure 2-6. Relocated Temporary Chemical Feed System.....	21
Figure 2-7. Additional OdaLog H <sub>2</sub> S Monitoring Data – MH.5556.02.005.....	22
Figure 2-8. Additional OdaLog H <sub>2</sub> S Monitoring Data (without landfill leachate discharge).....	22
Figure 3-1. Activated Carbon Manhole Insert.....	27
Figure 3-2. Continental Carbon Centaur HSV Replacement Frequency Curve.....	28
Figure 3-3. MH.5556.02.005 Site Plan .....	30
Figure 3-4. Vortex Flow Insert Schematic .....	31
Figure 4-1. Alternative 1 Conceptual Site Plan.....	33
Figure 4-2. Alternative 2 Carbon Manhole Insert Location Plan .....	34
Figure 4-3. Alternative 3 Alignment.....	36
Figure 4-4. Alternative 3 Profile.....	36

## List of Tables

---

Table ES-1. Comparative Cost Summary .....	2
Table 1-1. Leachate Sampling Results .....	7
Table 1-2. Forcemain Detention Time.....	9
Table 2-1. OdaLog H <sub>2</sub> S Monitoring Data.....	15
Table 2-2. Reduced Sulfur Compound Sampling Results.....	18
Table 2-3. Liquid-Phase Sampling Results .....	20



Table 2-4. Additional Liquid-Phase Sampling Results..... 23

Table 3-1. Anticipated Liquid Phase Treatment Annual Chemical Costs..... 25

Table 3-2. Carbon Parameters and Replacement Cost ..... 28

Table 4-1. Alternative 1 (Chemical Addition) Estimate of Probable Construction Cost ..... 33

Table 4-2. Alternative 1 (Chemical Addition) Advantages and Disadvantages ..... 34

Table 4-3. Alternative 2 Advantages and Disadvantages ..... 35

Table 4-4. Alternative 3 Estimate of Probable Construction Cost ..... 37

Table 4-5. Alternative 3 Advantages and Disadvantages ..... 28

Table 4-6. Comparative Cost Summary ..... 38



## List of Abbreviations

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ASTM	American Society for Testing and Materials
avg	average
BC	Brown and Caldwell
BOD	biochemical oxygen demand
C	Celsius
CCUSA	Campbell County Utilities and Service Authority
City	City of Lynchburg
cfm	cubic feet per minute
COD	chemical oxygen demand
DO	dissolved oxygen
F	Fahrenheit
FM	forcemain
ft	foot(feet)
GIS	geographic information systems
gpd	gallons per day
gpm	gallons per minute
H <sub>2</sub> S	hydrogen sulfide
in	inch or inches
kWh	kilowatt hours
L	liter
lbs.	pounds
max	maximum
MH	manhole
mg/L	milligrams per liter
MRL	method reporting limit
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
ppb	parts per billion
ppm	parts per million
RSC	reduced sulfur compound
SCADA	supervisory control and data acquisition
TM	technical memorandum
WEF	Water Environment Federation
WERF	Water Environment Research Foundation
WWPS	Wastewater Pumping Station



## Executive Summary

This Technical Memorandum (TM) describes the history of and attempts to identify the cause(s) of odor complaints from the gravity sewer located on the Liberty University campus, near the intersection of Candler's Mountain Road and University Boulevard. This report provides an alternatives analysis and recommendations for managing collection system odors in this location.

The study area is located on Liberty University's campus, within the City of Lynchburg's (City) wastewater collection system, upstream of the Fishing Creek Interceptor. Liberty University notified the City of odor complaints around the LaHaye Recreation and Fitness Center located near the intersection of Candler's Mountain Road and University Boulevard. The sewer collection system in the study area is comprised of City gravity sewers, a Campbell County Utilities and Service Authority (CCUSA) forcemain, and Liberty University private gravity sewers.

The two primary sources of wastewater flow in the study area are flows generated from Liberty University and CCUSA, with a small portion of flow from City commercial customers. The wastewater flow from Liberty University is generated in facilities located on campus including athletic facilities, food service, student unions, hotels, dorms, and the Liberty Mountain Snowflex Centre. Flow from the Liberty University private sewer system enters the City collection system at multiple locations upstream of MH.5556.02.005 (closest City manhole to the area of the odor complaint).

Flow from CCUSA is received at MH.5656.03.004 via the Flat Creek forcemain. The common forcemain receives flow from both the Flat Creek Wastewater Pumping Station (WWPS) and 460 East WWPS. It should be noted that landfill leachate from the Region 2000 Regional Landfill is received by CCUSA at the Lynbrook WWPS and then conveyed to MH.5656.03.004 via the Flat Creek WWPS.

The City engaged Brown and Caldwell (BC) to develop a sampling plan, for execution by the City, for the collection of both air and liquid phase samples to track the source of odor generation. The City completed the air and liquid phase sampling at six (6) sample sites. As outlined in the sampling plan, the City measured H<sub>2</sub>S concentrations and odor-related parameters, and also identified the source of odors in the area. Based on the data collected, the lengthy 20,900 LF Flat Creek forcemain generates high liquid-phase sulfide quantities, which are volatilized as H<sub>2</sub>S in downstream gravity sewers, including at MH.5556.02.005, which is in the vicinity of the reported odor complaints. Additionally, the turbulence of the flow entering MH.5556.02.005 from the steep pipe grade of the Candler's Mountain Road outfall sewer further increases H<sub>2</sub>S volatilization and odors.

Available odor control technologies (liquid-phase, vapor-phase, and collection system operational and design modifications) were reviewed to identify viable technologies for the City to implement to reduce or eliminate odors from the sewer immediately upstream of the Fishing Creek Interceptor. Upon review, liquid-phase (chemical) addition and operational and design modifications are identified as the most viable options to reduce or eliminate odors from the study area. Three alternatives have been developed, with a detailed review and evaluation performed using both non-economic and economic factors.

Table ES-1 summarizes the estimated capital cost for each alternative, annual O&M cost, and 20-year present worth.



<b>Table ES-1. Comparative Cost Summary</b>			
<b>Alternative Costs</b>	<b>Alternative 1 Liquid Phase Treatment</b>	<b>Alternative 2 Carbon MH Inserts</b>	<b>Alternative 3 Outfall Sewer Improvements</b>
Capital Costs	\$377,000	\$12,000	\$949,000
Annual O&M Costs	\$37,800	\$1,590	\$15,200
20-Year Present Worth	\$817,000	\$31,000	\$1,129,000

Based on the review and evaluation of the three alternatives, using both non-economic and economic factors, it is recommended that the City implement Alternative 1 to reduce sulfide concentrations in the gravity sewer downstream of the Flat Creek forcemain discharge. It is worth noting that although Alternative 2 provides a short-term, easy to deploy, low-cost alternative for localized odor control around the Liberty University campus, it is not recommended as a long-term solution to address H<sub>2</sub>S volatilization and the potential for corrosion of existing sewer infrastructure and odor complaints.

Pilot testing is recommended to confirm chemical selection in order to provide the most cost-effective liquid-phase treatment. Depending on chemical selection, an alternative location (460 East WWPS or Candler's Mountain Road Pump Station) could be selected to eliminate the majority of the disadvantages identified during the alternative analysis.



## Section 1: Introduction and Background

This Technical Memorandum (TM) describes the history of and attempts to identify the cause(s) of odor complaints from the gravity sewer located on the Liberty University campus, near the intersection of Candler Mountain Road and University Boulevard. This report provides an alternatives analysis and recommendations for managing collection system odors in this location. The alternatives generally include liquid-phase treatment (chemical addition), vapor-phase treatment (foul air extract-and-treat), and sewer structural modifications.

### 1.1 Study Area and Historical Odor Complaints

The study area is located on Liberty University’s campus, within the City of Lynchburg’s (City) wastewater collection system, upstream of the Fishing Creek Interceptor. Liberty University notified the City of odor complaints around the LaHaye Recreation and Fitness Center located near the intersection of Candler Mountain Road and University Boulevard. A site plan showing the study area, location of the odor complaints (noted with the yellow star) and connectivity of the sewer collection systems are provided in Figure 1-1. As illustrated, the sewer collection system in the study area is comprised of City gravity sewers (green), a Campbell County Utilities and Service Authority (CCUSA) forcemain (purple), and Liberty University private gravity sewers (orange).



Figure 1-1. Study Area and Wastewater Collection System Connectivity



The two primary sources of wastewater flow in the study area are flows generated from Liberty University and CCUSA, with a small portion of flow from City commercial customers. The wastewater flow from Liberty University is generated in facilities located on campus including athletic facilities, food service, student unions, hotels, dorms, and the Liberty Mountain Snowflex Centre. Flow from the Liberty University private sewer system enters the City collection system at multiple locations upstream of MH.5556.02.005 (closest City manhole to the area of the odor complaint). Geographic information system (GIS) maps of the private sewer system were unavailable and, with the exception of the tie-in at MH.5556.02.005 near the intersection of Candler's Mountain Road and University Boulevard (for which contract drawings were provided), the private Liberty University sewer lines are not shown on Figure 1-1.

Flow from CCUSA is received at MH.5656.03.004 via the Flat Creek forcemain. The common forcemain receives flow from both the Flat Creek Wastewater Pumping Station (WWPS) and 460 East WWPS. It should be noted that landfill leachate from the Region 2000 Regional Landfill is received by CCUSA at the Lynbrook WWPS and then conveyed to MH.5656.03.004 via the Flat Creek WWPS. A schematic showing the connectivity of the CCUSA WWPS's and discharge location at MH.5656.03.004 is shown below in Figure 1-2.

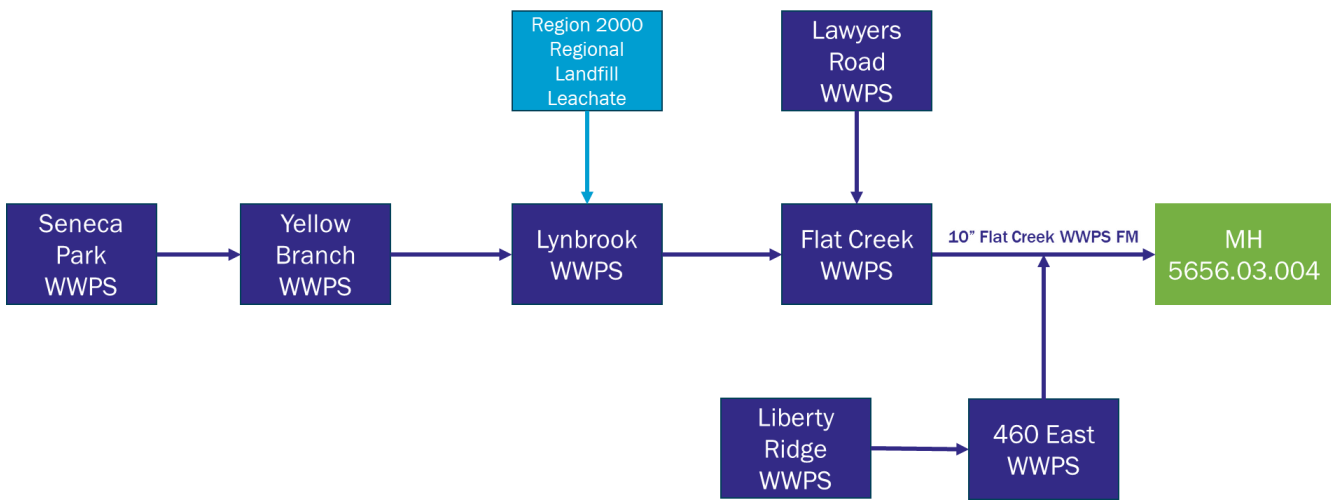
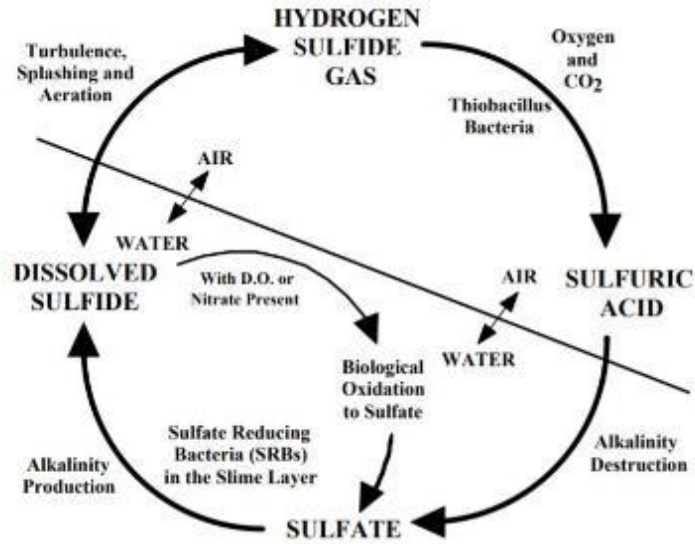


Figure 1-2. CCUSA WWPS Schematic

## 1.2 Hydrogen Sulfide Generation and Control

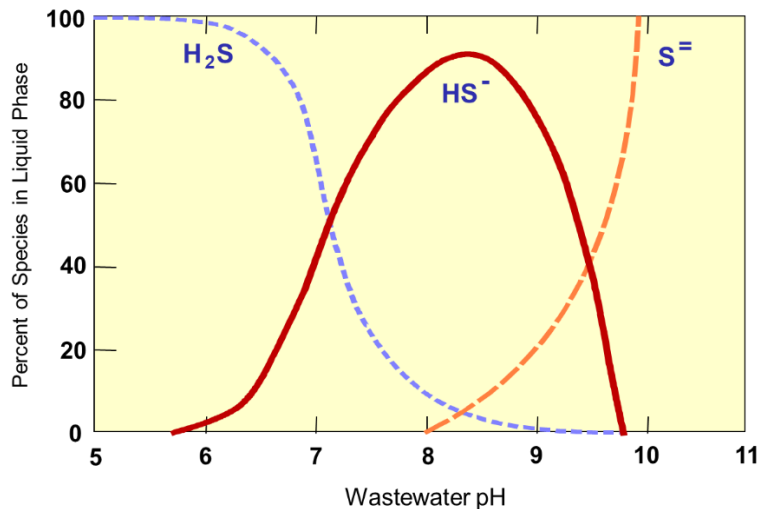
The primary compound of concern contained in foul air emitted through wastewater collection systems is hydrogen sulfide (H<sub>2</sub>S), which retains a familiar “rotten egg” smell detectable at concentrations as little as 1 part per billion (ppb) and can be hazardous at concentrations of 1 part per million (ppm), depending on exposure time and environmental conditions. Gaseous H<sub>2</sub>S is formed in the sewer sulfide production cycle, as illustrated in Figure 1-3. Organic sulfides such as methyl mercaptan and dimethyl sulfide can also present a concern with respect to odors in collection system air emissions; these compounds usually are present in lower concentrations than H<sub>2</sub>S, but may be impactful, particularly after an odor control unit eliminates H<sub>2</sub>S. Typically, collection system odor control units are designed to target H<sub>2</sub>S removal as a metric of success without consideration to other compounds.



**Figure 1-3. Sulfide Production Cycle in Wastewater Sewers**

Source: Water Environment Research Foundation (WERF) *Minimization of Odors and Corrosion in Collection Systems* (2008)

Domestic sewage entering a wastewater collection system typically contains low dissolved sulfide concentrations. Sulfide generation is a biological process that occurs in the submerged portion of sanitary sewers, caused by reduction of naturally occurring liquid-phase sulfate. Sulfate reducing bacteria grow in the submerged portion of the sewer to create a slime layer on the surface of the pipe. These bacteria reduce sulfate in the wastewater to sulfide compounds, which, depending upon the pH of the wastewater, may present themselves as dissolved H<sub>2</sub>S as shown in Figure 1-4. The dissolved H<sub>2</sub>S may be volatilized as gaseous H<sub>2</sub>S as the liquid flows through turbulent conditions. In addition to pH, several other factors contribute to sulfide generation in municipal wastewater, including high biochemical oxygen demand (BOD), high temperature, low dissolved oxygen (DO), long detention times, the presence of multiple pump stations and long forcemains, and sewer debris accumulation.



**Figure 1-4. Reduced sulfide compound speciation in wastewater as a function of pH**

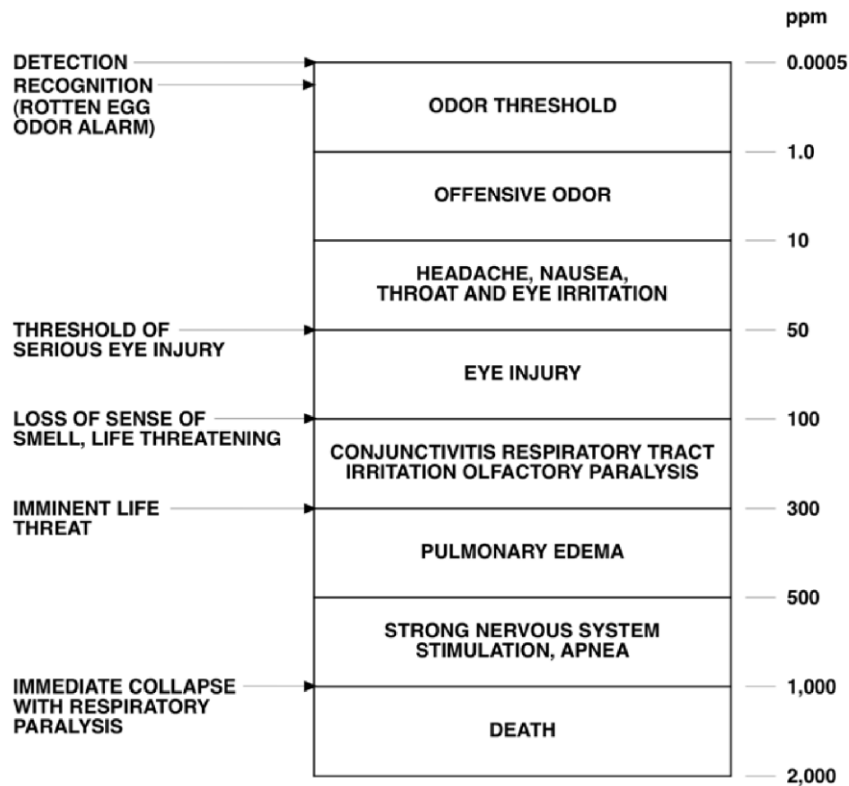
*Of the three compounds in the plot, only H<sub>2</sub>S can volatilize and contribute to odor and corrosion potential.*



Corrosion occurs when Thiobacillus bacteria oxidizes H<sub>2</sub>S on pipe walls and forms sulfuric acid. High H<sub>2</sub>S concentrations correlate with greater quantities and concentrations of sulfuric acid, a strong corrosive that aggressively attacks unprotected sewer infrastructure and is most evident on surfaces located above the waterline. These concentrations can be reduced either by adding chemicals to the wastewater to reduce the wastewater dissolved sulfide concentration or (for gravity sewer headspaces) by extracting the foul air so that the headspace is continually refreshed by a circulation of lower-odor air.

### 1.2.1 H<sub>2</sub>S Exposure Health Concerns

Hydrogen sulfide’s potential negative health effects are related to the concentration during exposure and the duration of the exposure. At low levels, exposure can present itself as an unpleasant smell or nose/throat irritant, but at high levels it can be fatal at very short exposure times. Figure 1-5 provides a generally accepted H<sub>2</sub>S toxicity spectrum, as provided in the Water Environment Research Foundation (WERF) study report WERF Minimization of Odors and Corrosion in Collection Systems (2004).



**Figure 1-5. Generally Accepted H<sub>2</sub>S Toxicity Spectrum**

Source: WERF Minimization of Odors and Corrosion in Collection Systems (2004)

The Occupational Safety and Hazard Administration (OSHA) limits worker exposure to H<sub>2</sub>S to not exceeding 20 ppm for a continuous 8-hour shift and limits exposure to H<sub>2</sub>S concentrations of 50 ppm to 10 minutes.

## 1.3 Data Review

The following project data, provided by the City and CCUSA, was reviewed with respect to factors which contribute to sulfide generation:



### 1.3.1 Region 2000 Regional Landfill Leachate Sampling

The leachate sampling data provided by the City and CCUSA included recoverable metals, oil and grease, chemical oxygen demand (COD), BOD, and cyanide. The leachate sample was collected at the Region 2000 Regional Landfill, Livestock Road Facility, from the wet well associated with the leachate pump station. The constituents of interest, COD and BOD, were reported with average concentrations of 1,320 mg/L and 140 mg/L, respectively, across the five (5) provided sampling events. These concentrations are generally within anticipated ranges, with BOD greater than 300 mg/L tending to correlate with increased sulfide generation. Provided leachate sampling results for COD and BOD are presented below in Table 1-1. BOD concentrations less than 200 mg/L are typically associated with moderate to low sulfide concentrations in municipal wastewater streams.

Table 1-1. Leachate Sampling Results		
Sample Date	COD (mg/L)	BOD (mg/L)
3 <sup>rd</sup> Quarter 2020 (September 1, 2020)	1,400	200
4 <sup>th</sup> Quarter 2020 (December 3, 2020)	1,600	140
1 <sup>st</sup> Quarter 2021 (February 8, 2021)	800	57
2 <sup>nd</sup> Quarter 2021 (May 10, 2021)	1,500	110
4 <sup>th</sup> Quarter 2024 (November 11, 2024)	1,300	180

### 1.3.2 CCUSA WWPS Flow Data

Flow from CCUSA into the study area is via the Flat Creek WWPS and 460 East WWPS. Both pump stations utilize two (2) submersible pumps located within 10-foot diameter wet wells. Limited supervisory control and data acquisition (SCADA) data is collected and recorded for the Flat Creek WWPS and 460 East WWPS. The recorded data includes pump on/off status, indication of which pump is running and wet well level. The data is viewable with trendlines but unable to be exported. An example plot from the Flat Creek WWPS is shown in Figure 1-6. The figure depicts the typical pump operation in a lead/lag off configuration with control based off wet well level, as shown with the red trendline.



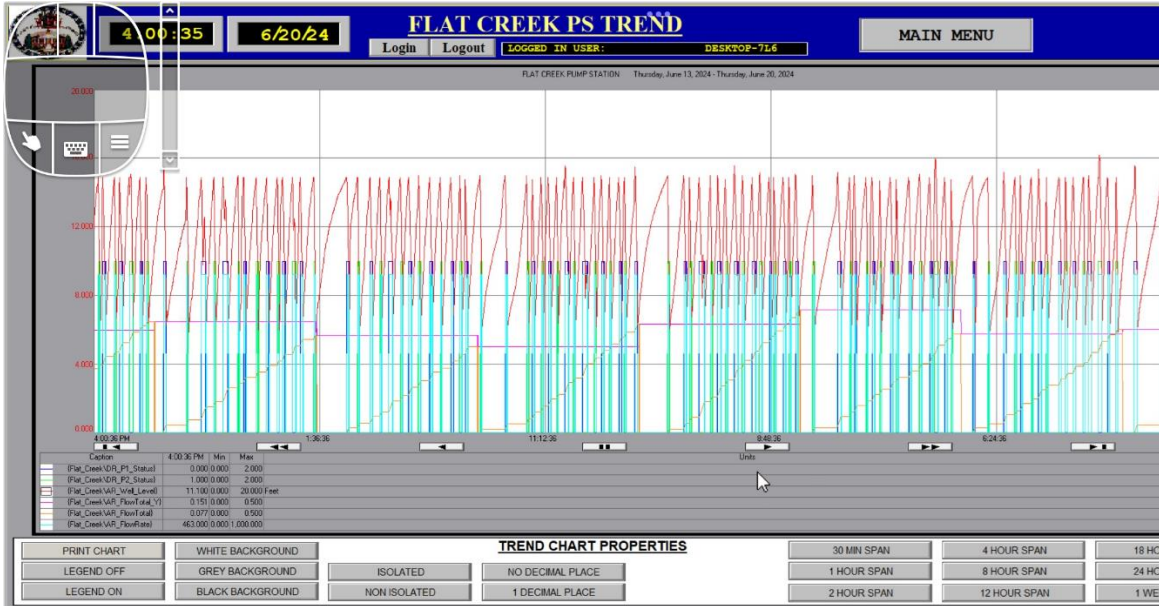


Figure 1-6. Flat Creek WWPS SCADA Output  
Source: CCUSA

Based on 2023 pump station flow data provided by CCUSA, the Flat Creek WWPS and 460 East WWPS pumped a total of approximately 50.3 million gallons and 24.9 million gallons, respectively, for an average of approximately 138,000 gallons per day (gpd) and 68,500 gpd, respectively. Flow rates are calculated based on annual pump run time and a design flow rate for each pump station. The design flow rate utilized for the calculation is 463 gallons per minute (gpm) and 393 gpm for each pump station, respectively.

### 1.3.3 Flat Creek WWPS Forcemain

The Flat Creek forcemain is a 10-inch forcemain that receives pumped flow from both the Flat Creek WWPS and 460 East WWPS. The forcemain is approximately 20,900 linear feet (about 4 miles) and discharges flow into MH.5656.03.004. As described in the previous section (1.3.2), the pumps at both pump stations cycle on and off throughout the day, creating times where there is no flow in the forcemain. The amount of time that the liquid resides in the forcemain between pumping cycles, the detention time, has an impact on the characteristics of the wastewater, especially in the low oxygen environment found inside a forcemain pipe.

As the detention time increases, more oxygen is consumed within the forcemain. This reduces the oxidation reduction potential of the wastewater and organic material becomes more solubilized—which favors the growth of sulfate-reducing bacteria. The time that the wastewater resides in the forcemain between the Flat Creek WWPS and the 460 East WWPS and between the Flat Creek WWPS and the forcemain discharge manhole (MH.5656.03.004) were estimated using the available CCUSA WWPS flow data. As shown in Table 1-2, the detention time was estimated at approximately 10 hours and 13 hours, respectively. These detention times were well beyond the typical time required for sulfide generation and elevated H<sub>2</sub>S concentrations. It is presumed this lengthy forcemain creates a high potential for sulfide generation and associated H<sub>2</sub>S release upon transition to the gravity line. A summary of the findings from the air and liquid phase sampling performed at the forcemain discharge manhole is included in Section 2.



Table 1-2. Forcemain Detention Time			
Description	Distance (LF)	Volume (gal)	Detention Time (hours)
Flat Creek WWPS to 460 East WWPS	14,000	56,900	10 <sup>a</sup>
460 East WWPS to MH.5656.03.004	6,900	28,300	3 <sup>b</sup>
<b>Total</b>	<b>20,900</b>	<b>85,200</b>	<b>13</b>

<sup>a</sup> Detention time calculated utilizing average daily flow rate of Flat Creek WWPS (138,000 gpd).

<sup>b</sup> Detention time calculated utilizing sum of average daily flow rate of Flat Creek WWPS (138,000 gpd) and 460 East WWPS (68,500 gpd).

A review of the record drawings indicated that in 2020 CCUSA replaced all of the air release valves along the forcemain with combination air/vacuum valves, approximately 18 years after the forcemain was placed in service. It is assumed that the replacement of these combination air/vacuum valves was a result of corrosion, which may indicate the historical presence of H<sub>2</sub>S inside the pipe.

### 1.3.4 Candler's Mountain Road Outfall Sewer

Sewer and manhole/drop structure design and configuration can impact sulfide production and odor re-lease. Pipe alignment and slope influence wastewater velocity, depth of flow, and air space constrictions. These parameters dictate air movement within the sewer headspace, as well as potential areas of air pressurization and fugitive odor emissions. These effects are extremely dependent upon site specific conditions. However, it is often the case where areas of steep slope followed by areas of flat slope often results in transition zones with high odor areas on the downstream end due to a combination of reduced headspace and high turbulence in the liquid flow. The Candler's Mountain Road outfall sewer system (approximately 1,100 linear feet of 12-inch ductile iron pipe from MH.5656.03.004 to MH.5556.02.014, constructed as part of the CCUSA Flat Creek WWPS and forcemain project) within the study area follows this pattern, which may contribute to the formation and release of H<sub>2</sub>S. The City indicated that portions of this outfall sewer were rehabilitated due to H<sub>2</sub>S corrosion of the existing ductile iron sewer. This sewer, in the vicinity of the bridge over US Route 460, is located approximately 40 linear feet upstream from a 2-foot drop connection and sudden change in direction, which likely leads to turbulence in the manhole, resulting in volatilization of H<sub>2</sub>S. A profile from the forcemain discharge at MH.5656.03.004 downstream to MH.5556.02.005 is shown in Figure 1-7.



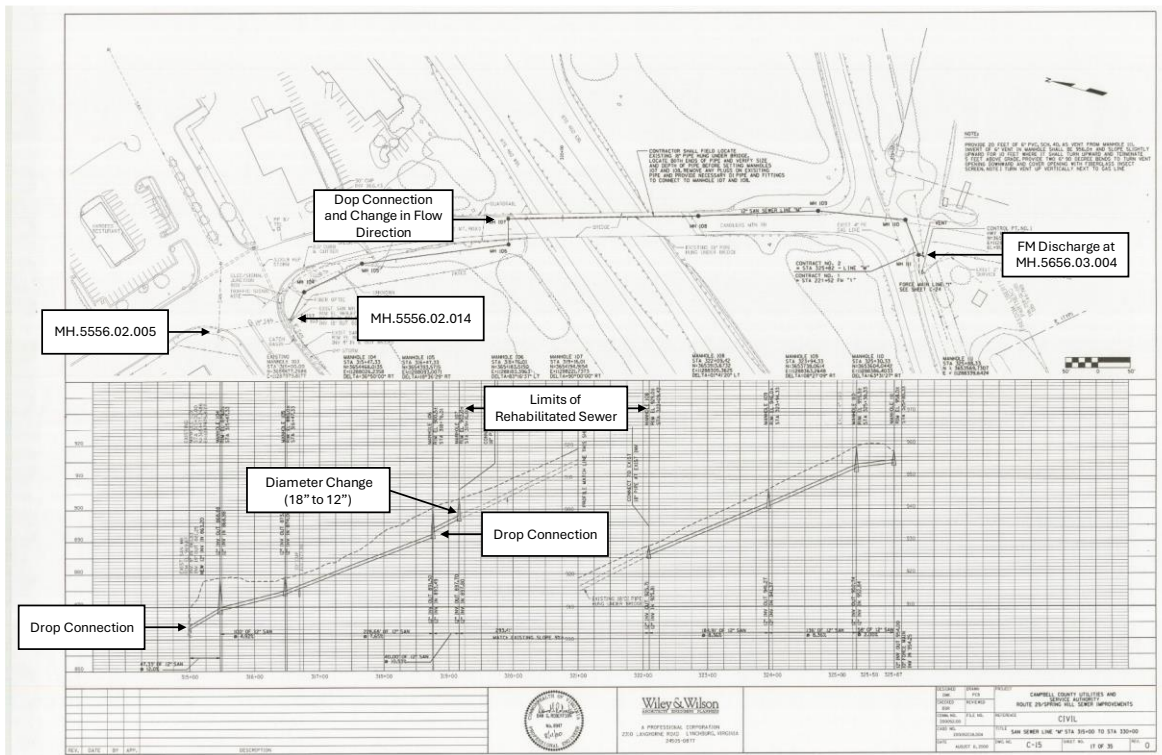


Figure 1-7. Candler Mountain Road Outfall Sewer Profile

## 1.4 Mitigation Efforts to Date

Following receipt of the odor complaints from Liberty University, several actions have been implemented by the various stakeholders to better understand and mitigate the impacts of hydrogen sulfide within the study area. These actions include:

- The City installed an OdaLog data logger within MH.5556.02.005 to measure and record H<sub>2</sub>S concentrations in the gas headspace of this manhole.
  - Elevated H<sub>2</sub>S concentrations were recorded by the OdaLog with an average reading of 18 ppm and peak reading of 220 ppm between January and May 2024.
  - A summary and review of the OdaLog data collected during the study period is included in Section 2.2.
- The City installed a temporary chemical feed system in an attempt to address the odor issues at Liberty University.
  - The temporary chemical feed system commenced operation at the beginning of January 2024 at the Candler Mountain Road Pump Station site. On January 26, 2024, the system was relocated to the CCSUA Flat Creek WWPS. On January 27, 2025, the City relocated the system back to the Candler Mountain Road Pump Station site where it is currently in services as of the writing of this report.
  - The system is feeding TOTALOX Odor Eliminator™ (TOTALOX) chemical which claims to provide two odor reduction reactions when added to raw wastewater; (1) oxidation of sulfides and other



odorous compounds by potassium permanganate and (2) prevention of sulfide formation by sulfate-reducing bacteria by introducing nitrate as an alternative, and preferred nutrient source for the bacteria.

- The temporary chemical feed system pulls TOTALOX from a storage tote and discharges the chemical directly into the wet well via a constant speed (user defined) chemical feed pump. It should be noted that the chemical feed pump is run continuously and the City has varied the chemical feed rate since the system was implemented.
- During the most recent calibration (January 2025), the City was dosing approximately 36 gallons of TOTALOX per day. This chemical addition is resulting in an annual cost in excess of \$100,000 for chemicals.
- Liberty University replaced bolted-down manhole frame and covers with standard frame and covers on the private sewer immediately upstream of MH.5556.02.005.
  - After discussions with Liberty University, it was discovered that prior to receiving the odor complaints, a portion of their private sewer system was relocated to support the Green Hall Parking Deck project (North Campus Garage). Before the sewer was relocated, it employed standard frames and manhole covers. The relocated private 8-inch sewer alignment was installed with bolted down manhole frames and covers, and the existing 18-inch sewer was filled with flowable fill to abandon the pipe in place. It is presumed that the bolted covers trapped the H<sub>2</sub>S in the system, that was previously being released through the standard frames and covers; thus causing the H<sub>2</sub>S to travel upstream and generate odor complaints at the LaHaye Recreation and Fitness Center.



## Section 2: Odor Emissions Assessment

The City engaged Brown and Caldwell (BC) to develop a sampling plan, for execution by the City, for the collection of both air and liquid phase samples to track the source of odor generation. The City completed the air and liquid phase sampling at six (6) sample sites. As outlined in the sampling plan, the City measured H<sub>2</sub>S concentrations and odor-related parameters, and also identified the source of odors in the area. This section summarizes the monitoring methods used and data collected.

### 2.1 Sample Sites

Six (6) sites were identified for the odor sampling: PRI\_MH.OFFGRID.453, PRI\_MH.5555.03.452, MH.5656.03.004, MH.5556.02.012, PRI\_MH.5556.02.448, and MH.5556.02.005. These sample sites were selected based on the location of the reported odor complaint and the upstream connectivity of the City, CCUSA and private Liberty University collection systems. The locations were also selected to profile the liquid and vapor phase characteristics of the varying flow sources contributing to MH.5556.02.005. The following is a brief description of each sample site:

- **PRI\_MH.OFFGRID.453:** This location is referred to as Sample Site #1 throughout the TM. The sample site is within the 10-foot diameter wet well of the CCUSA Flat Creek WWPS. This WWPS receives flow from the CCUSA service area, including landfill leachate from Region 2000 Regional Landfill.
  - It should be noted that this wet well received TOTALOX via the temporary chemical feed system during the duration of the study.
- **PRI\_MH.5555.03.452:** This location is referred to as Sample Site #2 throughout the TM. The sample site is within the 10-foot diameter wet well of the CCUSA 460 East WWPS. This WWPS receives flow from the CCUSA service area.
- **MH.5656.03.004:** This location is referred to as Sample Site #3 throughout the TM. The sample site is within a manhole located at the intersection of Candler's Mountain Road and Liberty Mountain Drive as part of the City's wastewater collection system. A single 10-inch forcemain enters and a single 12-inch sewer exits the vented manhole. This manhole receives forcemain discharge from the common CCUSA Flat Creek WWPS and 460 East WWPS forcemain.
- **MH.5556.02.012:** This location is referred to as Sample Site #4 throughout the TM. The sample site is within a manhole located on the southside of the intersection of Candler's Mountain Road and University Boulevard, as part of the City's wastewater collection system. A single 8-inch sewer enters and exits the manhole. This manhole receives gravity flow from Liberty University facilities along University Boulevard and facilities located southeast of US Route 460. This sample site is approximately 156 linear feet upstream of MH.5556.02.005 (Sample Site #6).
- **PRI\_MH.5556.02.448:** This location is referred to as Sample Site #5 throughout the TM. The sample site is within a manhole located at the intersection of Candler's Mountain Road and LaHaye Circle as part of the Liberty University wastewater collection system. A single 8-inch sewer enters and exits the manhole. This manhole receives gravity flow from Liberty University facilities north of University Boulevard. This sample site is approximately 265 linear feet upstream of MH.5556.02.005 (Sample Site #6).
- **MH.5556.02.005:** This location is referred to as Sample Site #6 throughout the TM. The sample site is within a manhole located on the northside of the intersection of Candler's Mountain Road and University Boulevard, as part of the City's wastewater collection system. Two sewers, 8-inch and 18-inch, enter the manhole and a 24-inch sewer exits the manhole toward the Fishing Creek Interceptor (an



additional 18-inch connection was abandoned as part of the previously mentioned Green Hall Parking Deck project). This “common” manhole receives gravity flow from all upstream sample sites, including flows from both Liberty University facilities and CCUSA.

A map depicting the location of the six (6) sample sites and schematic representing the sewer connectivity between the sample sites are provided in Figure 2-1 and Figure 2-2, respectively.

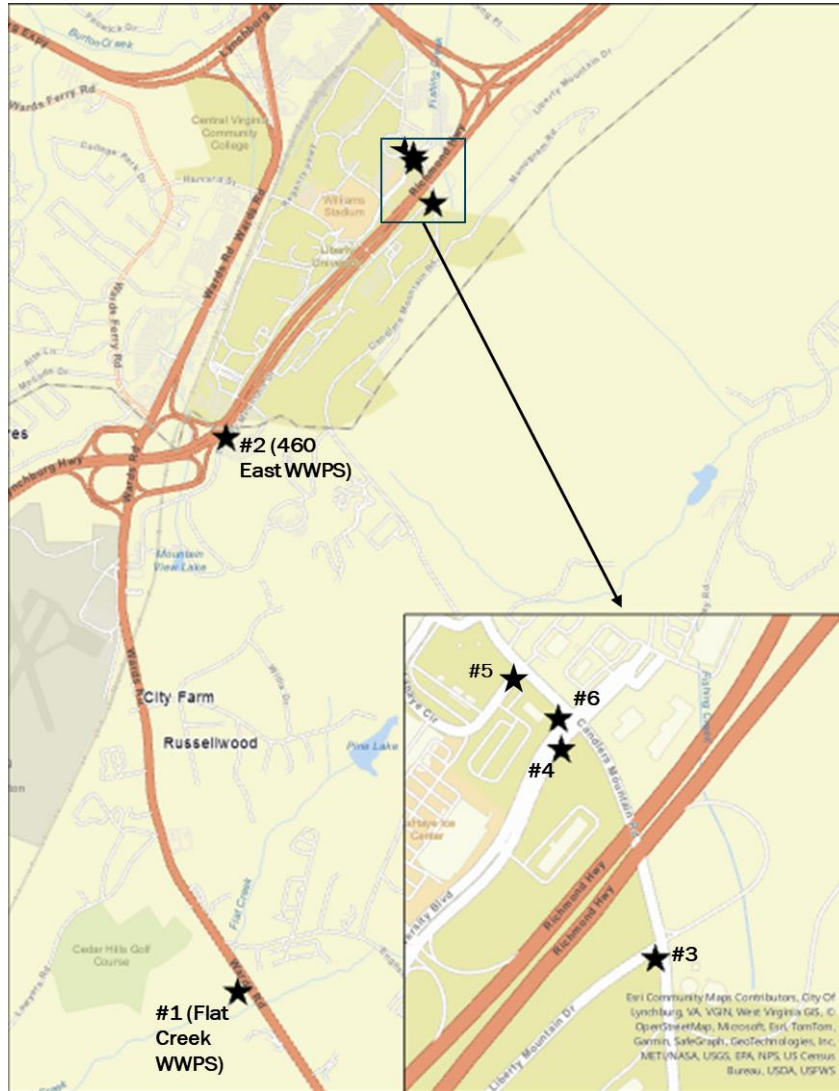


Figure 2-1. Air and Liquid Phase Sample Sites



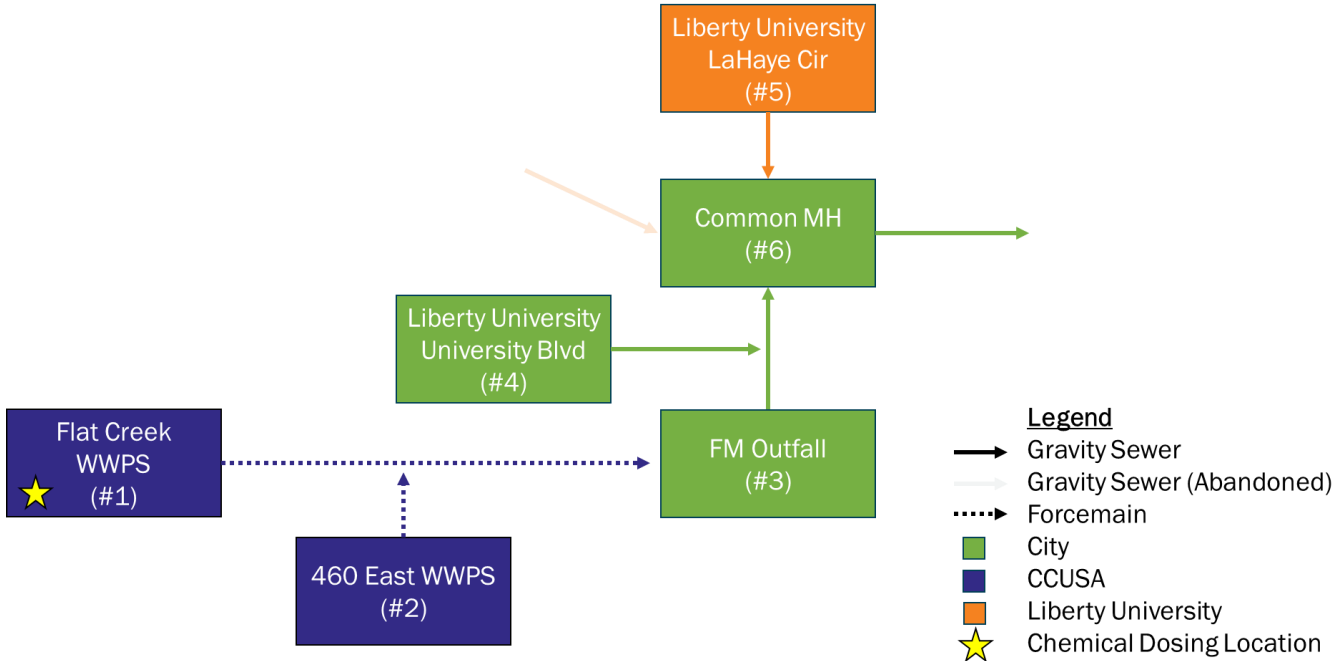


Figure 2-2. Sample Site Flow Schematic

## 2.2 H<sub>2</sub>S Monitoring

This section provides a review of the H<sub>2</sub>S monitoring conducted for this project.

### 2.2.1 H<sub>2</sub>S Monitoring Results

OdaLog data loggers were used to record ambient vapor-phase H<sub>2</sub>S concentrations in the headspace of the sample sites. The goal was to provide a “snapshot” indication of vapor-phase H<sub>2</sub>S concentrations at the sample sites.

In addition to the MH.5556.02.005 OdaLog previously installed by the City, following the initial odor complaints, City staff deployed five additional (six total) monitors by hanging a data logger in the sample man-hole/wet well and positioning the monitors above the pipe crown/water surface elevation. The monitors were installed beginning on August 14, 2024 and were removed on August 30, 2024. The sampling was performed before and during the academic year at Liberty University to see if the return of students impacted H<sub>2</sub>S levels. According to the 2024-2025 academic calendar, students began to return to campus on August 14, 2024, and classes commenced on August 19, 2024. The monitors continuously recorded H<sub>2</sub>S concentrations every three (3) minutes, with a detection range of 0 to 1,000 ppm with 1 ppm resolution.

A review of the findings from the OdaLog H<sub>2</sub>S measurements from the six (6) sample sites is provided below. A summary of the results is presented in Table 2-1.

- Very high (average 26 ppm, maximum 318 ppm) H<sub>2</sub>S concentrations were measured in MH.5556.02.005 with high maximum (69 ppm) concentrations measured in MH.5556.02.012. The proximity of MH.5556.02.012 to MH.5556.02.005 (approximately 156 linear feet) has the potential for this sample site to be influenced by fugitive odor emissions.
- The very high H<sub>2</sub>S concentrations at MH.5556.02.005 are notable, given the Flat Creek WWPS forcemain discharges 1,200 LF upstream of this manhole (into MH.5656.03.004), a



location where one would typically measure higher H<sub>2</sub>S concentrations because it is the first manhole immediately downstream of the forcemain/gravity sewer transition. However, the concentrations of H<sub>2</sub>S were higher at MH.5556.02.005 rather than MH.5656.03.004. This is understandable given the following additional considerations:

- The configuration of MH.5556.02.005 produces turbulence as flow makes an abrupt turn (79 degrees) from Candler's Mountain Road toward University Boulevard. Turbulence created by this bend likely volatilizes high quantities of H<sub>2</sub>S.
  - The slope of the influent pipe along Candler's Mountain Road to MH.5556.02.005 is approximately 12%, which is very steep and results in velocities ranging from 4.8 to 6.7 feet per second (utilizing flow rates from Section 1.3.2). The high velocity that results from the slope transition likely also exacerbates turbulence and the volatilization of H<sub>2</sub>S.
  - The pipeline diameter increases from 12-inches to 18-inches upstream of the manhole and then increases again to 24-inches downstream of the manhole; sudden diameter transitions also can result in increased turbulence.
- Higher (maximum 23 ppm) H<sub>2</sub>S concentrations were measured in MH.5656.03.004 (the first manhole after the transition from forcemain to gravity) as compared to the measured concentrations (maximum 11 ppm and 13 ppm, respectively) of the upstream Flat Creek WWPS and 460 East WWPS (PRI\_MH.OFFGRID.453 and PRI\_MH.5555.03.452). This H<sub>2</sub>S release aligns with the high-risk potential for sulfide accumulation and associated H<sub>2</sub>S release upon transition to the gravity previously discussed in Section 1.3.3.
  - Much lower (average 0.31 ppm, maximum 2 ppm) H<sub>2</sub>S concentrations were measured in PRI\_MH.5556.02.448 (intersection of Candler's Mountain Road and LaHaye Circle); this manhole does not appear to be a significant contributor to odors in MH.5556.02.005.

Table 2-1. OdaLog H <sub>2</sub> S Monitoring Data				
Sample Site (#)	Manhole ID	H <sub>2</sub> S Concentration (ppm) <sup>a</sup>		
		Average	Maximum	Standard Deviation
1	PRI_MH.OFFGRID.453	0.11	11	0.99
2	PRI_MH.5555.03.452	1.17	13	1.47
3	MH.5656.03.004	1.08	23	2.43
4	MH.5556.02.012	1.07	69	4.92
5	PRI_MH.5556.02.448	0.31	2	0.60
6	MH.5556.02.005	25.94	318	36.68

<sup>a</sup> Measured by OdaLog during August 14-30, 2024 deployment.

Figures 2-3, 2-4 and 2-5 provide a graphical representation of the OdaLog H<sub>2</sub>S monitoring data for each sample site. Figure 2-3 illustrates the OdaLogs located at the forcemain outfall (MH.5656.03.004) and manholes located at Liberty University, while Figure 2-4 illustrates the OdaLogs located at the Flat Creek WWPS, 460 East WWPS and the forcemain outfall. Figure 2-5 illustrates the response between the OdaLog located at the forcemain outfall and MH.5556.02.005.



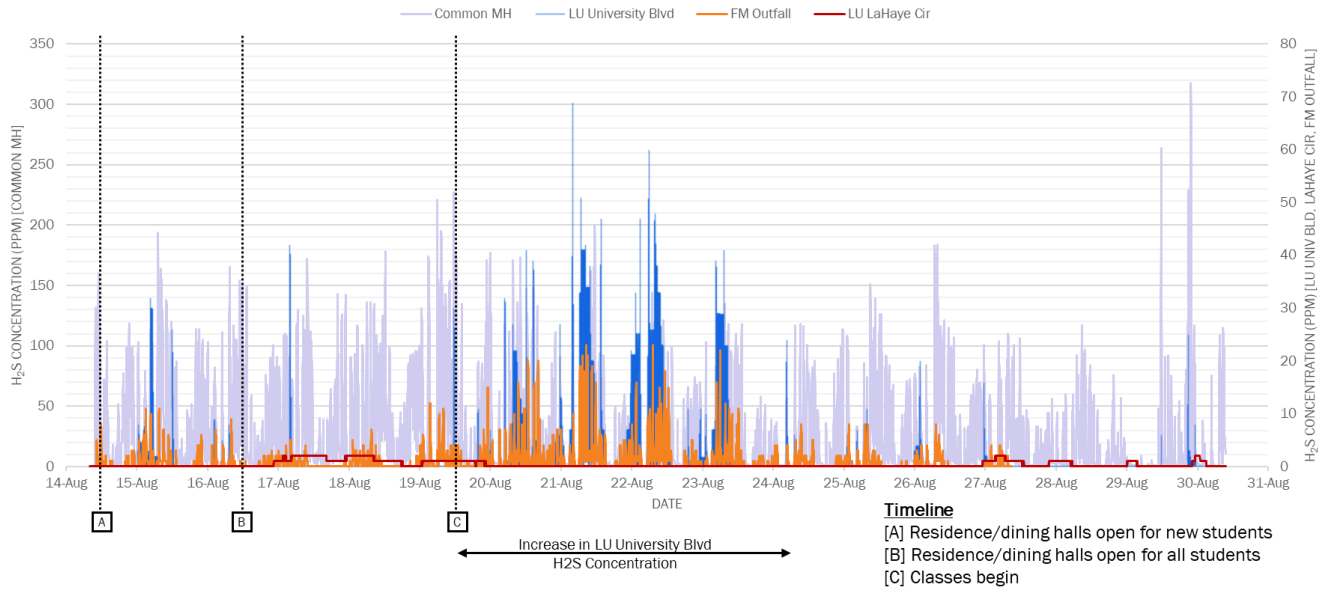


Figure 2-3. OdaLog H<sub>2</sub>S Monitoring Data – Liberty University Campus

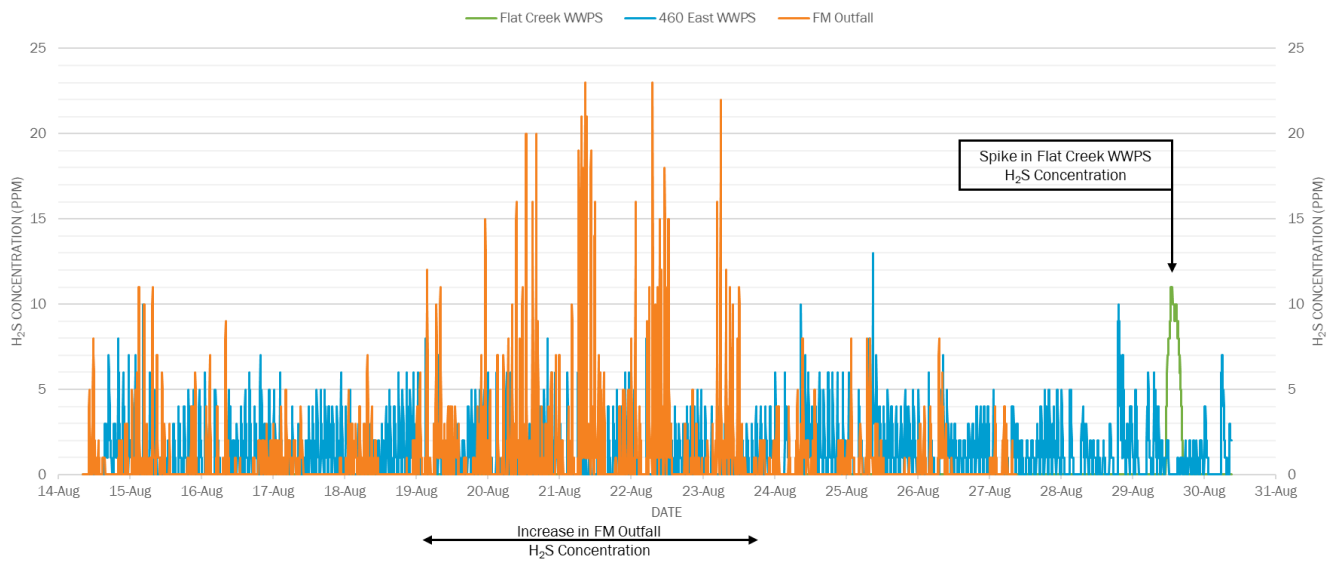
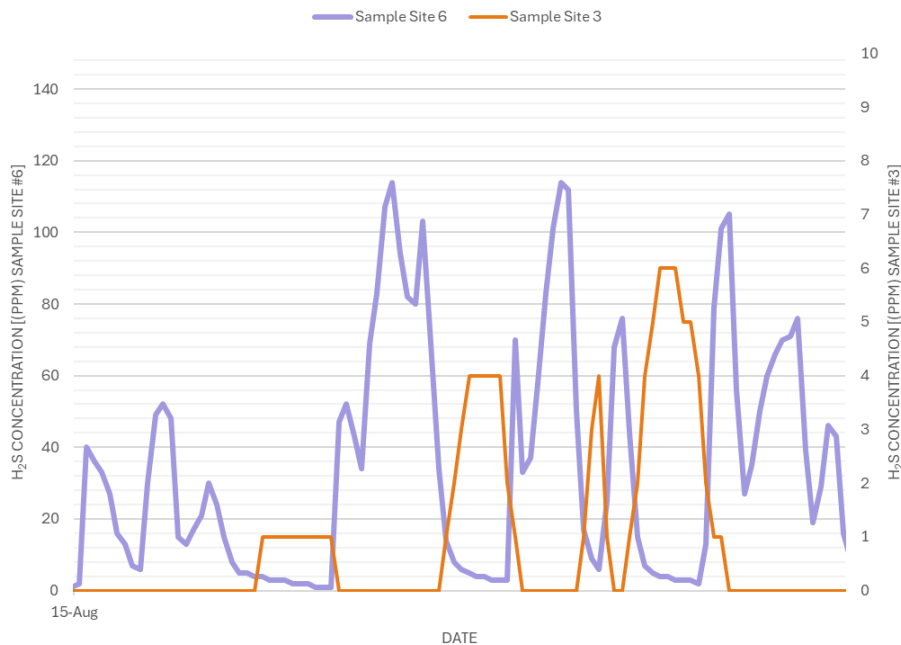


Figure 2-4. OdaLog H<sub>2</sub>S Monitoring Data – CCUSA WWPS and FM





**Figure 2-5. OdaLog H<sub>2</sub>S Monitoring Data – FM Response**

An increase in the H<sub>2</sub>S concentration was observed (Figure 2-3) at the forcemain outfall (MH.5656.03.004) and MH.5556.02.012 during the first week of classes (August 19, 2024). The H<sub>2</sub>S concentrations at these locations then dropped off following the first week classes (August 24, 2024) through the remainder of the monitoring period.

A spike in H<sub>2</sub>S concentration was observed at the Flat Creek WWPS on August 29, 2024 (Figure 2-4). Prior to the spike on this date, no H<sub>2</sub>S was observed at the sample site located within the wet well; noting this wet well was the discharge location of the temporary chemical feed system. Based on discussions with City staff, the chemical feed system was offline due to loss of power at the WWPS. During that same period when flows from Flat Creek WWPS were offline, H<sub>2</sub>S concentrations fell at MH.5556.02.005 and then were immediately followed by the maximum observed concentration during the monitoring period (318 ppm).

Upon further review, a relationship was observed between odors measured at the forcemain outfall (Sample Site #3) and MH.5556.02.005 (Sample Site #6). Periods of increased H<sub>2</sub>S concentration in the forcemain outfall (forcemain actively discharging) were followed by periods of increased H<sub>2</sub>S concentration downstream in MH.5556.02.005. Once the H<sub>2</sub>S concentrations subsided in the forcemain outfall (inactive forcemain discharge), H<sub>2</sub>S concentrations decreased at MH.5556.02.005.

### 2.3 Reduced Sulfur Compound Results

Measurement of H<sub>2</sub>S is often considered a reasonable surrogate for all contributing odorous compounds in upstream wastewater collection systems, because it is the most prevalent odorous compound in raw wastewater emissions. In addition to H<sub>2</sub>S, other reduced sulfur compounds (RSCs) may also significantly contribute to odorous emissions from raw wastewater. Like H<sub>2</sub>S, these organic RSCs have a low human detection threshold concentration (the minimum concentration of the compound required for the average nose to detect its presence). For example, the detection threshold of the organic RSC methyl mercaptan (CH<sub>3</sub>SH) is approximately 1.1 ppb. RSCs are frequently described as smelling like rotten vegetables and garbage. The measurement of these compounds alongside the continuous H<sub>2</sub>S concentration data is important for



wastewater samples as it gives an indication of what compounds are contributing to the odor, which is important when analyzing the effectiveness of potential future odor control systems that would treat the foul air.

In an effort to measure the RSCs near the location of the odor complaints, the City collected two (2) Tedlar bag samples from MH.5556.02.005 on August 27, 2024. The samples were collected using a small foot pump device that pulled the sample into the bag by pressing down on the bladder and then releasing to draw a vacuum as it expanded back up, pulling the sample into the bag. The samples were sent to a laboratory (ALS Environmental) for analysis of 20 RSC per ASTM Testing Standard D5504-01. The method reporting limit (MRL) for the group of compounds ranges from 2.5 to 5.0 ppb.

A review of the findings from the RSC analysis from MH.5556.02.005 is provided below. A summary of the results are presented in Table 2-2.

- One (1) of the two (2) samples, collected from MH.5556.02.005, arrived at the laboratory with the Tedlar bag torn and was not analyzed.
- In addition to hydrogen sulfide (0.90 ppm), concentrations of methyl mercaptan (0.06 ppm) were measured in the sample. Methyl mercaptan is characterized as a “rotten cabbage” smell.
  - Some degradation is anticipated between the instantaneous OdaLog measurement and the RSC analysis with the 24-hour turnaround on the RSC. However, significant degradation was observed between the measured H<sub>2</sub>S concentration (0.90 ppm) and the OdaLog H<sub>2</sub>S concentration (21 – 39 ppm) during the time of the RSC sampling.
  - It is worth noting that the sample depth within the manhole could impact this comparison since H<sub>2</sub>S is heavier than air. If the OdaLog was drawing a sample deeper in the manhole than the RSC sample, a higher concentration of H<sub>2</sub>S would be expected.
- Reduced sulfur compounds are not highly significant, though peak values may not have been captured. If vapor-phase odor treatment alternatives are further pursued, additional reduced sulfur compound testing is recommended prior to finalizing vapor-phase treatment options.

Compound	MRL (ppb)	Result (ppb) <sup>a</sup>	Result (ppm) <sup>a</sup>
Hydrogen Sulfide	5.0	900	0.90
Carbonyl Sulfide	5.0	ND	ND
Methyl Mercaptan	5.0	64	0.06
Ethyl Mercaptan	5.0	ND	ND
Dimethyl Sulfide	5.0	ND	ND
Carbon Disulfide	2.5	ND	ND
Isopropyl Mercaptan	5.0	ND	ND
tert-Butyl Mercaptan	5.0	ND	ND
n-Propyl Mercaptan	5.0	ND	ND
Ethyl Methyl Sulfide	5.0	ND	ND
Thiophene	5.0	ND	ND
Isobutyl Mercaptan	5.0	ND	ND



**Table 2-2. Reduced Sulfur Compound Sampling Results**

Compound	MRL (ppb)	Result (ppb) <sup>a</sup>	Result (ppm) <sup>a</sup>
Diethyl Sulfide	5.0	ND	ND
n-Butyl Mercaptan	5.0	ND	ND
Dimethyl Disulfide	2.5	ND	ND
3-Methylthiophene	5.0	ND	ND
Tetrahydrothiophene	5.0	ND	ND
2,5-Dimethylthiophene	5.0	ND	ND
2-Ethylthiophene	5.0	ND	ND
Diethyl Disulfide	2.5	ND	ND

<sup>a</sup> Sample collected from MH.5556.02.005 on August 27, 2024.

ND – compound was analyzed for but not detected above laboratory reporting limit

## 2.4 Liquid-Phase Field Sampling

Wastewater samples were collected by the City to measure various odor-related parameters in the field (pH, temperature, and dissolved sulfide concentrations), with additional wastewater samples collected and shipped to Pace Analytical for BOD and COD analysis.

- The pH of wastewater has an important role in determining the amount of dissolved molecular H<sub>2</sub>S available for release to the atmosphere. Hydrogen sulfide gas is moderately soluble in water and dissociates to other forms of sulfide depending on pH. As can be seen in the Figure 1-4, at pH 6.0, over 90 percent of dissolved sulfide is present as dissolved hydrogen sulfide gas. At pH 8.0, less than 10 percent is available as hydrogen sulfide gas for release from the wastewater. Therefore, a change of one pH unit in wastewater can significantly increase the release of H<sub>2</sub>S gas, potentially causing odor and corrosion problems.
- Sulfide production is carried out via microbial means which are greatly aided by higher temperatures. For this reason, warmer times of year will see an increase in production of sulfides. Also, industrial discharges of higher temperature effluent can cause increased microbial activity year around. Generally, each degree Celsius (1.8 degree Fahrenheit) increase in temperature represents a 7 percent increase in the biological activity of the sulfate reducing bacteria up to 30 °C (86 °F). For illustration, when wastewater is near 25 °C (77 °F), sulfide production can be more than two times greater than it is when wastewater temperature is 15 °C (59 °F) or lower.
- Measured liquid-phase sulfide concentrations are valuable because chemical selection and dose rates are directly related to those values (average and peak). They also provide a basis for evaluating multiple chemicals for cost-effectiveness, considering factors such as dose location, wastewater flow, and general wastewater parameters such as pH, BOD, and oxidation-reduction potential (ORP).
- The formation of hydrogen sulfide and subsequently sulfuric acid is contingent on the presence of sulfides in the wastewater stream. High sulfide concentrations are often associated with high BOD. BOD greater than 300 mg/L tends to be correlated with higher sulfide production.

The City utilized field test kit equipment to collect liquid samples and analyze for three wastewater parameters: temperature, pH and total dissolved sulfide concentration. The dissolved sulfide parameter is particularly important as it can be used as an indicator of how much H<sub>2</sub>S is available in aqueous form to volatilize.



H<sub>2</sub>S volatilization may become problematic in highly turbulent areas, such as at drop connections, abrupt changes in direction or transitions from pressurized to gravity flow.

A review of the findings from the liquid phase sampling analysis is provided below. A summary of the results are presented in Table 2-3.

- A large pH shift was observed between the collected samples in MH.5556.02.012 along University Boulevard. A pH increase would reduce dissolved H<sub>2</sub>S from more than 50% of all dissolved inorganic to nearly zero (reducing volatilized H<sub>2</sub>S).
- High pH (> 8.5) in several locations around Liberty University is unusual, which would result in decreased H<sub>2</sub>S compared to neutral or acidic pH.
- Sulfide concentrations of 0.7 and 1.0 mg/L were measured in MH.5656.03.004 during both sampling events. Noting that this concentration is located downstream of the temporary chemical feed system that was active during the sample period.
  - Existing downstream conditions (slope, drop connections and change in flow direction) likely to result in turbulent flow conditions causing release of H<sub>2</sub>S.
  - Sulfide (H<sub>2</sub>S) stripping at the forcemain discharge could result in lower sulfide concentration at downstream manholes. However, sulfide concentrations of 0 mg/L at MH.5556.02.005 is inconsistent with continuously high H<sub>2</sub>S measured by OdaLog.
- Observed BOD and COD are generally within anticipated ranges.

**Table 2-3. Liquid-Phase Sampling Results**

Sample Site (#)	Manhole ID	Date	Time	pH	Temperature (°C/°F) <sup>a</sup>	Dissolved Sulfide Concentration (mg/L)	BOD (mg/L)	COD (mg/L)
1	PRI_MH.OFFGRID.453	11/18/24	10:45 AM	7.31	18.4 / 65.1	0.0	284	615
2	PRI_MH.5555.03.452	8/28/24	10:53 AM	7.88	26.4 / 79.5	0.3	164	200
		8/29/24	11:07 AM	7.81	28.5 / 83.3	0.1	208	586
3	MH.5656.03.004	8/27/24	10:51 AM	6.98	26.9 / 80.4	1.0	215	456
		8/29/24	10:45 AM	7.28	27.7 / 81.9	1.0	109	454
		11/18/24	11:05 AM	6.45	---	0.7	377	377
4	MH.5556.02.012	8/26/24	3:31 PM	8.54	26.7 / 80.1	0.0	56	144
		8/29/24	10:12 AM	6.75	26.9 / 80.4	0.0	125	268
5	PRI_MH.5556.02.448	8/27/24	10:15 AM	8.49	26.6 / 79.9	0.0	294	765
		8/28/24	10:08 AM	8.63	26.6 / 79.9	0.0	272	352
6	MH.5556.02.005	8/26/24	3:11 PM	8.64	25.0 / 77.0	0.0	296	772
		8/28/24	10:23 AM	8.51	26.6 / 79.9	0.0	339	418

<sup>a</sup> Temperature data not reported for 11/18/24 sampling event at MH.5656.03.004.



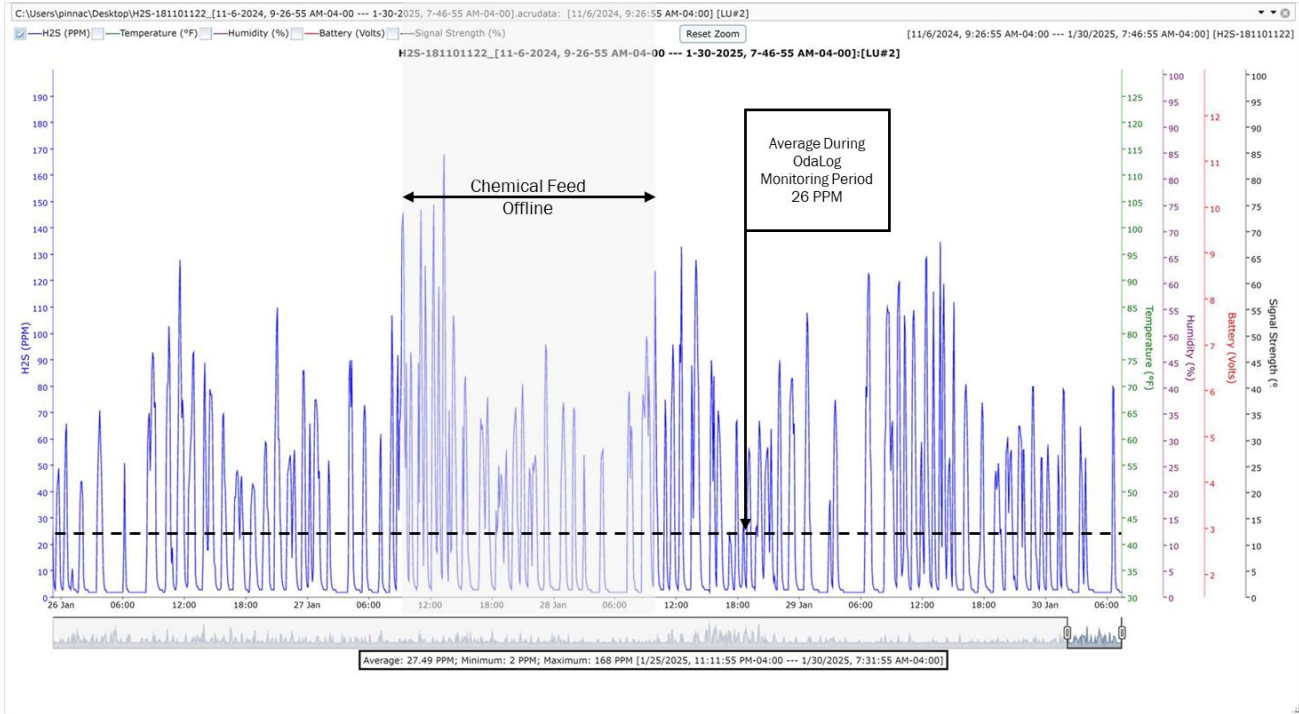
## 2.5 Additional Sampling

On January 28, 2025, the City relocated the temporary chemical feed system from the Flat Creek WWPS to the Candler Mountain Pump Station, which places the chemical dose closer to the source of the odor complaints (along University Boulevard and near MH. 5556.02.005). The temporary chemical feed system setup pulled TOTALOX from a storage tote and discharged the chemical directly into a manhole located on the Candler Mountain Pump Station site. The chemical feed pump was setup using the same constant speed (user defined) setpoint as was used at the Flat Creek WWPS site. Carrier water from the water pump station was utilized to transport the chemical downstream approximately 190 linear feet where the flow combines with flow from the forcemain outfall, as shown below in Figure 2-6.



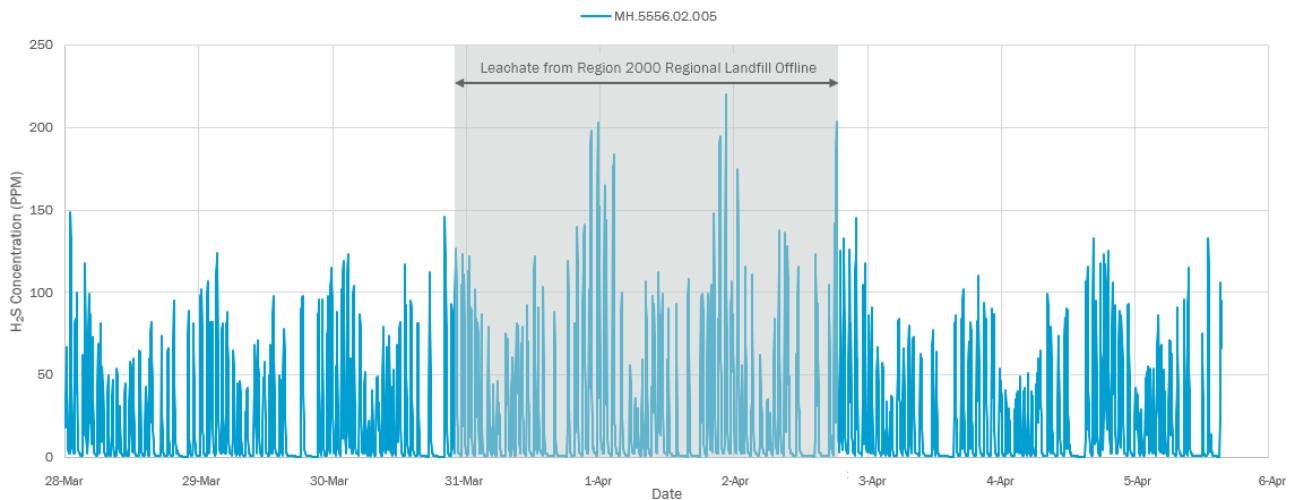
**Figure 2-6. Relocated Temporary Chemical Feed System**

While the chemical feed system was being relocated, the City collected ambient vapor-phase H<sub>2</sub>S concentrations at MH.5556.02.005. The results are presented in Figure 2-7 below. The period on the left represents the chemical feed system installed at Flat Creek WWPS while the period on the right represents when the system was relocated to the Candler Mountain Pump Station. Liquid phase samples were collected from MH.5556.02.005 and MH.5556.03.004 following the relocation of the chemical feed system on February 4, 2025. The results are presented in Table 2-4.



**Figure 2-7. Additional OdaLog H<sub>2</sub>S Monitoring Data – MH.5556.02.005**

At the end of March 2025, the City requested that the Region 2000 Regional Landfill stop discharging leachate into the CCUSA collection system to monitor the production of hydrogen sulfide without the impact of leachate. The landfill agreed to withhold leachate for a period of three days, shutting off the leachate pump station from March 31, 2025 at 8:00 am through April 3, 2025 at 8:00 am. During this time period, the City collected ambient vapor-phase H<sub>2</sub>S concentrations, utilizing an OdaLog data logger, at MH.5556.02.005, and additional liquid phase samples from MH.5656.03.004 and MH.5556.02.005. The results of the vapor phase sampling and the liquid phase sampling are presented in Figure 2-8 and Table 2-4, respectively.



**Figure 2-8. Additional OdaLog H<sub>2</sub>S Monitoring Data (without landfill leachate discharge) – MH.5556.02.005**



Table 2-4. Additional Liquid-Phase Sampling Results								
Sample Site (#)	Manhole ID	Date	Time	pH	Temperature (°C/°F) <sup>a</sup>	Dissolved Sulfide Concentration (mg/L)	BOD (mg/L)	COD (mg/L)
3	MH.5656.03.004	2/4/25	14:55	7.06	---	2.0	153	500
		4/2/25	14:40	7.71	16.3 / 61.3	0.7	168	545
6	MH.5556.02.005	2/4/25	14:40	8.64	---	0.0	576	1440

<sup>a</sup> Temperature data not reported for 2/4/25 sampling event.

A review of the findings from the additional vapor-phase and liquid-phase sampling analysis is provided below.

- Very high (maximum 168 ppm) H<sub>2</sub>S concentrations were measured in MH.5556.02.005 with the temporary chemical feed system offline and after the system was relocated to the Candler's Mountain Pump Station (maximum 135 ppm).
  - The relocation of the TOTALOX temporary chemical feed system did not significantly reduce H<sub>2</sub>S at MH.5556.02.005, as shown in Figure 2-7.
- Very high (maximum 220 ppm) H<sub>2</sub>S concentrations were measured in MH.5556.02.005 during the 3-day period of no landfill leachate discharge from Region 2000 Regional Landfill. The following 3-day period with landfill leachate discharge resulted in lower H<sub>2</sub>S concentrations (maximum of 204 ppm) measured in MH.5556.02.005. As shown in Figure 2-8, H<sub>2</sub>S concentrations increased while landfill leachate was not in the system and then decreased following the reintroduction of landfill leachate. This indicates that landfill leachate may not be the likely source of H<sub>2</sub>S precursors in the system.
- Prior to relocation of the chemical feed system, sulfide concentrations of 1.0 mg/L and 0.7 mg/L were measured in MH.5656.03.004. Following the relocation of the chemical feed system to the Candler's Mountain Pump Station, a sulfide concentration of 2.0 mg/L was measured at MH.5656.03.004. During the time period when the landfill was not discharging leachate, a sulfide concentration of 0.7 mg/L was measured. This also indicates that the landfill leachate may not be the likely source of H<sub>2</sub>S precursors in the system.

## 2.6 Sampling Summary

Based on the data collected during the vapor- and liquid-phase sampling, the lengthy 20,900 LF Flat Creek forcemain generates high liquid-phase sulfide quantities, which are volatilized as H<sub>2</sub>S in downstream gravity sewers, including at MH.5556.02.005, which is in the vicinity of the reported odor complaints. When the landfill leachate flow was removed from the system, the additional residence time created in the forcemain generated more liquid-phase sulfides which caused higher levels of H<sub>2</sub>S in downstream gravity sewers. Following the reintroduction of leachate into the system, residence times in the forcemain were reduced and as a result, H<sub>2</sub>S levels in the downstream sewers were reduced. Additionally, the turbulence of the flow entering MH.5556.02.005 from the steep pipe grade of the Candler's Mountain Road outfall sewer further increases H<sub>2</sub>S volatilization and odors.



## Section 3: Odor Control Alternatives Development

Several odor control technologies are available to reduce or eliminate odors from the sewer immediately upstream of the Fishing Creek Interceptor. This section includes a review of available and viable odor control technologies (liquid-phase, vapor-phase, and collection system operational and design modifications) considered for implementation to reduce or eliminate the H<sub>2</sub>S odors within the project area.

### 3.1 Liquid-Phase Treatment

Liquid-phase chemical treatment methods to control dissolved sulfides rely on one or more of three principles: inhibition of sulfide-producing bacteria, sulfide oxidation, or sulfide precipitation. Additionally, because sulfides are produced bacteriologically in the slime layer on the sewer wall, sulfide formation can be prevented by creating conditions that are adverse to bacterial metabolism. pH adjustment, addition of strong oxidants or caustics, and physical sewer cleaning can achieve such bacterial inactivation. However, these options can be difficult to implement because of potential impacts to downstream treatment facilities, or frequent and costly sewer cleaning requirements. Because of the cost and resource requirements required for cleaning, chemical addition for ongoing control of sulfide and odor production in sewers is typically preferred.

A variety of chemicals, including oxidants, iron salts, and nitrate solutions, are suitable for liquid-phase sulfide and H<sub>2</sub>S control. Dosage rates are set to lower liquid-phase sulfide concentrations to less than an appropriate target, such as 0.5 mg/L, such that H<sub>2</sub>S emissions at critical points are reduced to average H<sub>2</sub>S concentrations of approximately 10 ppm or less. Chemical addition can normally be expected to also reduce pipeline corrosion because the sewer headspace H<sub>2</sub>S concentration is reduced, mitigating H<sub>2</sub>S condensation to sulfuric acid along the crown of pipes. However, even highly effective sulfide control will not completely eliminate corrosion (or odor) generation.

Three common types of chemicals used for liquid-phase sulfide and H<sub>2</sub>S control are:

- Oxidants - Strong oxidizing chemicals, such as hydrogen peroxide, attack odor-causing compounds and destroy them through oxidation-reduction reactions. Strong oxidants can decrease dissolved sulfide concentrations to or near zero. Oxidants such as hydrogen peroxide do not leave a residual in the wastewater that will continue to reduce sulfide concentrations downstream of the injection point.
  - Oxidants are not desirable for Flat Creek WWPS chemical injection because liquid-phase sulfide concentrations will increase downstream of the point of addition beyond the desired threshold before the wastewater reaches the gravity breakpoint. To make this effective, the oxidant dose point would need to be much closer to the study area (i.e. the location of the relocated temporary chemical feed system at the Candler Mountain Pump Station).
- Iron salts - Iron salts such as ferrous chloride or ferric chloride combine chemically with dissolved sulfide to form relatively insoluble metal sulfides that precipitate from the wastewater, thus reducing H<sub>2</sub>S emissions. Metal sulfide precipitates usually do not settle in the collection system but are easily removed at treatment plants. Iron salt addition differs from oxidants in that overdosing the chemical will leave a residual in the wastewater, which allows further liquid-phase treatment downstream.
- Nitrate solutions (frequently, Bioxide, produced by Xylem) are often a good chemical choice for extended forcemains because sufficient dose rates will inhibit sulfide formation by sulfate-reducing bacteria. This occurs because nitrate becomes an alternative (and preferred) electron acceptor for sulfate-reducing bacteria. However, a notable disadvantage of nitrate addition for the City's application is the potential impact on the biological nutrient removal (BNR) process at the downstream Lynchburg Regional Water Resource Recovery Facility.

- If nitrate impacts are an issue, the iron salt ferrous chloride could be used for sulfide precipitation at the Flat Creek WWPS wet well.

Liquid-phase sulfide and H<sub>2</sub>S control chemical costs vary, typically ranging between \$3 and \$10 per pound of sulfide controlled. Field testing can confirm the actual required dosage and approximate annual costs. Dosages and corresponding costs may decrease in the winter months, as wastewater temperature and biological activity decreases. Chemicals can also be dosed at variable rates during the day and night, for the chemical to achieve maximum effectiveness and minimize added cost associated with over-dosing.

Calculated daily dose and annual cost ranges for the oxidant hydrogen peroxide and iron salts, Bioxide, and ferrous chloride, using a dissolved sulfide concentration target of 0.5 mg/L at MH.5656.03.004, are presented in Table 3-1. Dose requirements for each chemical are based on average requirements found in similar case studies of reducing liquid-phase sulfide as a rate of pounds of chemical required per pound of sulfide removed. The dose rates shown in the table assume an estimated initial sulfide concentration of approximately 2 mg/L based off of the liquid-phase sampling results (Table 2-4).

<b>Chemical</b>	<b>Dose Ratio (lb./lb. S)</b>	<b>Chemical Cost (\$/gal)</b>	<b>Annual Cost (\$)</b>
Hydrogen peroxide	4	\$5.50	\$25,000
Bioxide (nitrate solution)	7	\$4.50	\$33,000
Ferrous chloride	8	\$1.00	\$15,000

Chemical dosing stations vary in complexity and cost. Similar to the City’s current temporary chemical feed system, the simplest system consists of a small storage tank and metering pumps that inject the chemicals directly into a pump station wet well. A more complex system typically involves a larger storage tank, which can have a capacity of as much as 5,000 gallons, so that a full tanker truck load can be accepted for refills. The chemical loading station, instrumentation and controls, and associated equipment may be housed in a building. If the chemical is hazardous, an emergency eyewash and shower are required. Chemicals or oxygen may also be injected directly into a forcemain; however, this requires a more sophisticated chemical addition system and higher-pressure pumps.

It should be noted that a chemical addition system does not alleviate sewer pressurization and fugitive emissions; it only reduces the concentration of odorants that are emitted from the wastewater. Vapor-phase treatment, presented in Section 3.2, are more effective with addressing these issues.

Liquid phase treatment is considered a viable alternative and is included in the alternative analysis presented in Section 4.

### 3.2 Vapor-Phase Treatment

Vapor-phase treatment involves extracting air from the sewer headspace gas to eliminate pressurization at manholes and other structures. The collected foul air is then treated prior to atmospheric discharge. Sewer foul air discharge systems are designed to reduce pipeline pressurization a distance away from the air extraction point, with some systems producing negative pressures at potential off-gassing points miles upstream and downstream.

A secure site with access to potable water and electric power is the best location for a vapor-phase odor control unit. Pump stations that are owned and operated by the utility are often used for these reasons. Appropriate security is essential for the equipment, especially if hazardous chemicals are stored, which makes for another benefit of using a pump station for either vapor-phase or liquid-phase treatment.



Several treatment technologies that provide effective vapor-phase odor treatment are available, including activated carbon adsorption, bulk media biofilters, biotrickling filters, and chemical scrubbers. Because air treatment systems are designed to keep sewer headspaces under negative pressure, fugitive odor emissions are fully contained; however, the foul air fan at the extraction point must be robust and reliable in providing a negative pressure at all times, as many collection system air spaces have natural fluctuating differential pressures throughout a typical day. Therefore, the fan must be designed to pull air from the headspace to match conditions of greatest positive pressure under baseline (no air extraction) conditions.

Another challenge with sewer headspace extraction is that foul air H<sub>2</sub>S concentrations may at times be very high (hundreds of ppm) and therefore must be well treated (potentially using a two-stage system) to avoid odor complaints when the treated air is discharged. The observed H<sub>2</sub>S concentrations at MH.5556.02.005, with average and maximum concentrations of 26 ppm and 318 ppm, respectively, fall into this category. If possible, the system should be situated so that a buffer zone exists between the treatment system and potential odor receptors and complaint locations (i.e., campus facilities, residential areas or commercial areas). For vapor-phase treatment systems situated close to the public, like on Liberty University's campus, special consideration should be given to noise reduction measures for fans and, in some cases, chemical pump motors. Tall stacks exiting the air treatment units are desirable from a dispersion standpoint, but shorter stacks may be necessary to minimize visual impacts.

The following are typical vapor-phase treatment options for collection system odor control:

- Activated carbon adsorption can remove H<sub>2</sub>S from foul air streams at greater than 99% efficiency when odor concentrations are relatively low. However, virgin activated carbon is typically not a good choice when high concentrations of H<sub>2</sub>S and other odorous compounds are present because it will require frequent media replacement (on the order of months or even weeks). An activated carbon adsorption system often will be used as a polishing step located after another treatment unit, such as a biofilter, when two stages of treatment are deemed necessary.
- Bulk media biofilters offer several advantages because treatment is robust (having the ability to treat H<sub>2</sub>S as well as other odorous compounds in collection system foul air streams), and no chemicals are required. Biofilters can be constructed as in-ground systems blended into the landscape or above-ground systems contained in a vessel. A disadvantage of biofilters is that they require the largest footprint of commonly considered vapor-phase treatment units.
- Biotrickling filters offer several advantages, especially for treating high H<sub>2</sub>S emissions. While biotrickling filters do not require chemical addition, they can provide high H<sub>2</sub>S reduction efficiency, often greater than 99 percent. They also occupy smaller footprints than bulk media biofilters. However, biotrickling filters are less effective for removing non-H<sub>2</sub>S odorous compounds in foul air streams, and require routine operation and maintenance (O&M) activities to assure that the media biology remains alive and at an optimal energy level.
- Chemical scrubbers are also effective at H<sub>2</sub>S reduction, although they are more costly and significantly more complex to operate than other vapor-phase odor control systems. The additional operator attention needs can be challenging for remote facilities. A dependency of chemical scrubbers on regular chemical deliveries is also a disadvantage, as is the large footprint requirement for storing chemical.

Based on an initial assessment, extract-and-treat vapor phase approaches, requiring a fan to be installed to exert a negative pressure on the collection system headspace, are less desirable due to the limited available footprint in the vicinity of the area of complaints to install the system. Further, according to City GIS, the parcels immediately adjacent to MH.5556.02.005 are owned by Liberty University. Therefore, a vapor-phase odor control system would need to be installed at a downstream location within the gravity line, and a fan sized to pull a negative pressure on the pipe headspace at all times. However, the nearest City owned property (Parcel ID 11801016) that could accommodate the installation of a vapor-phase treatment system (fan

and odor control unit) is approximately 3,400 linear feet downstream of MH.5556.02.005. This is a considerable distance given that the focus of odor issues is in a very specific area of Liberty University.

If selected as an odor control approach, it is recommended to pilot test vapor-phase odor control technologies before the design and construction of a new facility. This would involve fan testing, which consists of bringing a trailer-mounted fan and small carbon odor control unit out to the site and pulling air from the sewer such that a negative pressure is constantly applied to the manholes downstream of the Flat Creek forcemain discharge. This pilot fan testing process is time-consuming and cost prohibitive.

Because of the limited available space in the vicinity of the area of complaints, vapor-phase treatment (foul air extraction within the gravity line and treating the air) is not considered to be a cost-effective or viable alternative to address the current odor issues. Therefore, they have not been included in the alternative analysis presented in Section 4.

### 3.3 Operational Modifications

Operational odor control measures, such as sealing select manholes or utilizing activated carbon manhole inserts, provide a cost-effective alternative to liquid-phase or vapor-phase odor control. Sealing manholes utilizes the existing infrastructure and requires minimal O&M once implemented but it would not provide any odor treatment. Odor emissions are likely to be shifted further downstream, likely resulting in higher odor impacts at those locations.

Activated carbon inserts, similar to the example shown below in Figure 3-1, provide passive odor treatment with air traveling through the filter without use of a fan.

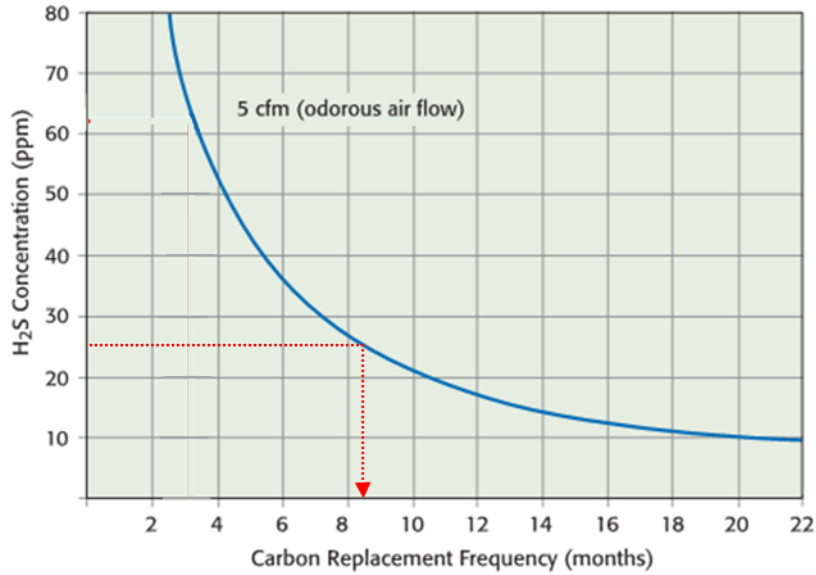


**Figure 3-1. Activated Carbon Manhole Insert**

*Source: Continental Carbon Group SweetStreet® Manhole Odour Control Module*

Inserts provided by Continental Carbon (the SweetStreet Manhole Odour Control Module), contain 20 pounds (lbs.) of regenerable activated carbon. A typical carbon replacement frequency curve, provided by Continental Carbon, for their Centaur HSV media, is shown in Figure 3-2. Based on the replacement frequency curve, and an average H<sub>2</sub>S concentration of 26 ppm in MH.5556.02.005 (Table 2-1), the activated carbon is predicted to need to be regenerated or replaced approximately every 8 months (refer to the red dotted lines in Figure 3-2). This prediction assumes an average airflow rate of 5 cubic feet per minute (cfm).





**Figure 3-2. Continental Carbon Centaur HSV Replacement Frequency Curve**  
*Predicted replacement frequency shown for MH.5556.02.005*

The Centaur HSV carbon can be regenerated by washing it with potable water. Because the residual wash water contains the removed contaminants, forming a dilute sulfuric acid solution, it needs to be handled carefully and discarded appropriately. The regeneration process is time-consuming, and because of that labor intensity, the manufacturer recommends this procedure only for large carbon quantities (much larger than the 20 lbs. in each manhole canister). Because of this, it is recommended to appropriately dispose of spent carbon without attempting regeneration by water washing. Table 3-2 summarizes the adsorption capacity, replacement schedule, and annual replacement cost for the activated carbon manhole insert for MH.5556.02.005.

Table 3-2. Carbon Parameters and Replacement Cost				
Carbon Type	H <sub>2</sub> S Breakthrough Capacity (g H <sub>2</sub> S/cc carbon)	Estimated Replacement Frequency <sup>a</sup>	Cost (\$/lb.)	Annual Replacement Cost <sup>b</sup>
Centaur HSV	0.10	8 months	\$4.50	\$135

<sup>a</sup> Calculated based on average H<sub>2</sub>S concentration measured in MH.5556.02.005 (ppm).

<sup>b</sup> Cost approximated based on Continental Carbon replacement curves (20 lb. per replacement). Cost does not include disposal of spent carbon.

It should be noted that Continental Carbon provides other activated carbon products with higher H<sub>2</sub>S adsorption capacities than the Centaur HSV product, which has an absorption capacity of 0.1 grams (g) H<sub>2</sub>S per cubic centimeter (cc). These options are not regenerable and range in absorption capacity from 0.14 to 0.30 g H<sub>2</sub>S / cc. There are numerous vendors that provide similar carbon media to the types described above, including Purafil, Pure Air Filtration, and Jacobi Carbons. Utilizing a higher capacity carbon will reduce annual media replacement costs and will require maintenance staff to change out the carbon less frequently. However high-capacity carbons are often not as effective on non-H<sub>2</sub>S compounds.

Given the history of odor complaints following the implementation of bolted-down manhole frame and covers causing odor emissions to shift in the collection system, sealing select manholes is not considered to be a



viable alternative. However, installation of carbon manhole inserts is considered a viable alternative and is included in the alternative analysis presented in Section 4.

### 3.4 Sewer Design Modifications

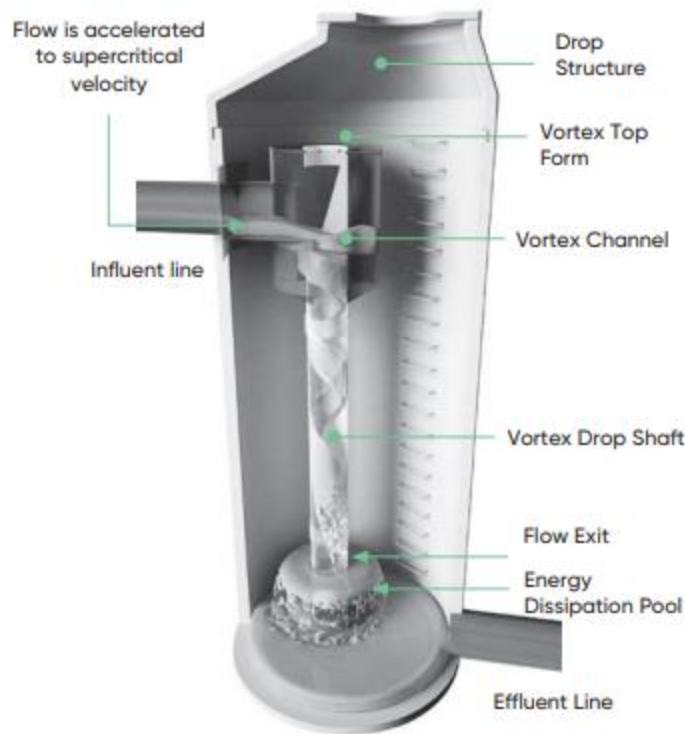
As discussed in Section 2.2, measured H<sub>2</sub>S concentrations in MH.5556.02.005 were higher than in the upstream MH.5656.03.004, which is the first manhole downstream of the Flat Creek forcemain transition to gravity. In many similar collection systems, the highest H<sub>2</sub>S volatilization occurs in the manhole immediately following the transition of forcemain to gravity (MH.5656.03.004). However, MH.5556.02.005 appears to have a high potential for H<sub>2</sub>S volatilization because of the orientation of the manhole, the influent pipe location, and the drop connections along the outfall sewer. Flow enters MH.5556.02.005 from the south before making a turn at an acute angle (approximately 80 degrees) before entering the Fishing Creek Interceptor. This is an abrupt turn that is normally associated with turbulence and volatilization of odorous compounds.

Pipeline and manhole design modifications can be an effective alternative to liquid-phase or vapor-phase odor control. These modifications can reduce turbulence, resulting in reduced H<sub>2</sub>S volatilization. The following are typical design modifications to reduce H<sub>2</sub>S volatilization:

- Increasing the diameter of the manhole and constructing a new channel to provide curvilinear flow paths. The intent would be to modify the channel geometry to ease the flow transition into and out of the manhole by keeping the flow in the channel.
- Eliminate drop connections by increasing or decreasing pipe slopes.
- Reroute sewer pipes to eliminate abrupt changes in flow direction.

The proximity of MH.5556.02.005 to existing infrastructure (traffic boxes, underground traffic, underground fiber and overhead signals), as shown in Figure 3-3, presents constructability challenges to upsizing this manhole. Further, maintenance of existing flows and traffic control would pose additional challenges during construction due to the time required to bypass flow, demolish and remove the existing manhole, and upsize the manhole in place within the intersection of University Boulevard and Candler's Mountain Road. Because of these issues, upsizing the manhole is not considered to be a viable design modification.





**Figure 3-4. Vortex Flow Insert Schematic**

Source: *Ipex Vortex Flow™ Insert for Odour and Corrosion Control*

The dissipator device size is based on the peak flow the unit is required to handle. According to the manufacturer’s literature, the vortex-flow energy dissipator is designed to effectively dissipate energy for flows between 15 to 115 percent of the design flow. Energy from the drop in elevation is dissipated by the high velocities and helical patterns, which create friction along the drop shaft walls, and by cascading into the plunge pool, which creates mixing. The vortex-flow energy dissipator also provides the ability to aerate flows, as the flows pass through the helical vortices in the drop shaft and into the plunge pool. Acceleration of water in the form of a vortex, through the inlet section, causes air pressure to drop below atmospheric value. Atmospheric air gets drawn into the structure due to this pressure drop and the interfacial drag between water and air as the water spirals down the drop shaft. As air is drawn down the drop shaft and passes through the plunge pool, air is entrained in the liquid, which increases the concentration of DO in the liquid oxidizing sulfides in the wastewater.

Sewer alignment and manhole design modifications, including elimination of drop connections with vortex flow energy dissipators are considered a viable alternative to reduce turbulence and H<sub>2</sub>S volatilization and are included in the alternative analysis presented in Section 4.

### 3.5 Odor Control Alternatives Summary

As presented in the information provided throughout this Section, the following odor control technologies are determined to be viable and cost-effective, and are further evaluated in Section 4:

- Alternative 1 – Liquid-Phase Treatment
- Alternative 2 – Carbon Manhole Inserts
- Alternative 3 – Outfall Sewer Improvements



## Section 4: Alternatives Analysis

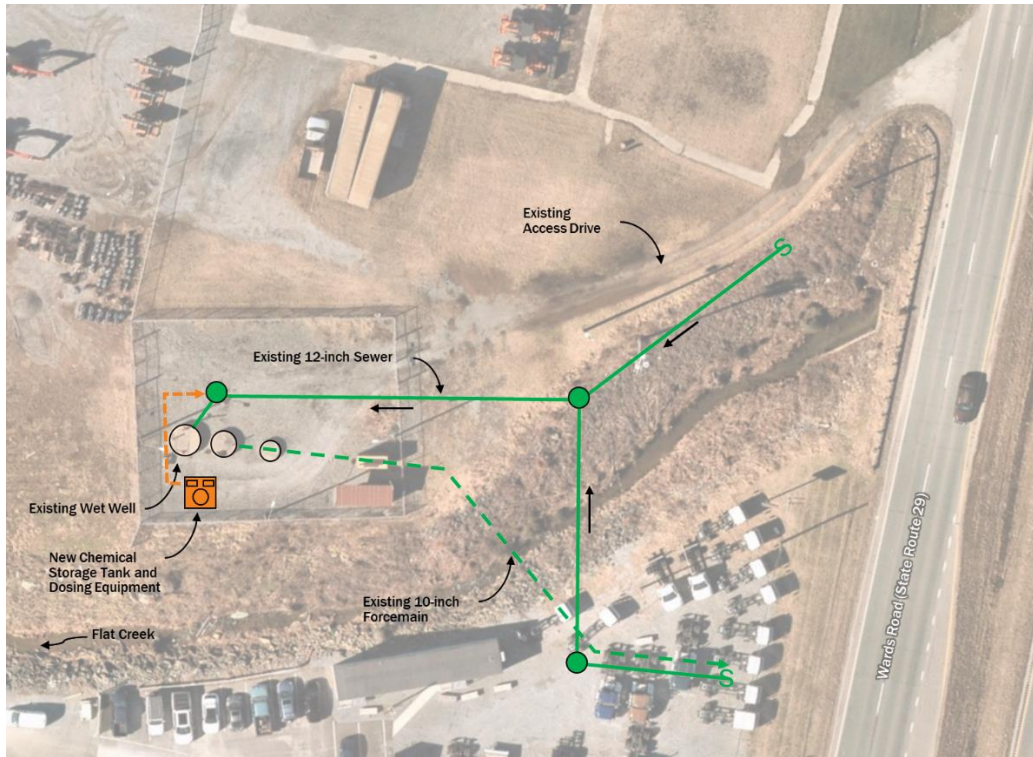
As presented in Section 3, liquid-phase (chemical) addition, operational (carbon insert) modifications, and sewer design modifications have been identified as the most viable options to reduce or eliminate odors from the sewer immediately upstream of the Fishing Creek Interceptor. This Section provides a review and evaluation of each of the alternatives using both non-economic and economic factors.

### 4.1 Alternative 1 – Liquid-Phase Treatment

Alternative 1 is proposed to address odor control using a permanent chemical dosing system to reduce liquid-phase sulfide concentrations below a threshold of 0.5 mg/L at the transition from the Flat Creek forcemain to gravity (MH.5656.03.004). As presented in Section 3.1, there are a variety of chemicals, including oxidants, iron salts, and nitrate solutions, that are suitable for liquid-phase sulfide and H<sub>2</sub>S control in this application. It is recommended that pilot testing and/or bench scale testing occur prior to final chemical selection and system optimization. For purposes of this analysis, Alternative 1 assumes the use of calcium nitrate (Bioxide) as the chemical used for liquid-phase treatment injected at the Flat Creek WWPS.

Alternative 1 consists of the following improvements:

- All chemical feed equipment would be located outdoors due to the limited available space at the Flat Creek WWPS. Figure 4-1 provides a conceptual layout of the chemical dosing system.
- Chemical storage would occur within a double-walled 1,000-gallon storage tank installed on a 10-foot x 10-foot concrete slab. Due to the limited footprint and available space, it is assumed that the chemical would be offloaded with a chemical transfer pump.
- The chemical would be injected just upstream of the manhole via a peristaltic chemical feed pump with a backup pump provided for redundancy.
- Instrumentation and controls (tank level, chemical feed pump status) would be housed in a small panel adjacent to the storage tank.



**Figure 4-1. Alternative 1 Conceptual Site Plan**

The cost of Alternative 1 is estimated at approximately \$190,000, assuming that adequate electrical capacity is available on site. The estimate of probable construction cost is included below in Table 4-1.

Table 4-1 Alternative 1 (Chemical Addition) Estimate of Probable Construction Cost					
No.	Item	Unit	Est. Qty.	Unit Cost	Total Cost
1	Mobilization (Approx. 5% of total)	LS	1	\$7,275	\$7,275
2	Excavation for Chemical Storage Tank	CY	10	\$100	\$1,000
3	Concrete Slab for Chemical Storage Tank	CY	6	\$3,000	\$18,000
4	7' Dia Bulk Storage Tank (1,000 gallons)	EA	1	\$7,500	\$7,500
5	Peristaltic Chemical Feed Pump	EA	2	\$15,000	\$30,000
6	Chemical Transfer Pump	EA	1	\$5,000	\$5,000
7	Small Diameter Chemical Feed Piping	LF	150	\$50	\$7,500
8	Miscellaneous Valves, Meters, Gauges	LS	1	\$10,000	\$10,000
9	Emergency Eye Wash Station and Hot Water Heater	LS	1	\$25,000	\$25,000
10	Grading, Seeding, and Strawing	SY	270	\$20	\$5,400
11	Electrical and I&C Improvement (Approx. 30% of total)	LS	1	\$32,820	\$32,820
12	Erosion and Sediment Control (Approx. 3% of total)	LS	1	\$3,282	\$3,282
Subtotal					\$157,777
20% Contingency					\$30,555
Total					\$183,333



Advantages and disadvantages of Alternative 1 are provided in Table 4-2.

Table 4-2. Alternative 1 (Chemical Addition) Advantages and Disadvantages	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Sufficient dose rates will inhibit sulfide formation by sulfate-reducing bacteria (nitrate becomes an alternative and preferred electron acceptor for sulfate-reducing bacteria).</li> <li>• Nitrate maintains a residual with long detention time for remain.</li> <li>• Chemical addition can be optimized by increasing or decreasing dose rates to achieve a target sulfide or H<sub>2</sub>S level.</li> </ul>	<ul style="list-style-type: none"> <li>• Remote facilities require staffing and will need to be incorporated into routine O&amp;M.</li> <li>• Long-term agreement recommended between City and CCUSA for permanent access and use of facilities.</li> <li>• Ingress/egress limits options for acceptance of chemical directly from larger tank trucks.</li> <li>• If nitrate is overdosed, nitrate impacts can reach the wastewater plant and can affect nutrient-removal systems by adding unexpected nitrogen loads</li> <li>• Flat Creek WWPS is located within close proximity to Flat Creek and its associated 100-year floodplain. Design and /or permitting challenges associated with chemical storage within a floodplain.</li> </ul>

## 4.2 Alternative 2 – Carbon Manhole Inserts

Alternative 2 consists of the installment of activated carbon manhole inserts to provide localized odor control. The activated carbon manhole inserts would be installed within the existing infrastructure at select manholes upstream and downstream of MH.5556.02.005. For the initial deployment, it is assumed activated carbon manhole inserts would be installed within MH.5556.02.005, one manhole downstream of MH.5556.02.005, and three manholes upstream of MH.5556.02.005, for a total of ten inserts (Figure 4-2). The activated carbon manhole inserts are scalable and easy to deploy should future odor complaints arise.

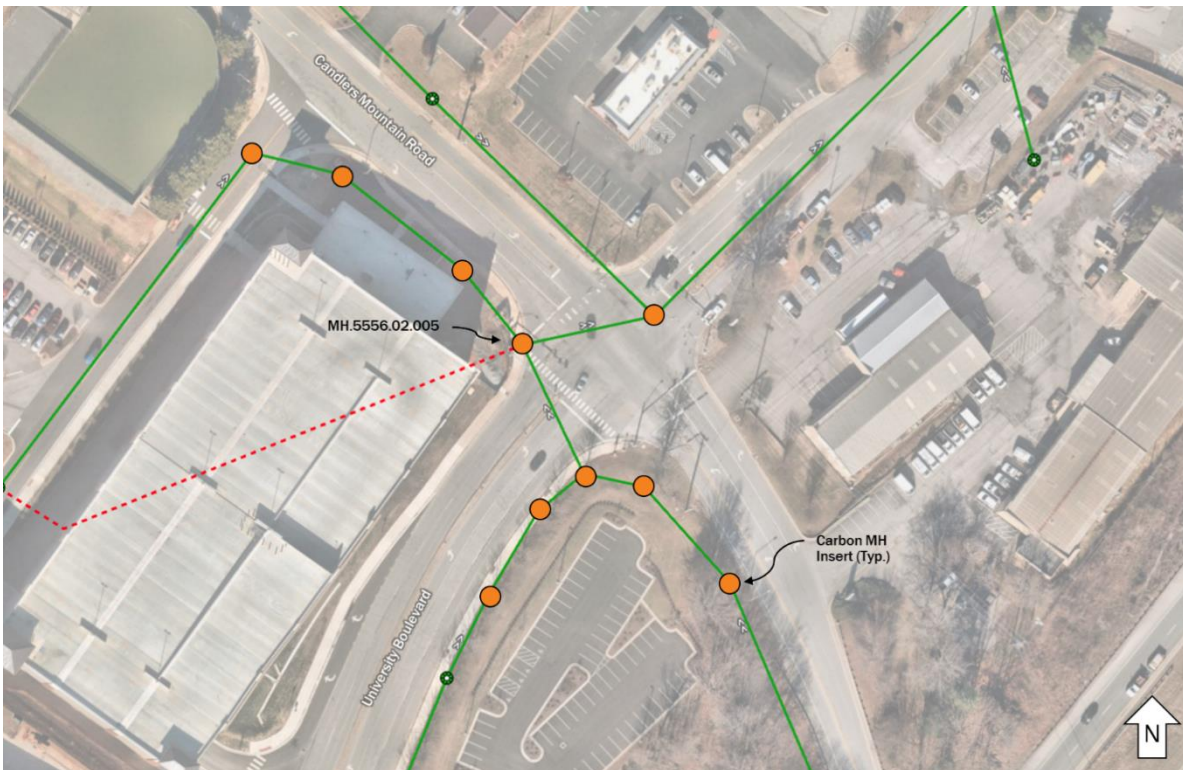


Figure 4-2. Alternative 2 Carbon Manhole Insert Location Plan



The cost per activated carbon manhole insert is approximately \$1,000 per unit (includes manhole insert and 20 lbs. of Centaur HSV carbon) for an estimated cost of approximately of \$12,000 for Alternative 2. This assumes the units are deployed and installed by City staff and the estimate includes a 20% contingency.

Table 4-3 lists the advantages and disadvantages of Alternative 2.

Table 4-3. Alternative 2 Advantages and Disadvantages	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Provides odor control at select manholes where fugitive emissions can be problematic and lead to complaints.</li> <li>• Activated carbon adsorption is a proven and reliable technology.</li> <li>• Utilizes existing infrastructure and can quickly be implemented.</li> </ul>	<ul style="list-style-type: none"> <li>• O&amp;M - limited amount of carbon can be installed, so the life of the unit may be reduced and require frequent media replacement to prevent breakthrough and resulting odor impacts.</li> <li>• Once breakthrough occurs, odor impacts and potential complaints can occur without warning to the City.</li> <li>• Carbon media can be impacted by accumulation of solids and moisture within the manhole (particularly in surcharge conditions), which reduces the carbon media life.</li> <li>• Does not address H<sub>2</sub>S volatilization and potential for corrosion of existing sewer infrastructure.</li> </ul>

### 4.3 Alternative 3 – Outfall Sewer Improvements

Alternative 3 includes an alternative outfall sewer alignment and profile to reduce turbulence and H<sub>2</sub>S volatilization. As proposed, the system modifications would eliminate the drop connections (MH.5656.01.023 and MH.5556.02.014) and reroute the Candler's Mountain Road outfall sewer to bypass MH.5556.02.005 to eliminate the abrupt change in flow direction and drop connections likely associated with turbulence and volatilization of odorous compounds. A conceptual site plan alignment and profile are shown in Figures 4-3 and 4-4, respectively.

This approach is believed to be viable to construct and would provide odor control benefit by reducing H<sub>2</sub>S volatilization at MH.5556.02.005. What remains uncertain is whether the turbulence and H<sub>2</sub>S volatilization reduction in this alternative would be sufficient to reduce odor emissions such that impacts on nearby residential and commercial facilities, motorists, and pedestrians would be eliminated and not migrated downstream.

Implementing this alternative would include the following improvements:

- Tie-in to the existing Fishing Creek Interceptor downstream of MH.5656.01.003 with a new doghouse manhole (MH 1), bypassing MH.5556.02.005 entirely.
- Install vortex drop inlet structure (MH 2). Dissipate the hydraulic energy downstream of MH.5656.01.023 (MH 4) by reducing the slope, installing a new 12-inch sewer and installing a vortex drop inlet structure within a new manhole structure near MH.5656.01.021. This would produce a gradual descent of wastewater from the top of the manhole (where the pipe enters) and the manhole invert. As a result, turbulence should be reduced along with reduced H<sub>2</sub>S emissions.
  - The new 12-inch sewer pipe would cross two existing storm sewers (24-inch and 30-inch) and two water mains (12-inch and 16-inch).
- For this alternative, it is assumed that the 8-inch sewer between MH.5656.01.021 and MH.5556.02.014 would be diverted to the rerouted sewer alignment and tie-in at MH 2. A detailed survey would be required to confirm the feasibility due to the difference in invert elevations at MH.5556.02.014 (elevation 861.63) and MH.5656.01.021 (868.88). GIS invert elevations were limited



on the Fishing Creek Interceptor and as-builts from various improvement projects on campus revealed conflicting information.

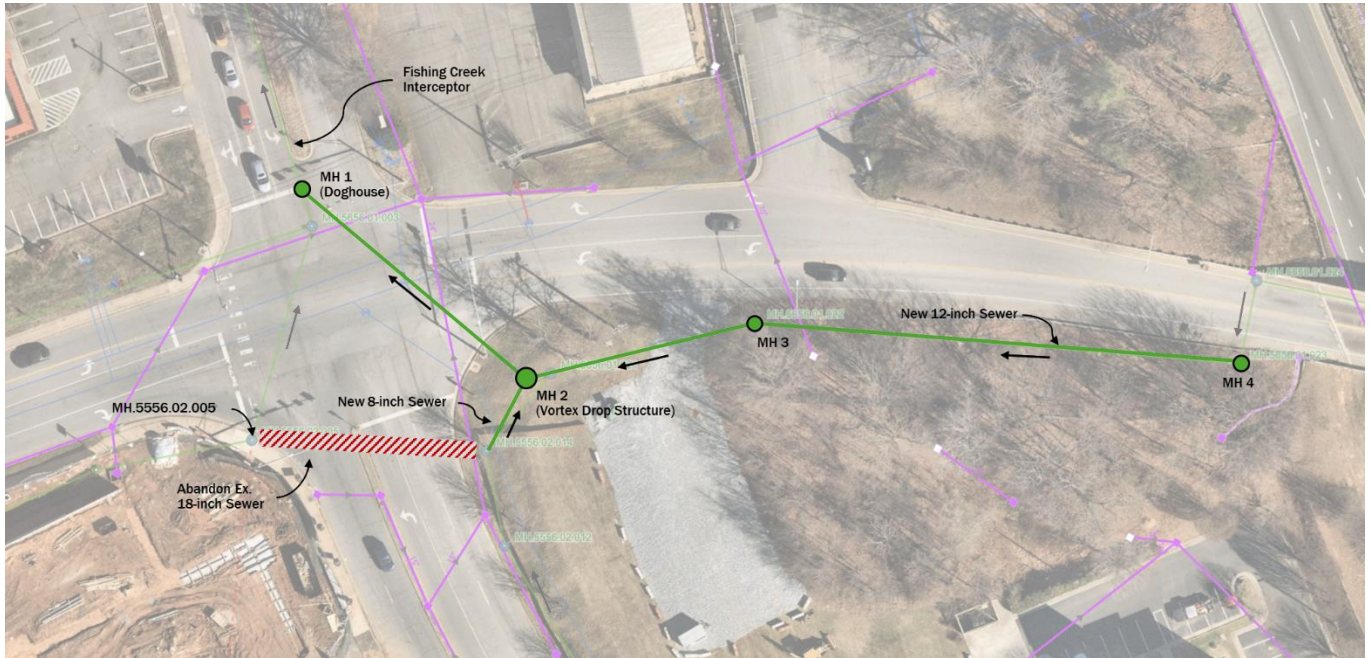


Figure 4-3. Alternative 3 Alignment

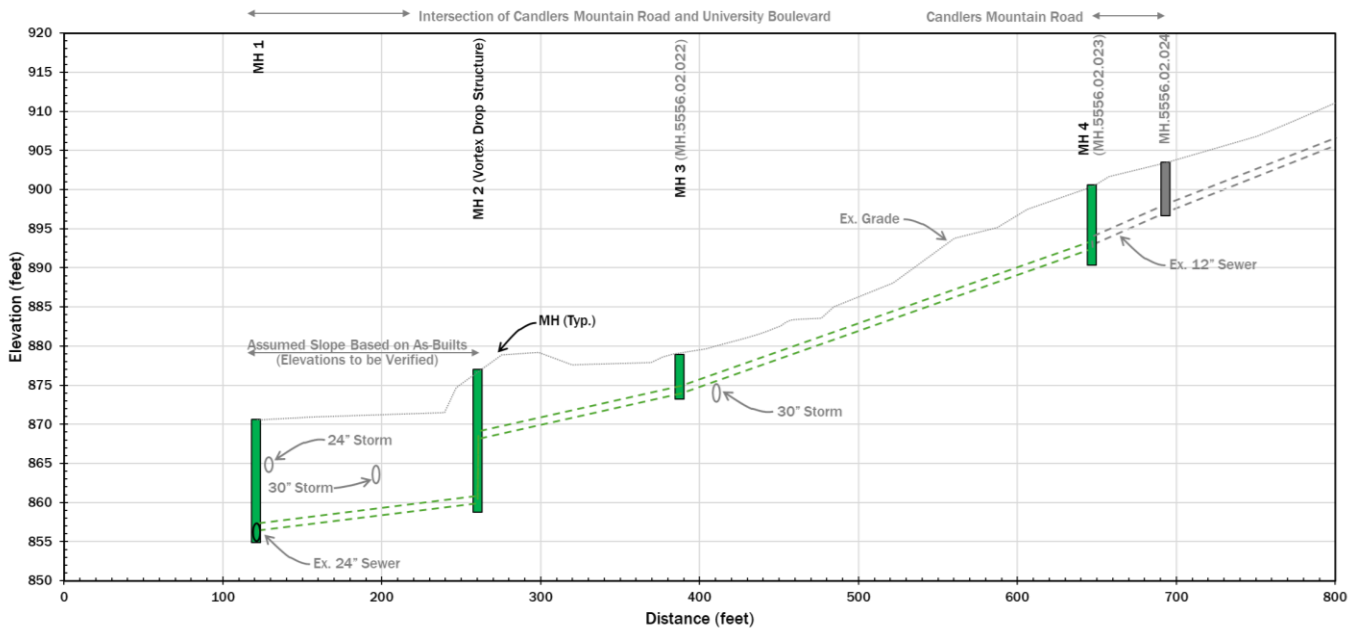


Figure 4-4. Alternative 3 Profile

Source: Profile surface and invert elevations per CCUSA Flat Creek WWPS and forcemain project drawings

The cost of the outfall sewer improvements is estimated at approximately \$760,000. The estimate of probable construction cost is included below in Table 4-4. Similar to the other alternatives, a 20% contingency has



been added. A brochure, installation guide, and drawing supplied by the vortex drop insert are provided in Attachment A.

Table 4-4 Alternative 3 Estimate of Probable Construction Cost					
No.	Item	Unit	Est. Qty.	Unit Cost	Total Cost
1	Mobilization (Approx. 5% of total)	LS	1	\$30,076	\$30,076
2	Excavation and Backfill for 8" and 12" Sewer Pipe	LF	540	\$150	\$81,000
3	48" Dia Precast Concrete Manholes w/ Acid Resistant Liner System	VF	15	\$900	\$13,500
4	60" Dia Precast Concrete Manholes w/ Acid Resistant Liner System	VF	18	\$1,500	\$27,000
5	60" Dia Doghouse Concrete Manhole w/ Acid Resistant Liner System	VF	16	\$1,800	\$28,800
6	Standard Manhole Frame and Cover	EA	4	\$2,500	\$10,000
7	Furnish and Install Vortex Drop Insert	LS	1	\$65,000	\$65,000
8	Furnish and Install 8" PVC SDR-35 Sewer Pipe	LF	50	\$95	\$4,750
9	Furnish and Install 12" PVC SDR-35 Sewer Pipe	LF	490	\$120	\$58,800
10	Connection of Sewer Pipe into Existing Manhole	EA	1	\$2,700	\$2,700
11	Abandonment of 12" Sewer Pipes	LF	48	\$50	\$2,400
12	Abandonment of 18" Sewer Pipes	LF	110	\$50	\$5,500
13	Post Installation Cleaning and CCTV Inspection	LF	540	\$6	\$3,240
14	Bypass Pumping (Pump up to 6" w/ 500 LF of piping)	Day	15	\$3,250	\$48,750
15	Select Backfill (#57 or 21A stone, bedding to crown of pipe outside roadway, 100% in roadway)	CY	310	\$100	\$31,000
16	Class A3 Concrete for Curbs and Gutters	CY	2	\$3,000	\$6,000
17	Replacement of Plant Mix Pavement - County Roads 10" BM - 25.0 Base Only	SY	70	\$100	\$7,000
18	Milling for Utility Patch	SY	1,700	\$30	\$51,000
19	Overlay - County Road 2-Inch	SY	1,700	\$42	\$71,400
20	Pavement Marking Restoration	LS	1	\$15,000	\$15,000
21	Grading, Seeding, and Strawing of Trenches	SY	700	\$20	\$14,000
22	Traffic Control Allowance (Approx. 7% of total)	LS	1	\$38,279	\$38,279
23	Erosion and Sediment Control (Approx. 3% of total)	LS	1	\$16,405	\$16,405
Subtotal					\$631,600
20% Contingency					\$126,320
Total					\$757,920

Advantages and disadvantages of Alternative 3 are provided below in Table 4-5.



Table 4-5. Alternative 3 Advantages and Disadvantages	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>Eliminates cascade effect from drop connections and turbulence from abrupt change in direction which lead to H<sub>2</sub>S volatilization.</li> <li>Future flexibility – vortex insert has the ability to handle a range of flow (15 to 115% of design flow)</li> </ul>	<ul style="list-style-type: none"> <li>Unknown whether modifications will reduce odorous emissions sufficiently to eliminate complaints.</li> <li>There would be O&amp;M challenges with potential debris/rag accumulation within energy dissipator pool.</li> <li>Impacts to Liberty University campus during construction of sewer improvements are significant.</li> <li>Limited vendors available for bid competition (Iplex and Hydro International are the primary vendors).</li> </ul>

### 4.4 Present Worth Analysis

Comparative cost estimates were developed for each of the evaluated alternatives. These include estimates of both capital costs and annual O&M costs to develop a 20-year present worth analysis to allow for comparison of each alternative based on consideration of the cost to build, operate, and maintain the system.

Capital costs include the opinions of probable construction cost from Sections 4.1 thru 4.3 plus engineering design and construction phase service costs. Engineering design and construction service costs were not included for Alternative 2 due to the ease of implementation. Alternative 1 included engineering fees associated with chemical pilot testing.

Each alternative includes an annual cost for maintenance as a percentage (2%) of the total construction costs. Additional annual O&M costs include power to run chemical feed pumps (assuming continuous operation), chemical and media replacement costs.

Table 4-6 summarizes the estimated capital cost for each alternative, annual O&M cost, and 20-year present worth.

Table 4-6. Comparative Cost Summary				
Alternative Costs		Alternative 1 Liquid Phase Treatment	Alternative 2 Carbon MH Inserts	Alternative 3 Outfall Sewer Improvements
Capital Costs	Construction	\$190,000	\$12,000	\$760,000
	Pilot Testing	\$50,000	---	---
	Engineering (Design and Construction) <sup>a</sup>	\$137,000	---	\$189,000
	Subtotal	\$377,000	\$12,000	\$949,000
Annual O&M Costs	Electricity <sup>b</sup>	\$1,000	---	---
	Chemical <sup>c</sup>	\$33,000	---	---
	Media Replacement <sup>d</sup>	---	\$1,350	---
	O&M <sup>e</sup>	\$3,800	\$240	\$15,200
	Subtotal	\$37,800	\$1,590	\$15,200
	Present Worth of Annual O&M Costs <sup>f</sup>	\$440,000	\$19,000	\$180,000
20-Year Present Worth		\$817,000	\$31,000	\$1,129,000

<sup>a</sup> Engineering design and construction phase services inclusive of survey, geotechnical engineering, and environmental services.

<sup>b</sup> Annual O&M costs for electricity calculated at \$0.07/kWh.

<sup>c</sup> Refer to Table 3-1.



- d Refer to Table 3-2.*
- e Annual O&M costs for maintenance calculated at 2% of the opinion of probable construction cost.*
- f Present worth calculated at an interest rate of 6% for 20-years.*

## 4.5 Alternative Analysis Summary

As presented in Table 4-6, the Alternative 1 Capital and 20-Year Present Worth Costs fall between Alternative 2 and 3; however, it has the highest annual O&M costs. The current temporary chemical feed system (TOTALOX) has shown limited impact with controlling odors. Pilot testing is recommended to confirm a chemical is selected that optimizes the most cost-effective liquid-phase treatment. Optimization would require pilot testing, followed by design and construction of the new chemical feed system facility.

Of the evaluated alternatives, Alternative 2 presents the lowest overall cost. It also provides a short-term, easy to deploy option for localized odor control around the Liberty University campus. However, it is not recommended as a long-term solution to address H<sub>2</sub>S volatilization and the potential for corrosion of existing sewer infrastructure.

Alternative 3 has the highest overall cost of the alternatives but will not have the annual chemical cost associated with installing a new liquid-phase treatment system (Alternative 1). However, this alternative runs the risk of reducing H<sub>2</sub>S volatilization to help the current odor issues in the problematic intersection, a result of not volatilizing H<sub>2</sub>S at MH.5556.02.005, which could then increase H<sub>2</sub>S emissions downstream of the study area with more sulfides remaining in the liquid phase.

## Section 5: Conclusions and Recommendations

As presented in the data and analyses throughout this Technical Memorandum, it appears the factors most responsible for the production of odors in the study area are the length/detention time of the Flat Creek forcemain, resulting in the generation of high liquid-phase sulfide quantities, which are volatilized as H<sub>2</sub>S in downstream gravity sewers, including at MH.5556.02.005. Additionally, the turbulence of the flow entering MH.5556.02.005 from the steep pipe grade of the Candler's Mountain Road outfall sewer appears to further increase H<sub>2</sub>S volatilization and odors. Based on the review and evaluation of the three alternatives, using both non-economic and economic factors, it is recommended that the City implement Alternative 1 to provide liquid-phase treatment to reduce sulfide concentrations in the gravity sewer downstream of the Flat Creek forcemain discharge. It is worth noting that although Alternative 2 provides a short-term, easy to deploy, low-cost alternative for localized odor control around the Liberty University campus, it is not recommended as a long-term solution to address H<sub>2</sub>S volatilization and the potential for corrosion of existing sewer infrastructure and odor complaints.

As described in the previous section, pilot testing is recommended to confirm chemical selection to provide the most cost-effective liquid-phase treatment. Depending on chemical selection, an alternative location (460 East WWPS or Candler's Mountain Road Pump Station) could be selected to eliminate the majority of the disadvantages presented in Table 4-2.

- The 460 East WWPS has additional space to allow for offloading of chemical, eliminating the need for chemical transfer pumps. This site is also located outside of the floodplain, eliminating the design and permitting challenges associated with storage of chemical in a floodplain.
- The Candler's Mountain Road Pump Station site is owned by the City and would eliminate the need for a long-term agreement or easement for use of a CCUSA facility. The site also has adequate space to allow for chemical offloading and is located outside of the floodplain. The viability of this site is dependent on chemical selection (viable for an oxidant) due to the short contact time between the forcemain discharge and outfall sewer.

## **Attachment A: Vortex Insert Literature (Ipex)**

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A-1

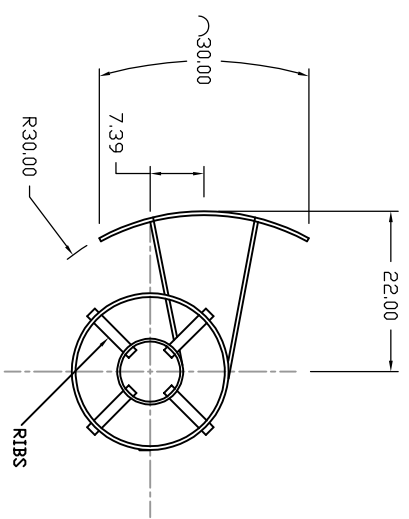
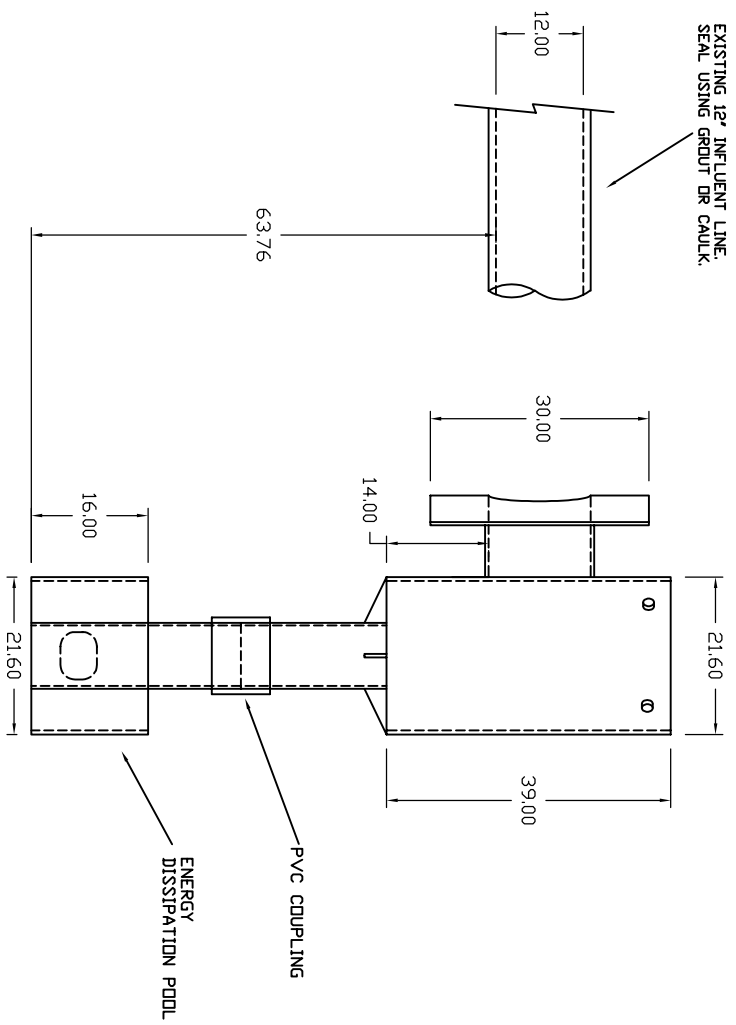


A-1

Any distribution, use or copying of this drawing or the information it contains by other than the intended recipient is unauthorized. All content is property of IPEX Incorporated or its parent and is protected by United States Copyright Laws. The original drawing held by IPEX Incorporated will supersede all other copies.

NAME	MATERIAL	PROPERTIES
VORTEX FORM	20" CIOD PVC PIPE AWWA C905	O.D. 21.6"
VORTEX SHAFT	8" CIOD PVC PIPE AWWA C900	O.D. 9.05"
VORTEX EDP	20" CIOD PVC PIPE AWWA C905	O.D. 21.6"

**GRAVITY DESIGN**



**VORTEX DESIGNED FOR A PEAK FLOW OF: 1.5 MGD**  
(AS SPECIFIED BY OTHERS)

DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED



**VORTEX FLOW INSERT**

DRAWING TITLE  
BROWN AND CALDWELL VA  
VIRGINIA

REV.	DATE	DESCRIPTION
CUSTOMER	BROWN AND CALDWELL	
	KYLE BAKER	

DWG #	VAKK19-1	DATE	12/17/24	DRAWN BY	MDB	SCALE	NTS	SHEET	1/1	REV
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**VORTEX APPROX. DRY WEIGHT: 250 LBS**

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# VORTEX ENGINEER'S ESTIMATE

**IPEX Customer Service Office**

Phone: 888-461-5307  
Fax: 888-461-5309  
Contact: Marc Bower

**Date:** December 20, 2024

Customer: **Brown and Caldwell**  
Contact: Kyle Baker  
Phone: -  
Fax: -

Description: **IPEX Vortex Flow PVC Insert Fitting**  
**US Patents # 6,419,843 & # RE40,407**

Project Name: Brown and Caldwell VA  
Project Location: Virginia

Peak Flow: 1.50 MGD  
Drop Height: 63.76 in  
IPEX Drawing: VAKK19-1

Dated: 12/17/2024

**Estimated Price:** \$37,688.00 USD (freight included)  
(Suggested sell to Contractor)

**Price includes:** The PVC Vortex unit and freight to project location.

**Not included in Price:** Strapping, anchorage and sealant are not included (the cost of these items will need to be added to the cost of the Vortex structure). Large Vortex units may require additional structural support which is not included in this estimate. IPEX will advise if added support is recommended. All supports, strapping, sealant, bolts, hardware are to be specified by a licensed engineer.

**Estimate Valid for Orders Placed By** —————▶ **3/20/2025**

**Delivery:** Estimated delivery is approx. 4-12 weeks after sign-off sheets on critical design information and PO with valid delivery address are received and accepted by IPEX

Regional Manager: Kerry Koressel  
Phone: 812-470-0306  
Email: kerry.koressel@ipexamerica.com

Attachments: - 1 Drawing of Unit, Design Checklist





# Installation Guide

## **Vortex Flow**<sup>TM</sup> ODOR & CORROSION CONTROL

### MUNICIPAL SYSTEMS

- Sewer Drop Structures
- Pumping Stations
- Forcemain Discharge



**IPEX**  
Committed to Excellence



## TABLE OF CONTENTS

<b>DISCLAIMER</b> .....	<b>2</b>
<b>INTRODUCTION</b> .....	<b>3</b>
<b>OVERVIEW</b> .....	<b>3</b>
Description .....	3
Patent Information .....	4
Abbreviations .....	4
Materials .....	4
Parts Description .....	5
<b>PRE-DELIVERY PREPARATION</b> .....	<b>7</b>
<b>RECEIVING AND HANDLING</b>	
<b>VORTEX FLOW INSERTS</b> .....	<b>8</b>
Before Accepting Shipment .....	8
Handling .....	8
Storage at the Job Site .....	8
Extreme Cold Temperatures .....	9
Remove Temporary Lifting Devices .....	9
Prolonged Outdoor Storage .....	9
<b>PRE-INSTALLATION PREPARATION</b> .....	<b>10</b>
Critical Measurements .....	10
Strapping .....	11
Sealant .....	12
<b>INSTALLATION</b> .....	<b>13</b>
Energy Dissipation Pool .....	13
Vortex Drop Shaft .....	14
PVC Coupling .....	14
Vortex Top Form .....	16
Flanged Entrance .....	17



<b>Strapping</b> .....	<b>18</b>
Strapping the Top Form. ....	18
Strapping the Drop Shaft .....	18
Securing the Energy Dissipation Pool .....	19
EDP Provided. ....	19
<b>WARRANTY</b> .....	<b>20</b>

## DISCLAIMER

**Technical data contained in this Installation Guide is furnished without charge and is given at the recipient's sole risk.** Every effort has been made to verify the information contained herein, however, IPEX USA LLC makes no representation about accuracy and is not responsible or liable for use of information contained in this Installation Guide, or for any use for which this guide was not intended. **In no event shall IPEX USA LLC be liable for incidental or consequential damages arising from the use of this Installation Guide or products manufactured by it.** IPEX USA LLC reserves the right to update literature and this guide without notice. To assure accurate and current information, contact IPEX USA LLC.

## RECOMMENDED PRACTICES FOR THE INSTALLATION OF IPEX USA LLC VORTEX FLOW INSERT

### INTRODUCTION

This booklet will answer the needs of contractors looking for general recommendations on how to install the Vortex Flow Insert. Out-of-the-ordinary conditions not covered here should be referred to the Engineer or his inspectors to provide on-site solutions. In such cases IPEX USA LLC advice is always available. Our objective is to encourage the use of methods that lead to a professional installation that will ensure the maximum effectiveness of the Vortex Flow Insert.

The Engineer who designs the Vortex manhole will determine how it should be installed. It is not our intention that the Guide should assume that responsibility. This booklet sets out the preferred methods of installation based on IPEX USA LLC experience. Users can receive additional helpful advice available from IPEX USA LLC upon request.

Customer Service Center at 1-800-463-9572

### VORTEX FLOW INSERT OVERVIEW

#### DESCRIPTION

The Vortex Flow Inserts patented spiral flow design eliminates odorous and corrosive gases in a unique way. It uses the wastewater's own flow energy to suppress the turbulence which releases noxious gases. The spiral flow created in the Vortex Top Form accelerates the flow as it enters the Vortex Drop Shaft. As the sewage spirals down the drop shaft it creates a downdraft which traps airborne gases and forces air into the sewage flow to oxidize odorous gases. The sewage exits the structure with reduced  $H_2S$ , increased dissolved oxygen and less velocity. No moving parts, no electricity, no chemicals and no filter media are needed to address the odorous and corrosive gases that are generated in typical drop structures.

## PATENT INFORMATION

The Vortex Flow Insert designed and manufactured by IPEX USA LLC is covered under U.S. Patents No. 6,419, 843, and RE40,407.

The patent abstract states:

*The invention relates generally to applications whereby it is desirable to introduce or reintroduce gas with liquid flowing through pipes, and/or mix two fluids within a pipe. In particular, this method can be used, but is not so limited, to mix and entrain air and other odorous gas emissions and to reduce hydrogen sulfide corrosion and abrasive wear in waste water conveyance, collection and treatment systems.*

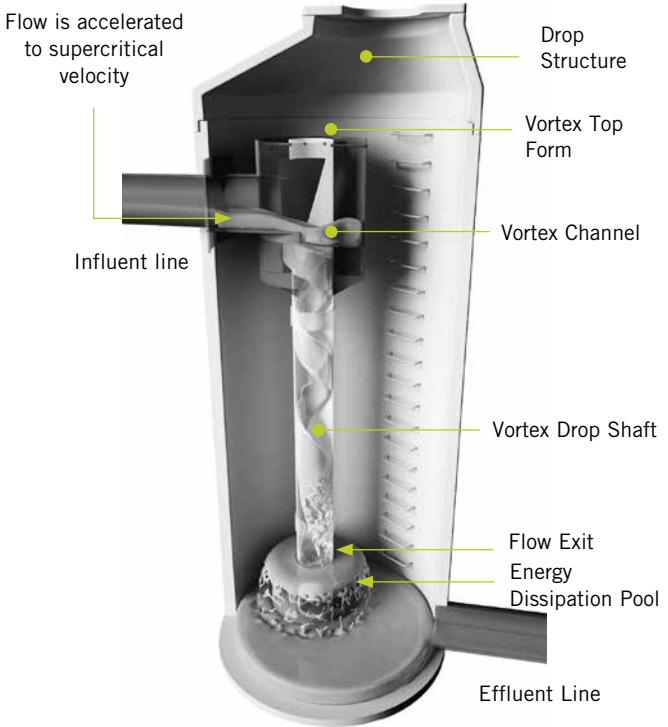
## ABBREVIATIONS

VFI	Vortex Flow Insert
DIF	Design Information Form
EDP	Energy Dissipation Pool
CIOD	Cast Iron Outer Diameter
IPS	Iron Pipe Size
H <sub>2</sub> S	Hydrogen Sulfide
DO	Dissolved Oxygen
CSA	Canadian Standards Association
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association

## MATERIALS

CSA B137.3	Polyvinyl Chloride (PVC) Pipe
AWWA C900-16	Polyvinyl Chloride (PVC) Pipe
ASTM D2241	Polyvinyl Chloride (PVC) Pressure Rated Pipe (SDR Series)
PVC SHEET	Polyvinyl Chloride (PVC) Sheet to be of 1/8" minimum thickness
ROVING	24 oz/sqyd minimum
MAT	1-1/2 oz/sqft minimum
DERAKANE	Grade 470 – 300 minimum

## PARTS DESCRIPTION



### Vortex Top Form

The top portion or headworks of the Vortex Flow Insert. Components of the Top Form include the entrance piece, the deflection plate, the Vortex Channel and the Vortex Top Cut.

### Drop Structure

The structure in which the Vortex Flow Insert will be installed.

### Deflection Plate

The angled plate at the inlet that directs the flow into the Vortex Flow Channel.



**Entrance Piece**

The Entrance Piece is designed to accommodate the inlet pipe. It will be a flanged channel large enough to accept the influent line. See the design engineers specifications to determine how the entrance piece and the inlet line are to be connected.

**Vortex Drop Shaft**

The Vortex Drop Shaft is the vertical pipe in which the sewage spirals down. The shaft may come in more than one piece and will have a slip coupling or flange as a means of assembling the shaft.

**Vortex Channel**

The channel that directs the flow at the Vortex Top Form entrance to the Vortex Top Cut.

**Energy Dissipation Pool**

The Energy Dissipation Pool is where the sewage is mixed and exits the Vortex Flow Insert.

## PRE-DELIVERY PREPARATION

The following items are to be evaluated/designed and supplied by others prior to the installation of the Vortex Flow Insert (IPEX USA LLC recommends using a licensed engineer in the state the Vortex Flow Insert will be installed);

### **Strapping or Anchorage of Vortex Top Form**

The Vortex Top Form (top portion of the Vortex Flow Insert) will need to be secured to the structure.

### **Strapping or Anchorage of Vortex Drop Shaft**

The length of the Vortex Drop Shaft may require additional support and securement to the structure.

### **Sealant**

Sealant or a gasket may be required on the face of the top form flange mating to the structure wall.

### **Support under Larger Vortex Top Forms**

All Vortex Top Forms that have a diameter larger than 57" will require support under the bottom of the Top Form. The supports must be designed assuming the Vortex Top Form is full of sewage.

### **Manhole / Structure Integrity**

It is recommended that the manhole/structure the Vortex Flow Insert will be installed in is verified to have the structural integrity to handle the weight and forces generated by the addition of the Vortex Flow Insert and the appurtenances used to hold it in place.

### **Base/Benching**

Ensure the manhole/structure base is designed to accommodate the Energy Dissipation Pool. It must be flat and large enough for the Energy Dissipation Pool to rest on. Appropriate benching may need to be designed.

### **Bolts and Related Hardware**

The bolts and other related hardware for strapping, supports, flanges, back up rings, restraints, etc... will need to be considered.

### **Weight of Unit**

Ensure the contractor will have appropriate equipment to lift and handle the Vortex Flow Insert upon delivery.

## RECEIVING AND HANDLING VORTEX FLOW INSERTS

### BEFORE ACCEPTING SHIPMENT

Each Vortex Flow Insert is custom fabricated and manufactured according to strict standards. Quality Control inspection of the products before they leave our plants ensures that only the highest quality products are shipped. Damage to the VFI is possible during shipping and must be checked before the shipment is received and signed for by the contractor.

1. The contractor should inspect each VFI prior to being unloaded.
2. Carefully note any sign of damage to the VFI in the form of cracks, chips or other damage.
3. DO NOT THROW AWAY ANY DAMAGED MATERIAL. Mark it carefully for further inspection by the carrier or their representative.
4. Notify the carrier immediately and enter a claim for damaged or missing parts in accordance with their instructions.
5. If there is any damage to the VFI please call IPEX USA LLC and ask for a Vortex Specialist at 1-800-463-9572.

### HANDLING

The VFI should come with specific instructions detailing where to lift the product in order to offload and handle it. If these documents are not present please call IPEX USA LLC and ask to speak with a Vortex Specialist 1-800-463-9572.

### STORAGE AT THE JOB SITE

The preferred method of storage at the job site is in the crates as shipped and away from high traffic areas to ensure the VFI doesn't get broken.

## EXTREME COLD TEMPERATURES

Although PVC has very good impact resistance, it can offer slightly reduced impact resistance at very low temperatures (below freezing). Do not allow the VFI to be exposed to excessive force.

## REMOVE TEMPORARY LIFTING DEVICES

As a convenience, temporary lifting apparatus are commonly shipped on the Vortex to insure correct lifting points and prevent damage to the Vortex. Once the unit is installed, ALL metal lifting bars, lifting eyes and clamp-on restraints are to be removed. Lifting eyebolts in the EDP must be removed before any benching occurs.

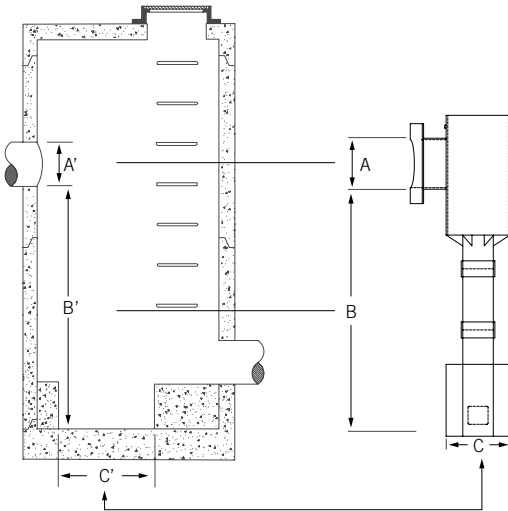
## PROLONGED OUTDOOR STORAGE

Prolonged exposure of the VFI to the direct rays of the sun will not damage the PVC. However some mild discoloration may take place in the form of a milky film on the exposed surfaces. This change in color merely indicates that there has been a harmless chemical transformation at the surface of the PVC. Physical properties such as pipe stiffness and tensile strength are unaffected by surface discoloration. However, a small reduction in impact strength could occur at the discolored surfaces. These are of a very small order and will not affect a proper field installation. IPEX products that are exposed to sunlight will still exceed all of the impact requirements of the standards. Discoloration of the PVC can be avoided by shading them from the direct rays of the sun. This can be accomplished by covering the VFI with an opaque material such as canvas. If the VFI is covered, always allow for the circulation of air through the VFI to avoid heat buildup in hot summer weather. Make sure that the VFI is not stored close to sources of heat such as boilers, steam lines, engine exhaust outlets, etc.

## PRE-INSTALLATION PREPARATION

There are a few things to consider before attempting to install the Vortex Flow Insert. This section will walk you through the pre-installation preparation to ensure you're ready to install the VFI.

### CRITICAL MEASUREMENTS

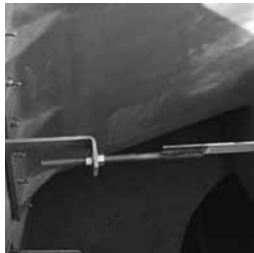
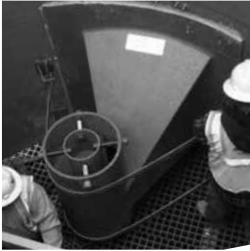


- A → A' Check that the Vortex opening (A) is able to adapt to the structures in-line (A').
- B → B' Verify that the VFI's drop height (B) is such that the in-line and the VFI opening will mate when the Vortex is sitting in its final resting place (B').
- C → C' Verify that the bottom of the structure (C') has a flat level surface large enough for the VFI's Energy Dissipation Pool (C) to rest.

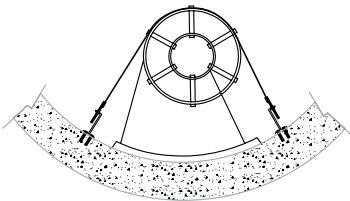
If there are any discrepancies with A → A' or B → B', please call IPEX USA LLC at 1-800-463-9572 and ask to speak with a Vortex Specialist.

**STRAPPING**

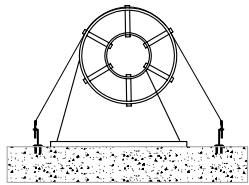
The VFI needs to be secured in place using a stainless steel strapping system. Before attempting to install the unit the straps should be designed and fabricated. Please refer to the design engineers specifications to determine the location and size of the straps required to secure your Vortex in place. Below are examples of some very effective straps used on other installations.



**Typical Strapping Method**

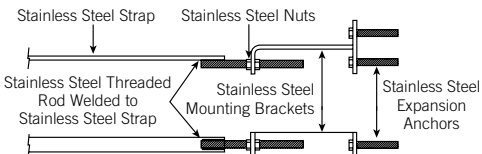


**Curved Wall**



**Flat Wall**

**Strapping Detail**



## SEALANT

There are instances that require some form of sealant placed between the entrance flange and structure wall. The primary function of the sealant is to maximize the amount of sewage that enters the Vortex Flow Insert. This sealant is to be evaluated/designed and supplied by others prior to the installation of the Vortex Flow Insert.

Some examples of sealant used are as follows;

- 3M 605 Urethane Sealant
- Waterplug Caulking by Dolphin Sealants 800-469-1677  
www.dsealants.com
- Hilti C-100 Sealant 800-879-8000 www.us.hilti.com
- 3M Scotch Seal-Chemical Grout 5610 Gel,  
I.D. # 62-5610-8521-8
- Sikaflex 1a – One-Component, Polyurethane.  
800-933-SIKA www.sika.ca
- Quikrete – QUIKRETE® Non-Shrink Precision Grout  
#1585-00
- Butyl Caulk – sample of material used for flange face before securing. (IPEX USA LLC does not specifically endorse or recommend any of the sample sealant products mentioned in this section)

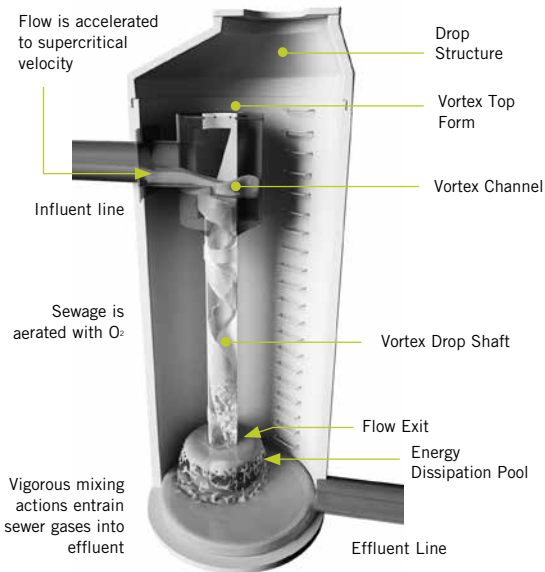


## INSTALLATION

### ENERGY DISSIPATION POOL

The Energy Dissipation Pool is one of the most critical aspects of the Vortex Flow Insert. Therefore, the proper installation of the EDP is crucial. Always keep in mind that the cut-outs in the Vortex Drop Shaft need to be submerged at all times.

#### EDP Provided



#### EDP Provided




The Energy Dissipation Pool is the 'cup' at the bottom of the manhole. The most important detail when installing this EDP is to ensure there is a flat level surface for it to rest on at the bottom of the structure. See the design engineers specifications for benching around the EDP.

## VORTEX DROP SHAFT

Installing the Vortex Drop Shaft is very simple in most cases. Depending on the amount of drop height the shaft can come as one piece or in many pieces. When the shaft comes in more than one piece intermediate connections must be made. These connections will come in the form of a PVC coupling. Below are assembly instructions for these connections.

### PVC COUPLING

A VFI with a coupling connection in the Vortex Drop Shaft is great because the spigot end can be cut to achieve the appropriate height. Here are the step by step procedures for cutting and assembling a PVC coupling connection.

1. Mark various points around the OD of the pipe where it should be cut.
2. Draw a line by connecting the various points preferably with a flexible sleeve or by using any other method available on site.
3. Use a handsaw and mitre box or mechanical saw to cut squarely on the outside of the line about 1/16" to 1/8". A diagonal cut will affect the functionality of the VFI.
 
4. Remove all burrs from both the inside and outside of the pipe with a knife, file or reamer. Burrs can create hang-ups inside the surface walls and affect the VFI's operation.
 
5. Chamfer with grinder to create a 45° taper on the OD of the pipe. The chamfer should be large enough to clear the PVC weld on the inside of the coupling.
6. Remove dirt, grease and moisture; a thorough wipe with a clean dry cloth is usually sufficient.
 

7. Measure the coupling depth and mark an insertion line to make sure the pipe is fully inserted. It is important that there is only a minimal gap between the pieces of drop shaft.
8. Prior to pipe insertion into the coupling, smear a lubricant inside the coupling and on the plain end of the pipe. The lubricant will make pipe joining possible. The lubricant will also allow for easier removal if there is ever a need.

## VORTEX TOP FORM

There are two distinct types of Vortex Top Forms, those that are Self Supporting and those which need to be Supported by other means. Vortex Flow top forms less than 57" in diameter will be self supporting and VFI's larger than 57" will require third party engineered supports under the top form. The need for external supports will be noted on the design drawing.

### Self Supporting



### Supported



### Flanged Entrance

The Vortex top form will typically come with a flanged entrance piece. Holes can be drilled through the flange into the structure wall and bolts inserted for temporary securement until the straps are installed. Bolts alone will not permanently secure top form to the structure.



The installation of a Self Supporting Top Form and a Supported Top Form varies only in the way they are supported and secured. Check the design engineers specifications to see how the Top Form is supposed to be supported and secured.

## FLANGED ENTRANCE

1. The influent pipe should be finished flush to the inside of the structure and properly sealed as per design engineers instructions.
2. If specified by the design engineer apply sealant or caulking on the face of the flange or the structure wall.
3. Now see the design engineers specifications to determine how the Flanged Entrance is to be fastened to the structure.



**NOTE:** If the flanged face is secured to the structure wall with nuts or bolts do not over tighten.

**CAUTION:** The Flanged Entrance piece is not intended to support the weight of the top form. The straps specified by the design engineer are required to secure the top form in place.

4. Again refer to the design engineers specifications to see how the Vortex Top Form is to be secured to the structure.
5. Once the Top Form is in its final resting place, if required, seal the connection between the Flanged Entrance and the influent line using the engineers specified product.



## STRAPPING

### STRAPPING THE TOP FORM

Securing the VFI to the structure is one of the most important steps of the installation. If the unit is not properly secured there are numerous issues that may arise so ensuring this is done properly and following the design engineers specifications is tremendously important. Below is some information for the strapping and the anchors: (The values given are for informational purposes only and it's ultimately the responsibility of the design engineer to ensure the straps and anchors specified will suffice.)

Top Form (inches)	Shaft Diameter (inches)	Min. Strap Area (in <sup>2</sup> )	Anchor Pull-out spec with a FOS of 2.5 (lbf)
60 or less	24	0.0052	500
76	30	0.0084	700
80	36	0.023	1800
96	42	0.0315	2500

- 2" x 1/8" stainless steel strap if ONE single strap is used on the top of the Vortex Top Form – This leads to a FOS on the strap of 10.9;
- 2" x 1/8" stainless steel strap if TWO straps are to be used, one on the top and one on the bottom of the Vortex Top Form – This leads to a FOS on the strap of 21.8.

### STRAPPING THE DROP SHAFT

Depending on how tall the VFI Drop Shaft is there may be a need to secure the shaft as well.

The design engineers specifications should indicate whether the shaft needs to be secured, the type and size of securement and the location.

Common practice is to secure each section of pipe used in the drop shaft in two locations.



## SECURING THE ENERGY DISSIPATION POOL

Securing the EDP will depend on the type of EDP utilized and the specifications of the design engineer. There should be no movement of the EDP when the installation is complete and no potential for movement when the VFI is in operation.

### EDP PROVIDED

If the EDP is supplied by IPEX USA LLC and will be benched into place as indicated in drawing on page 10, then the EDP will not be required to have additional securing.

The design engineer may specify that the EDP be secured to the base of the structure using anchor style bolts. Drilling through the base of the EDP once it is in its final resting place can done. It is recommended to use a large flat washer under the bolt or nut when securing in place. Stainless hardware is recommended.

If straps on the drop shaft are in close proximity to the EDP they may provide the support necessary. Shaft strapping proximity to the EDP is to be specified by the design engineer.

## WARRANTY

All of the Company's Products are guaranteed against defects resulting from faulty workmanship or materials. The Company will replace, free of charge, including shipping charges for the replacement Products, any Products which are found to be defective in workmanship or material, provided that the following conditions are met:

- a. The Company is promptly notified in writing of such defect immediately upon discovery of same, and the defective product is promptly returned to the Company;
- b. The defect is not due, without limitation, to faulty installation, misalignment of Products, vibration, ordinary wear and tear, corrosion, erosion, U.V. degradation, incompatible lubricants, pastes and thread sealants, unusual pressure surges or pulsation, water hammer, temperature shocking, or fouling; and
- c. The Products have not been altered or modified after leaving the company's premises.

The warranty period can be specifically limited for certain Products as stated in writing in the Company's literature.

The Company will not allow claims for labor, materials and/or other expenses required to replace the defective Product, or to repair any damage resulting from the use thereof. The Company disclaims any responsibility for the Purchaser's calculations, product drawings or engineering design specifications. The Company's liability is limited to the purchase price applicable to the product.

It is agreed and understood that the Company's liability in respect to the sale is strictly limited to the replacement of Products as hereinbefore specified and that the Company shall not, in any event, be liable for any damages whether for the loss of use or business interruption or any other claim for incidental, consequential, special or punitive damages. There is no warranty, condition or representation of any nature whatsoever, expressed or implied, by statute or otherwise, except as herein contained, and the Company disclaims any implied warranties of merchantability and/or fitness of its Products for a special purpose.

This literature is published in good faith and is believed to be reliable. However IPEX USA LLC does not represent and/or warrant in any manner the information and suggestions contained in this brochure. Data presented is the result of laboratory tests and field experience. IPEX USA LLC maintains a policy of ongoing product improvement. This may result in modification of features and/or specifications without notice.

## NOTES

## NOTES



## NOTES

# CUSTOMER SERVICE CENTER

U.S. Customers call IPEX USA LLC.

Toll free: (800) 463-9572

[ipexna.com](http://ipexna.com)

## About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the world's largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, ABS, PVCO, PEX, FR-PVDF and PE pipe and fittings (1/4" to 48")
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

Vortex Flow™ is manufactured by IPEX Inc. and distributed in the United States by IPEX USA LLC.

Vortex Flow™ is a trademark of IPEX Branding Inc.

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# DEED OF LEASE AGREEMENT FOR AIRPORT HANGAR

October 14, 2025



# PURPOSE & ACTION

## **Purpose:**

Authorize a lease agreement between the City of Lynchburg and Freedom Aviation for hangars and office space at the Lynchburg Regional Airport.

## **Why:**

The current tenant's lease has expired. In May 2025, the City extended the existing lease through the end of the year and solicited a Request for Proposals to lease the space.

# SPACE TO BE LEASED



Hangar #3

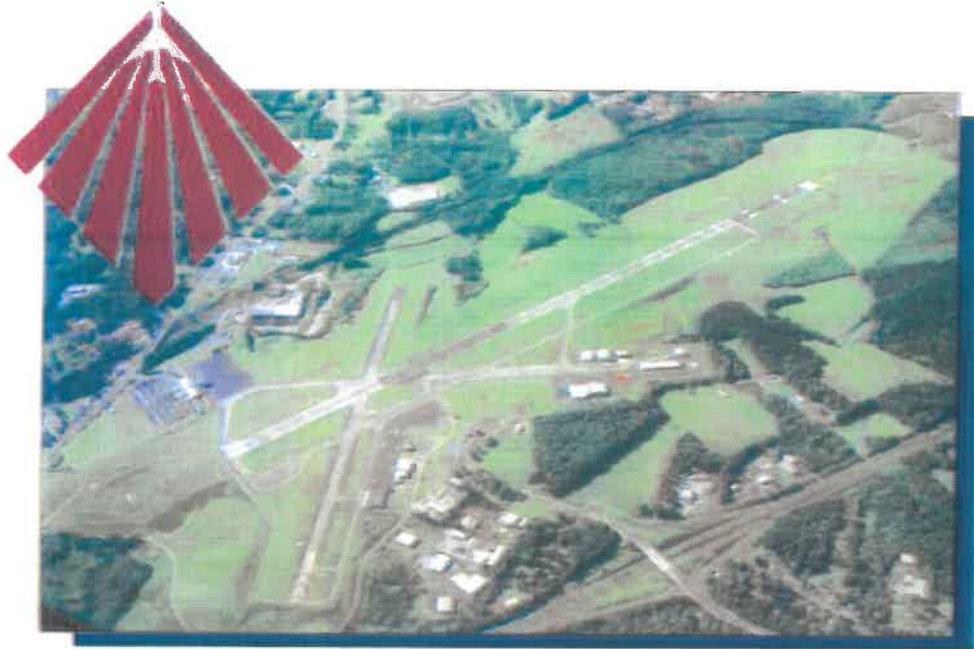
Hangar #1

# SUMMARY

- The City received two proposals; Freedom Aviation, Inc.'s proposal offered a higher monthly rent.
- The initial lease term would be 5 years, starting January 1, 2026, and includes an option to extend for up to 5 additional years.
- The rent would be \$7,000 per month and includes an annual 3% escalation.
- This item will be appear for public hearing on October 14<sup>th</sup>.
- Staff recommends Council adopt a resolution authorizing the lease agreement.



**CITY OF LYNCHBURG, VIRGINIA**  
**Lynchburg Regional Airport**



**LEASE OF PROPERTY**

**Aircraft Storage Hangars and Aeronautical Land Lease**

**By and Between the City of Lynchburg  
and Freedom Aviation, Inc.**

**Dated: October 14, 2025**

**LEASE OF PROPERTY:  
AIRCRAFT STORAGE HANGARS AND AERONAUTICAL LAND LEASE**

**THIS AGREEMENT**, made and entered into on the 14 day of October, 2025, by and between the **CITY OF LYNCHBURG**, a municipal corporation of the Commonwealth of Virginia, (the “City”); and **FREEDOM AVIATION, INC.**, a Virginia Corporation, (the “Lessee”); *and*

**WHEREAS**, the City owns and operates **LYNCHBURG REGIONAL AIRPORT**, hereinafter referred to as the “Airport,” located at 350 Terminal Drive, Campbell County, Virginia; *and*

**WHEREAS**, the Lessee is engaged in the business of providing specialized aviation services at Lynchburg Regional Airport by entering into this Agreement; *and*

**WHEREAS**, nothing in this Agreement shall be construed as granting any exclusive rights for aeronautical activity or the Property at the Airport to the Lessee, nor prevent the City from creating, modifying, and enforcing any “minimum standards” which would be applicable to all firms or individuals providing goods, services or engaging in commercial or non-commercial activity at the Airport, including the Lessee.

**NOW THEREFORE, WITNESSETH:** that for and in consideration of the fees, covenants and mutual promises set forth herein, the City and the Lessee do hereby agree to all of the following:

**ARTICLE I – TERM**

- A. **Term.** The term of this Agreement shall be for a period of five (5) years, beginning on the 1<sup>st</sup> day of January, 2026, and ending on the 31st day of December, 2031.
- B. **Extension of Agreement.** At the end of the initial five (5) year term, the parties have the option of extending this Agreement up to five (5) additional one (1) year terms, upon such terms and conditions as are mutually acceptable and agreed upon by the City and the Lessee in writing. However, such option must be exercised by the City and the Lessee within ninety (90) days of (i) this Agreement’s expiration or (ii) the expiration of the then current one (1) year term, as applicable.

**ARTICLE II - SCOPE OF SERVICES OFFERED BY THE LESSEE**

The primary use of the premises shall be for lawful aeronautical operations, specifically for operating a corporate hangar and conference room. This includes, but is not limited to, a kitchen, bathrooms, a meeting room, a lounge area, and sleeping quarters. The premises are part of the Airport and must be used in a manner consistent with public airport operations and in compliance with all applicable FAA rules and regulations, and airport minimum standards. The Lessee may conduct any lawful activities on the premises, provided they conform to all relevant regulations and requirements. Permitted aeronautical activities include, but are not limited to:

- Fixed base operations and operators
- Air taxi and charter operations
- Aviation education and technical training
- Pilot and flight training
- Aircraft rental
- Aircraft hangar leasing

- Sightseeing and aerial photography
- Crop dusting, aerial advertising, and surveying
- Air carrier operations
- Aircraft sales and services
- Sale of aviation petroleum products
- Aircraft repair and maintenance
- Sale of aircraft parts

These examples are not intended to be exhaustive, but serve as a reference for permitted aviation-related activities. Other lawful aeronautical uses that align with airport operations and regulatory compliance may also be conducted.

**ARTICLE III - AIRPORT PROPERTY TO BE LEASED**

- A. **The Property.** In order that the Lessee can offer the services described in ARTICLE II of this Agreement, the City does hereby let unto the Lessee the following buildings and related office space at the Airport (the dimensions and size are approximate) as shown on **Exhibit I**, attached hereto and incorporated herein this Agreement by reference:
1. An aircraft storage hangar consisting of 10,000 square feet (known as Hangar #1, AP 204), and an adjoining office and reception area consisting of 1,600 square feet; *and*
  2. An aircraft storage hangar consisting of 6,000 square feet (known as Hangar #3, AP 205), and an adjoining office, classroom and reception area consisting of 1,800 square feet.

All of which are collectively identified herein as “the Property.”

- B. **Parking.** The Lessee shall be permitted the non-exclusive use of the public vehicle parking areas that serve the adjacent hangars (#1 and #3) within the areas **Exhibit I**.
- C. **Possession.** The City covenants that the Lessee will have the right of quiet enjoyment and possession of the Property as shown on **Exhibit I** subject to the terms and conditions set forth in this Agreement.
- D. **Additional Uses Authorized.** This Agreement gives the Lessee the right to use the Property. The Property consists solely of the land identified above and on **Exhibit I**, together with the Common Areas listed in Article V (H)(1). The Lessee does not have the authority to use any other Airport premises or facilities without the City’s prior written approval.

**ARTICLE IV - FINANCIAL PROVISIONS**

The Lessee agrees to pay rent for use of the Property and for the privileges granted by this Agreement. All payments shall be made payable to the City of Lynchburg, Virginia, made without notice or demand, and remitted to the City of Lynchburg Attn: Billings and Collections Department PO Box 603, Lynchburg, VA 24502.

- A. **Rent.** Lessee shall pay the City the sum of SEVEN THOUSAND AND 00/100 DOLLARS (\$7,000.00) per month, without notice or demand therefor, on or before the 1st day of each month, throughout the term of this Agreement. Beginning on January 1, 2027, and on the first day of January each year thereafter, the rent shall be increased by three (3%) percent.

- B. **Late Payments.** If any of the fees and rents due under this Agreement shall not be paid within ten (10) days of the due date, the Lessee shall pay the City a five percent (5%) late penalty on the amount of such delinquent payment, which fee shall immediately become due and payable. In addition, the Lessee shall pay the City interest for the total amount(s) due at a rate equal to the prime lending rate as quoted in the Wall Street Journal or the maximum interest rate allowed by law, whichever rate is lower, on the due date for such delinquent payment. Such interest shall begin to accrue on the day following the due date for such delinquent payment and late fee, and all interest shall be calculated on a 365-day year. In the event it becomes necessary for the City to institute legal proceedings to collect any of the rent, fees, penalty, interest, or other amounts payable to the City under this Agreement, the Lessee agrees to pay all reasonable and necessary expenses incurred by the City in such legal proceedings, including reasonable attorney's fees and litigation costs.

#### ARTICLE V – USE AND MAINTENANCE OF THE PREMISES

- A. **Use.** The Lessee may use the Property for and in connection with specialized aviation service operation by which to engage in those activities set forth in Section V (SASOs – General Requirements) and Section VI (SASOs – Required Minimum Standards) of the *Airport Minimum Standards for Aeronautical Services or Activities* for the Lynchburg Regional Airport dated August 10, 2004, and updated on December 6, 2017, and any amendments thereto, and any other resolutions, regulations, or directives issued by the Lynchburg City Council of the City and/or its Airport Director.
1. **Other Uses.** The Lessee may not use the Property for non-aeronautical purposes without the prior written consent of the City's Airport Director or his designee, the FAA, and the Virginia Department of Aviation. Such consent shall not be given if the FAA determines that such non-aeronautical use does not conform to the Airport's ALP and FAA's revenue use provisions. The Lessee may not use the Property for aviation-related activities other than those referenced in ARTICLE II above, unless the Lessee has met the requirements of the Minimum Standards and obtained the prior written consent of the City's Airport Director or his designee.
  2. **Unsafe Activities and Materials.** The Lessee covenants that it shall not introduce into or onto the Property (or any other Airport property), any equipment, materials and/or activity which would be unsafe, detrimental to the public, or which would detrimentally affect the ability of others to utilize Airport facilities. In addition, the Lessee shall give immediate notice to the City in case of fire or accident occurring in or about the Property, and of any damage and/or injury occurring there to any person, property and/or equipment.
  3. **Appearance of Premises.** The Lessee shall keep the Property in neat condition and good order.
  4. **Minimize Impact.** The Lessee shall conduct its operations in an orderly and proper manner so that it will not unreasonably annoy, disturb or interfere with others conducting business or other operations on or near the Airport. The Lessee shall also take all reasonable measures to keep the sound level of its operations as low as reasonably possible, particularly during hours of darkness.
    - a. **Aircraft Engine Run-Ups** – Aircraft maintenance run-ups shall be limited to a pre-determined location on the Airport and specific hours as approved by the Airport Director.
- B. **Sub-leases.** The Lessee may sub-lease suitable portions of the Property to other aeronautical operators or Specialized Aircraft Service Operators (SASOs) consistent with the requirements of the Airport's Minimum Standards, and shall provide a copy of any such sub-lease agreement to the Airport Director.
- C. **Additions and Alterations.** The Lessee shall be permitted, within the term of this Agreement, to make alterations and erect additions and structures upon the Property upon advance written approval by the City. Such alterations, and additions, if of a permanent nature, will become the property of the City. It is understood that while it shall be the right of the City to improve the Property leased hereunder, there shall be no duty or

obligation upon the City to do so under the terms of this Agreement.

- D. **Illumination.** The City shall maintain the suitable lighting around the exterior of the leased office buildings to ensure the safe operation of equipment and passage of persons. Such lighting or illumination shall be installed in such a way as to not interfere with aircraft operations. The City shall be responsible for all aircraft storage hangar, roadway and parking lot lighting in public areas.
- E. **Utilities.** The Lessee shall arrange for all heating, sewer, gas, water, electricity, telephone and/or other utility services which may arise from the Lessee's use of the Property and shall purchase utilities directly from the respective supplier and if required by the City or utility agencies as a condition of said services, the Lessee shall install standard metering devices for the measuring of such services. In the event it shall become necessary to make changes upon the Property, or within the structures covered by this Agreement, such as wiring, plumbing or similar installations, as a condition of the continuance of utility services, and the Lessee desires to continue such services, the Lessee shall promptly make such changes in installations, as directed and required by the utility organizations. It is agreed that the City shall have the right, without cost or compensation to the Lessee, to install and maintain in, on or across the Property, sewer, water, gas, electric, telephone lines, electric substations, street widenings or other installations necessary to the operation of the Airport, or to service the other tenants of the City.
- F. **Snow and Ice.** The Lessee shall promptly remove snow and ice from walkways located on the Property.
- G. **Signs.** Prior to the erection, construction or placing of any identifying signs on the Property, the Lessee shall submit to the Airport Director, for approval in writing, such drawings, sketches, design dimensions and type, number and character of the sign(s) and proposed means of attachment, as is necessary to obtain such approval.
- H. **General Privileges.** The City hereby grants to the Lessee the following general privileges, uses and rights, in common with others, subject to the terms, conditions and covenants set forth herein:
1. **Common Areas.** The Lessee will be permitted the non-exclusive right to use in common with others now or hereafter duly authorized, any and all air navigation facilities which now or have been or may hereafter be provided by the City, the Federal, or the State Governments, for the generality thereof, the landing field, the runways, aprons, taxiways, floodlights, landing lights, signals, beacons, aids to navigation and other conveniences for the flying, landings and takeoffs of the Lessee's aircraft at the Airport.
  2. **Ingress/Egress.** The Lessee shall have reasonable rights of ingress and egress from its Property over Airport roadways, including common use roadways, subject to the Airport's Security Program. The rights of ingress and egress granted herein are granted to the Lessee employees, guests, patrons, invitees, suppliers and other individuals authorized by the Lessee. If requested to do so by the FAA, or for the purpose of construction or any aeronautical purpose, the City shall have the right to establish and/or limit hours in which the Lessee may exercise its rights of ingress and egress, by providing the Lessee with prior written notice of the proposed changes.
- I. **Other Facilities.** It is possible the Lessee and/or the City and/or others will wish to construct hangars or other aviation or non-aviation facilities, or change the use of or lease existing facilities at the Airport, other than those leased to the Lessee under this Article. Nothing in this Agreement shall prevent the City or others from constructing new facilities, or making different uses or changing the uses of or leasing existing facilities, other than those leased to the Lessee under Article III of this Agreement, or from additional contracts being made between the City, the Lessee, or others to construct, operate, or lease such new or existing facilities, including the right to demolish and/or replace existing leased buildings. Separate agreements may also be negotiated between the City, the Lessee, and/or others to construct T-hangars, common hangars or other facilities at the Airport with different terms than this Agreement.

J. **The Lessee's Property.** All property and equipment belonging to the Lessee, located on or about the Property shall be there at the sole risk of the Lessee, and the City shall not be obligated hereunder to carry any insurance on any property or equipment owned by the Lessee, nor liable for any loss, damage or expense with respect thereto, regardless of how such loss or damage shall occur. The City shall not be liable for the theft, misappropriation, or loss thereof, or for any damage or injury thereto regardless of how they occurred.

K. **Maintenance of Premises.**

1. **Condition of Premises.** The Lessee agrees to accept the Property in its current condition, 'as is', 'where is', without warranty, and the Lessee shall be responsible for interior cleaning, and shall cause to be removed all trash and garbage, and agrees not to deposit the same on any part of the Airport except temporarily in conjunction with the collection or removal thereof. The Lessee shall not store large quantities of aviation fuel, oils, deicer or similar substances on the Property.
2. **Maintenance – Aircraft Storage Hangars and Offices (AP 204 and 205).** The Lessee shall be responsible for maintaining and making all non-structural repairs to the leased facilities on the Property, including, but not being limited to, hangar doors, screens, glass, office and hangar lighting, walls, flooring and carpet replacement, plumbing, electrical, and all HVAC, including heating equipment in the aircraft maintenance and storage hangars. The total replacement of entire HVAC, hangar heating, mechanical, electrical, and lighting systems shall be the responsibility of the City upon the determination by a qualified professional vendor acceptable to both the City and the Lessee that any such system has reached the end of its useful life and/or is beyond repair. Further, (i) the Lessee shall repair all damages caused by its agents, employees, guests, and patrons on the Property; (ii) the Lessee shall perform interior painting and any other preventive maintenance needed to maintain the Property in a presentable, safe, and operating condition, or when the City determines it necessary to maintain the Property in a proper condition; and (iii) the Lessee shall perform all regular grounds maintenance around the Property including debris removal, mowing, and maintenance of landscaped areas. The City reserves the right to enter the Property at reasonable times, as determined by the City, to make inspections to ensure the maintenance and upkeep provisions described herein are upheld. Should the Lessee fail to keep the Property in good order and repair as is required to preserve the general appearance and value of the Property, and if such maintenance and repair is not undertaken within ten (10) days of written notice to do the same, then the City shall have the right to enter the Property and perform the necessary maintenance or repairs, and the Lessee shall be responsible for the of the cost of the same. Such costs shall be paid within thirty (30) days of a written demand for the same.
3. **Grounds Maintenance.** The Lessee shall perform all regular grounds maintenance around the Premises including debris removal, mowing and maintenance of landscaped areas, if any.

**ARTICLE VI – RULES, REGULATIONS AND OTHER REQUIREMENTS**

- A. **The City's Rules.** The Lessee shall observe all rules and regulations currently in force, or from time to time promulgated by the City, which in the City's judgment are needed for the general well-being and safety of the Property and the Airport of which they are a part; provided, however, that any such rules and regulations shall be of general application to other similarly situated Airport tenants and users. The rules and regulations may, in the discretion of the City, be modified from time to time.
- B. **The Airport's Minimum Standards.** The Lessee and all other persons over whom the lessee has authority, direction, control, or responsibility including, without limitation, employees, agents, or persons it invites or permits to be on the Premises, shall be subject to and shall comply with all provisions of the *Airport Minimum Standards for Aeronautical Services or Activities* for the Lynchburg Regional Airport dated August 10, 2004, and updated on December 6, 2017, and any amendments thereto, and any other resolutions, regulations, or directives issued by the Lynchburg City Council of the City and/or its Airport Director. The Minimum

Standards are incorporated into this Agreement by reference as if fully set forth herein and are attached as **Exhibit II**. In the event of a conflict between the terms, provisions, and covenants of this Agreement and the Minimum Standards, the terms, provisions, and covenants of this Agreement shall be controlling. In the event of a conflict as to the required scope of services, however, the Minimum Standards shall control.

- C. **Compliance with Airport Assurances.** The Lessee shall conduct its operations and activities under this Agreement in accordance with the obligations of the City to the federal government as well as to the Commonwealth of Virginia under any existing or future grant agreements. The Lessee shall comply with all requirements of the FAA Airport Sponsor Assurances as applicable including, but not limited to:
1. That the Lessee shall furnish all services on a fair, reasonable, and non-discriminatory basis to all users thereof; and,
  2. That the Lessee shall charge fair, reasonable, and non-discriminatory prices for each unit or service, provided that the Lessee may be allowed to make reasonable and non-discriminatory discounts, rebates, or other similar types of price reductions to volume purchasers.
- D. **Licenses and Other Authorizations.** The Lessee shall procure from all government authorities having jurisdiction over its activities and/or operations at the Property and/or the Airport, and shall maintain in effect at all times during the term of this Agreement, all governmental or other licenses, certificates, permits, or other authorizations which are or may be required and/or necessary for the conduct of its operations or any activities at the Airport. The Lessee shall provide proof of the existence of such authorization(s) to the City upon execution of this Agreement. Thereafter, such proof shall be provided upon request, written or oral.
- E. **Rules and Regulations of Others.** In exercising the rights and privileges granted to it herein, the Lessee shall observe, obey and comply with all federal, state and local laws, regulations, ordinances, orders, directives, and other requirements applicable to the Airport and/or the Lessee's operations at the Airport. This requirement shall include, without limitation, the obligation to comply with all applicable FAA, EPA and/or State DEQ regulations, other environmental or hazardous waste laws or regulations, and other orders and directives. The Lessee shall obtain all necessary FAA, EPA and/or DEQ approvals required in connection with its operations and/or any activities on the Premises and/or the Airport. The Lessee shall promptly provide notice to the City of any notice of violation, warning, summons or legal process received by the Lessee in connection with the enforcement of any such laws, regulations, ordinances, orders, directives and other requirements.
- F. **Drug-Free Workplace.** The Lessee acknowledges and certifies that it understands that the following actions by it, its employees and/or agents on Airport property are prohibited: (a) The unlawful manufacture, distribution, dispensing, possession or use of alcohol or any controlled substance(s); and (b) any impairment or incapacitation from the use of alcohol or controlled substances. The use of drugs in connection with legitimate medical purposes may be permitted. The Lessee will comply with the Drug-Free Workplace Act (DFWA) in all relevant respects.
- G. **Discrimination.** The Lessee, for itself, its personal representatives, successors in interest, and assigns, as part of the consideration hereof, does hereby covenant that (a) no person on the grounds of race, color, religion, sex, national origin, or any other basis prohibited by applicable law, shall be unlawfully excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of the Property, and (b) that the Lessee shall use the Property in compliance with all other requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-Assisted Programs of the Department of Transportation - Effectuation of Title VI of the Civil Rights Act of 1964, and as said regulations may be amended, added to, or changed. In addition, the Lessee shall not, on the grounds of race, color, national origin, sex, religion, or any other basis prohibited by applicable law, unlawfully discriminate or permit discrimination against any person or group of persons in any manner prohibited by Part 15 of the Federal Aviation regulations and Title VI of the Civil Rights Act of 1964. The City reserves the right to take such action as the federal government may direct to enforce

this provision. Further, the Lessee shall not engage in any similarly discriminatory treatment of customers, subtenants, or members of the public, including requiring belief in a certain religion or church affiliation for the receipt of services at the Airport, use of facilities at the Airport, or use of the Property. The Lessee, where required, will also adhere to the requirements of the Americans with Disabilities Act of 1990.

- H. **Taxes and/or Charges.** The Lessee shall pay all taxes, fees, and/or charges, if any, with respect to the Property, this Agreement, and/or its operations on the Property.
- I. **Fines.** In the event the City is fined by any local, state, or federal authority for the failure of the Lessee to abide by all applicable rules and regulations in its operations and activities at the Airport, and in particular, should the Lessee violate any rules or regulations pertaining to security on the Property or at the Airport, the Lessee shall be responsible for the payment of all penalties and fines.
- J. **Record Keeping.** The Lessee shall keep accurate records, books, and accounts concerning its sale of aviation fuel, collection of parking and landing fees, and names and addresses of any FAR Part 121 air carriers for billing purposes by the Airport. The Lessee shall further record the number and identification of aircraft using its hangars and/or tie-downs at the Airport.

On or before the 15<sup>th</sup> day of each calendar month, the Lessee shall provide the City with a statement detailing the source and amount of the Lessee's gross receipts from parking and landing fees, the gross gallonage pumped to all users, a breakdown of all fuel sales (such as Avgas and Jet A), and by class of user (such as military, commercial airline, retail general aviation based/transient, and inter-company) during the preceding calendar month.

Upon the written request of the Airport's Director, the Lessee shall allow the City reasonable access to its books, records, files, accounts, other sources and repositories of information, and its facilities, as may be pertinent to parking and landing fees, fueling operations, and any other aeronautical services the Lessee performs at the Airport, in order to allow the City and/or the FAA to investigate and/or determine the Lessee's compliance with this Agreement and/or with any law, rule, order, or regulation pertaining to the Lessee's activities or operations at the Airport. In the event that any information sought by the City is within the exclusive possession of another who fails or refuses to furnish the information, the Lessee shall pursue all available efforts and means to obtain the information, and the Lessee shall provide the City with a written description of the efforts made by it to obtain the information.

At its option, the City may conduct a special audit of the Lessee's books and accounts of parking and landing fees, fueling operations, and any other aeronautical services the Lessee performs at the Airport. If conducted, the audit shall be performed by an Independent Certified Public Accountant selected by the City. The cost of the audit shall be paid by the City.

All such records described in this subsection shall be kept throughout the existence of the Lessee granted by this Agreement and for a period of at least five (5) years thereafter its termination or expiration and shall make the same available to the Airport's Director upon request, written or oral.

- K. **Certificates and/or ratings.** All personnel of the Lessee who are required to hold FAA certificates and/or ratings shall maintain such certificates and ratings in a current status, and the Lessee shall maintain copies of such certificates and/or ratings in files located on Airport property and shall allow the City to inspect such documents upon request.
- L. **Employee Identification.** The Lessee shall require its line employees to wear uniforms (if applicable), and shall require all employees who have City-authorized access to the Security Identification Display Area (AOA Area Number 1) and/or the FAA designated Aircraft Movement Area of the airfield to wear identification badges which conform to the Airport's Security Program. Such uniforms (if applicable) and identification badges are subject to the prior and continuing approval of the City.

M. **Commonwealth of Virginia Annual Based Aircraft Survey.** The Lessee shall be responsible for accurately preparing and submitting to the City, the annual Virginia Department of Aviation Annual Aircraft Survey as required by the Code of Virginia, by reporting all aircraft based on its Property for a period of greater than six (6) months during a specified calendar or applicable fiscal year.

**ARTICLE VII - INDEMNITY AND INSURANCE**

A. **Indemnification.** The Lessee shall indemnify, hold harmless, and defend the City, its agents, officials, and employees from any and all liabilities, damages, expenses, causes of action, suits, claims, penalties, and judgments, including all court costs, legal fees, and other related costs, hereafter "Liabilities", which may accrue against, be charged to, or recovered from or sought to be recovered from the City, its agents, officials, and/or employees, by reason of or on account of (i) damage to the property of the City; (ii) damage to the property of third parties or subtenants; (iii) injury to or death of any person arising from the Lessee's or their subtenants use or occupancy of the Property; (iv) injury to or death of any person arising from the use or occupation of Lessee's or their subtenants aircraft, equipment, or property; (v) the performance (or nonperformance) of any services or actions by the Lessee or their subtenants, their respective agents, employees, and officials on the Property, or (vi) the existence of this Agreement. The Lessee shall afford the City a reasonable opportunity to investigate any claim against the City or the Lessee, its agents, employees, or duly authorized representatives. The Lessee shall not be required to indemnify, hold harmless, or provide a defense for the City in the event the Liabilities were caused by the negligent or willful acts or omissions of the City, its agents, or its employees.

**B. Insurance.**

1. **General Requirements.** In addition to any other insurance coverage required by this Agreement (e.g. insurance to cover the damage or loss of property and/or equipment in or on the Property), the Lessee, at its sole expense, shall obtain and maintain, while the Agreement is in effect, the following insurance coverage:

- a. \$3,000,000 Airport General Liability Insurance for bodily injury and property damage.
- b. \$3,000,000 Automobile Liability combined single limit for AOA/SIDA vehicles that are not licensed for public roads; \$1,000,000 Automobile Liability combined single limit for all other AOA vehicles that are restricted to the General Aviation area only (licensed for operation on public roads).
- c. Worker's Compensation Insurance as required by the Commonwealth of Virginia.
- d. All other insurance required by law.

2. **Casualty Insurance – Aircraft Storage Hangars and Offices.** The Lessee shall cause all buildings, structures and fixtures located in or on the Demised Premises to be insured to the extent of one hundred percent (100%) of the full replacement value thereof, against damage or destruction by fire, windstorm, cyclone, tornado, hail, explosion, riot, civil commotion, aircraft, vehicle and smoke ("Casualty"), as follows:

- a. Aircraft Storage Hangar #1 (AP 204) & Office Space \$893,200
- b. Aircraft Storage Hangar #3 (AP 205) & Office Space \$575,000

The Lessee shall regularly review and update this required coverage. The City assumes no obligation whatsoever to repair or replace any building, structure or fixture in or on the Demised Premises which is destroyed by Casualty.

3. **Required Provisions.** All insurance required by this Agreement shall be obtained in accordance with the following:
  - a. The City, its agents, officials, and employees shall be named as additional insureds under the terms and conditions of the policies covering liability for personal and/or physical injuries (including death) and property damage, and policies covering City-owned buildings, structures, or facilities leased hereunder. Certificates of Insurance illustrating the same shall be provided to the City's Risk Manager.
  - b. Any deductible or self-insured retention applicable to required coverages shall be paid by the Lessee and the City shall not be required to participate therewith.
  - c. Each of the insurance policies and certificates required herein, except for Worker's Compensation Insurance, shall bear the provision that the insurance company agrees that thirty (30) days prior to cancellation of or reduction in the insurance afforded by the policy, written notice shall be provided to the City's Risk Manager.
  - d. The insurance required of the Lessee herein shall be primary, and any insurance or self-insurance maintained by the City shall be in excess of the insurance required of the Lessee and shall not contribute therewith.
  - e. The Lessee's failure to comply with any reporting provisions of the insurance policies shall not affect coverage provided to the City.
  - f. All rights of subrogation are hereby waived by the Lessee in favor of the City, its agents, officials, and employees, and such waiver shall be shown on all certificates of insurance where the City, its agents, officials, and employees are listed as additional insureds.
  - g. All insurance will be obtained by the Lessee from insurance companies authorized by Virginia's State Corporation Commission to do business in Virginia.
4. **Certificates Required.** The Lessee shall provide the City with Certificates of Insurance confirming the required insurance and coverages and the additional insured endorsement, signed by a person authorized by the insurance company to bind the company to the representations contained therein. Certificates of insurance shall be provided to the City's Risk Management Division by the Lessee upon execution of this Agreement, upon each anniversary of the Commencement Date of this Agreement (without demand by the City), and at other times throughout the Term of this Agreement within ten days of a request by the City for confirmation of insurance.
5. **Contents Coverage.** The City will not carry, and will not be obligated to provide, any "contents coverage" insuring the contents of any office or other space within the Premises. The Lessee shall provide such coverage during this Agreement and thereafter, if and for so long as any property of the City is located and/or to be used within the Premises.
6. **Subcontractors.** The subcontractors of the Lessee, which perform their services on Airport property, shall be subject to all of the insurance requirements contained within this Agreement.
7. **Payment of Insurance Premiums.** The failure of the Lessee to maintain all of the insurance coverage required by this Article, or to pay all of the insurance premiums when due and payable, shall be grounds

for the immediate termination of this Agreement, without any prior notice by the City, any contrary provisions contained in ARTICLE XI notwithstanding.

8. **Liability to the City.** The Lessee's liability to the City under this Article shall not be limited to the amounts of the insurance coverage provided herein.
  9. **Modification of Insurance Requirements.** The City reserves the right to review and/or modify the insurance requirements herein prior to any renewal or extension of this Agreement.
- C. **Responsibility for Damage/Destruction.** The Lessee is responsible for any damage or destruction of the Airport's premises and the Property caused by the negligent or willful acts of the Lessee, its employees, agents, customers, patrons, or any persons it permits to be upon the same.
- D. **Other-Loss.** Absent the negligence or willful misconduct of the City, the City shall not be liable for any damage or injury to the Lessee, to any persons, or to any property caused by: fire, explosion, water, gas, electricity, leaks from the roof or any other portion of the Airport's premises, bursting or leaking pipes, plumbing, electrical wiring, or equipment or fixtures of any kind. The Lessee shall obtain insurance covering injury or damage to persons and property resulting from such occurrences.

#### ARTICLE VIII - AIRPORT SECURITY PROGRAM

The Lessee agrees to comply, at all times, with the Airport's Security Program (ASP) and requirements. The ASP is set forth in writing and applicable portions have been provided to the Lessee. The Lessee shall, in conducting its activities and operations in or about the Property and the Airport, be responsible for compliance with the ASP, and shall be liable for and shall pay any Transportation Security Administration (TSA) fine or fee imposed on the City as the result of or in connection with the Lessee's failure to comply with the ASP. In accordance with the Airport Security Program required by TSA Regulations, the Lessee agrees to assume authority and responsibility for pedestrian and vehicular access in and around all the leased property herein and to fully comply with the Airport Security Plan.

#### ARTICLE IX - POTENTIALLY HAZARDOUS SUBSTANCES

- A. The Lessee shall keep the Property free of all environmental, health and safety hazards, and/or nuisances of any kind whatsoever. The Lessee will not make or allow to be made any change in usage, additions, or improvements in, on or to the Property which will result in the presence or release of Hazardous Materials on the Property.
- B. The Lessee shall not install or allow to be installed any underground storage tanks (USTs) on the Property. The property that includes any above-ground storage tanks (ASTs) shall be maintained by the Lessee in compliance with Virginia's AST permit/operating/financial responsibility requirements. The Lessee shall keep all records pertaining to above-ground storage tanks at the Property, and shall provide the City with current copies of all permits obtained with respect to such above-ground storage tanks. On each anniversary of the Commencement Date of this Agreement, the Lessee shall provide the City with copies of all records maintained by the Lessee in connection with Virginia's AST program and requirements.
- C. In its activities at the Airport, the Lessee shall comply with all of the terms and conditions contained in the Stormwater Pollution Prevention Plan (SWP3) for Lynchburg Regional Airport, the terms and conditions of which are incorporated in this Agreement as if fully set forth herein. The Lessee will not be responsible for any capital improvements that may be required in order to comply with the Stormwater Pollution Prevention Plan. In addition, in order to prevent or reduce the discharge of pollutants to stormwater resulting from spills of petroleum products or other materials, the Lessee shall develop and implement a Spill Prevention Control and Countermeasure (SPCC) Plan, if required, in accordance with 40 CFR 112.

- D. The Lessee shall be required to obtain, maintain and comply with all permits, authorizations and registrations required by law for its operations on the Property.
- E. The City reserves the right to enter the Property, at any time, to determine whether the Lessee is complying with the terms and conditions of this Article.
- F. The Lessee shall furnish, within fourteen (14) days of a written request of the City, all report(s), assessment(s), or other document(s) satisfactory to the City showing, to the extent the Property is being used and/or have been used by it for any activities involving, directly or indirectly, the use, generation, treatment, storage, or disposal of any Hazardous Materials, that the Lessee is in compliance with any applicable federal, state, or local laws, regulations, or ordinances.
- G. The Lessee shall immediately furnish to the Airport Director written notice of any and all releases of Hazardous Materials or substances whenever such releases are required to be reported to any federal, state, or local authority. The Lessee shall pay for all clean up and removal costs. Such written notice shall identify the substance released, the amount released, the measures undertaken to clean up and remove the released material and any contaminated soil or water, and shall further certify that no contamination remains. The Lessee shall also provide the Airport Director with copies of any and all reports resulting from tests on Airport property or made to any governmental agency, which relate to the requirements of this Article and Airport property.
- H. The Lessee shall be responsible, at its sole cost, for the prompt and proper collection and disposal of all toxic or Hazardous Materials, as well as for petroleum product wastes such as waste oil. The Lessee shall collect waste oil in containers, with suitable containment to collect leaks and/or spillage, as the Airport Director shall permit, provided that, in no event, shall the Lessee collect waste oil in barrels located on unprotected earth or paved areas.
- I. The City shall have the right, but not the obligation, to enter onto the Premises and to take such actions as it reasonably deems necessary or advisable to clean up, remove, resolve or minimize the impact of, or otherwise deal with, any of the events described above, which, if true, could result in an order, suit or other action against the City affecting any part of the Property or the Airport by any governmental agency or otherwise which, in the sole opinion of the City, could jeopardize the City. All costs and expenses incurred by the City in the exercise of any such right shall be payable by the Lessee within thirty (30) days of a written demand.
- J. Regardless of the City's acquiescence, and in addition to indemnification provisions contained elsewhere in this Agreement, the Lessee shall defend, indemnify, and hold the City, its agents, officials, and employees harmless from all costs, liabilities, fines, or penalties, including attorney's fees, resulting from or arising out of the Lessee's violation of this Article. Further, the Lessee shall reimburse the City, its agents, officials, and employees for any and all costs and expenses incurred in eliminating or remedying such violations. The Lessee shall also reimburse the City, and hold the City, its agents, officials, and employees harmless from any and all costs, expenses, attorney's fees, and all penalties or civil judgments obtained against the City which result from the Lessee's use, release, leakage, spillage, discharge or disposal of any petroleum product, Hazardous Materials, waste, or the like, onto the ground, and into the water, or air, within thirty (30) days of a written demand. The provisions of this subsection shall have no impact whatsoever on the Lessee's indemnification obligations to the City under any other agreement, franchise, or other document existing between the Lessee and the City.

## ARTICLE X - RIGHTS RESERVED BY THE CITY

The City, in addition to any other rights herein retained by it, specifically reserves the following privileges:

- A. The Airport Director, or designee, is hereby designated as the official representative for the enforcement of all terms, provisions, and covenants of this Agreement with the full power to represent the City in its dealings with the Lessee granted hereby with the rights herein described.
- B. Intentionally Omitted.
- C. Except as otherwise previously provided in this Agreement, the City reserves the right to enter upon the Property or any other part of the Airport at any reasonable time, as it may determine, without notice, for the purpose of making any inspection it may deem expedient to the proper enforcement of the covenants, terms, and provisions of this Agreement.
- D. The City reserves the right to enter upon the Property or any other part of the Airport property at any time, without notice, in case of emergency.
- E. The City reserves the right to further develop or improve the Airport's property surrounding the Property for the benefit of the Airport as it sees fit, regardless of the desires or views of the Lessee.
- F. During time of war or national emergency, the City shall have the right to let or license any portion of the Airport to the United States of America or the Commonwealth of Virginia for military or national use if requested to do so. If any such lease or license is executed, the covenants, terms, and provisions of this Agreement, insofar as they are inconsistent with such lease with the United States of America or the Commonwealth of Virginia, shall be suspended, including the Lessee's obligation to pay rent, which will be suspended altogether or reduced proportionally, as appropriate.
- G. This Agreement shall be subordinate to the provisions of any existing or future agreement between the City and the United States of America or the Commonwealth of Virginia, relative to the operation, maintenance or management of the Airport, the execution of which has been, or may be required, as a condition precedent to the expenditure of Federal or State funds for the development of the Airport or the continued operation of the Airport. Should the effect of such agreement with the United States of America or Commonwealth of Virginia be to take the Property under this Agreement or substantially destroy the commercial value of such property, either the City or the Lessee shall have the right to immediately terminate this Agreement without further obligation hereto.
- H. The City reserves to itself, its successors and assigns, for the use and benefit of the public, a right of flight for the passage of aircraft in the airspace above the Property. This public right of flight shall include the right to cause in said airspace any noise or vibration inherent in the operation of any aircraft used for navigation or flight through the said airspace or landing at, taking off from or operation on the Airport.
- I. The City reserves the right to take any action it considers necessary to protect the area of approaches of the Airport against obstruction, together with the right to prevent the Lessee from erecting, or permitting to be erected, any structure on the Property, which, in the opinion of the City, would limit the usefulness of the Airport, or constitute a hazard to aircraft. This right includes:
  - 1. Prohibiting the erection of structures or growth of natural objects that would constitute an obstruction to air navigation; and
  - 2. Prohibiting any activity on the land that would interfere with or be a hazard to the flight of aircraft over the land or to and from the Airport or interfere with air navigation and communication facilities serving the Airport.

- J. The City reserves the right to control all Airport operations. This right shall include, without necessarily being limited to, the following: the right to close any of the Airport's facilities, without any liability to the Lessee for the consequences of any closing, when it deems such closing to be reasonably necessary for the maintenance, repair or development of any of the Airport's property or facilities and/or for the safety of the general public. This right shall also include the right to reserve adequate apron area for the landing, unloading and parking of aircraft at the Airport. The City reserves the right to make all Airport facilities developed with Federal aid, and all Airport facilities usable for the landing and taking-off of aircraft, available to the United States of America and the Commonwealth of Virginia at all times, without charge, for use by military aircraft; except that if use by military aircraft will be substantial, the City may charge the United States of America and the Commonwealth of Virginia a reasonable amount, proportionate to the use, to recover the costs of operating and maintaining the facilities to be used. The amount of use to be considered substantial, and the charges, if any, to be made therefor, shall be determined solely by and between the City and the United States of America and/or the Commonwealth of Virginia; however, the City shall consult with the Lessee and consider the Lessee's recommendations in that regard. The City's right to control Airport operations does not give the City the right to unilaterally modify the terms of this Agreement.
- K. All privileges and rights to the use of the Airport, other than those specifically authorized within this Agreement, are hereby reserved to the City.
- L. Except as otherwise provided in this Agreement, no exercise of any rights reserved to the City shall be construed as an eviction of the Lessee, nor such exercise be grounds for any abatement of any payment provided for by this Agreement, nor shall such exercise be grounds for any claim or demand for damages, of any nature whatsoever.

#### **ARTICLE XI - DEFAULT AND TERMINATION**

- A. **Termination by City.** Except as otherwise provided for in this Agreement, the City may terminate the lease granted by this Agreement, without forfeiture, waiver, or release of the City's right to any sum of money due or to become due under the provisions of this Agreement, by giving the Lessee ninety (90) days advance written notice, except as provided for in subsection (9) below, to be served and hereinafter provided, upon or after the happening of any one of the following events:
  1. The filing by the Lessee of a voluntary petition in bankruptcy;
  2. The institution of bankruptcy proceedings against the Lessee and the adjudication of the Lessee as a bankrupt corporation pursuant to such proceedings, which is not dismissed within thirty (30) days from the commencement thereof;
  3. The taking by a court of competent jurisdiction of the Lessee and its assets pursuant to proceedings brought under the provisions of any Federal reorganization act;
  4. The appointment of a Receiver of the Lessee's assets;
  5. The divestiture of the Lessee's estate herein by other operation of law;
  6. The voluntary abandonment of the Lessee of its business at the Airport for a period of ten (10) days;
  7. The default by the Lessee in the performance or the nonperformance of any covenant or agreement herein required to be performed (other than the Lessee's payment of rentals, fees or other charges), or required not to be performed by the Lessee, and the failure of the Lessee to remedy such default for a period of thirty (30) days after receipt from the City of written notice to remedy the same; provided, however, that no notice of termination as above provided shall be of any force or effect if

the Lessee shall have remedied the default prior to the receipt, in accordance with the provisions of this Article;

8. Any assignment made for benefit of Lessee's creditors or any assignment by operation of law of the Lessee's interests in this Agreement; *or*
9. In the event the Lessee fails to pay all or any part of the rentals, fees or other charges provided for in this Agreement when due and payable, the City shall give the Lessee written notice of such default. The failure of the Lessee to pay all of said rentals, fees or other charges provided for in this Agreement in full, within thirty (30) days after receipt of such written notice, shall be grounds for the immediate termination of the Agreement. At the end of the thirty (30) day period, the City may immediately declare the Agreement terminated without further notice to the Lessee.

No waiver of default by the City of the terms, covenants, or provisions hereof to be performed, kept, and observed by the Lessee shall be construed to be or act as a waiver of any subsequent default of any of the terms, covenants, and provisions herein contained to be performed, kept, and observed by the Lessee. The acceptance of monthly fees or the performance of all or any part of this Agreement by the City for or during any period or periods after default of any of the terms, covenants, and provisions herein contained to be performed, kept, and observed by the Lessee, shall not be deemed a waiver of any right on the part of the City to terminate the lease granted by this Agreement for the subsequent failure to so perform, keep, or observe any of the terms, covenants, or provisions hereof to be performed, kept, and observed by the Lessee.

If this Agreement is terminated on grounds of a default, and the Lessee does not surrender the Property as required herein, the City may re-possess the Property and remove the Lessee therefrom. Under such circumstances, the Lessee shall be deemed to have waived any right to notice of the City's re-possession, the City shall not be liable to the Lessee in connection with any action taken by it to re-possess the Property, and the Lessee shall pay all expenses incurred by the City to re-possess the Property including, without limitation, reasonable attorneys' fees and litigation costs, putting the Property back in good and proper repair, protecting the Property, and any expenses incurred to obtain a new tenant, etc.

**B. Termination by the Lessee.** The Lessee may terminate this Agreement and terminate all of its obligations hereunder at any time that the Lessee is not in default in the payment of any fees or charge to City hereunder by giving City ninety (90) days advance written notice to be served as hereunder provided, upon or after the happening of any one of the following events:

1. The failure or refusal of the FAA at any time during the term of this Agreement to permit the Lessee to operate into or from the Airport with any type of aircraft licensed to operate into or from other airports of like size and character; provided, however, that such failure or refusal is not due to any fault of the Lessee;
2. The issuance by any court of competent jurisdiction of any injunction in any way preventing or restraining the use of the Airport or any part thereof so as to substantially affect the Lessee's use of the Property at the Airport, and the remaining in force of such injunction for a period of at least ninety (90) days; provided, however, that the issuance of such injunction is not due to any fault of the Lessee;
3. The inability of the Lessee to use the Airport for a period in excess of sixty (60) days, because of the issuance of any order, rule or regulation by the FAA, or other competent governmental authorities, preventing the Lessee from operating into and/or from the Airport; provided, however that such inability or such order, rule or regulation is not due to any fault of the Lessee;
4. The default by the City in the performance or nonperformance of any covenant and agreement herein required to be performed by the City and the failure of the City to remedy such default for a period of thirty (30) days after receipt of the Lessee or written notice to remedy the same; provided, however, that

no notice of termination, as above provided, shall be of any force or effect if the City shall have remedied the default prior to receipt of the Lessee's notice of termination; or

5. The assumption or taking by the United States Government, the Commonwealth of Virginia, or any agency thereof, of the operation, control or use of the Airport and facilities, or any substantial part or parts thereof, in any manner as to substantially restrict the Lessee, for a period of at least ninety (90) days from operating an air transportation system; provided, however, that such assumption is not due to any fault of the Lessee.

The Lessee's waiver of default of the City's performance of all or any part of any terms, covenants and conditions herein contained to be performed, kept and observed by City, shall not be deemed a waiver of any right on the part of the Lessee to terminate this Agreement for a subsequent failure by City to so perform, keep or observe any of the terms, covenants or conditions hereof to be performed, kept and observed.

In the event termination by either party under this article, then such termination shall be done in good faith and for a/the legitimate reason(s) provided herein.

#### **ARTICLE XII - ASSIGNMENT OR TRANSFER OF AGREEMENT**

The Lessee shall not at any time assign, sell, or transfer this Agreement or any part thereof without prior written City approval, which shall not be unreasonably withheld. Under no circumstances shall the Lessee be relieved of any of its obligations hereunder by any such transfer or assignment, and any attempt to perform such transfer or assignment shall permit the City to unilaterally terminate this Agreement with written notice to the Lessee.

The above provisions of this article are not intended to prohibit the Lessee from entering into a sublease to provide aeronautical services required under, or consistent with the requirements set forth in the Airport's minimum standards. Any such consent shall require that the assignee to be financially able, as determined under the Airport's minimum standards, to assume said agreement and provided the assignee shall use the said property for the purposes set forth in this Agreement only. No assignment or sublease shall in any way affect or diminish the Lessee's obligations to perform all of the terms, conditions and provisions contained in this Agreement unless released in writing by the City. All such agreements shall be approved in writing by the City. Any aeronautical service(s) offered to the public by a subtenant, whether that service is authorized in this Agreement or not, must follow the applicable procedures as contained in the Airport's minimum standards for approval by the Airport Director prior to engaging in business activities.

In the event of a dispute between any future parties to this Agreement during its term which results in one of the future parties being unable or unwilling to utilize the Property in a mutually agreeable shared manner, this Agreement shall automatically terminate upon written notice from the City, and control of the Property shall automatically revert to the City without any further action being required.

In the event the City and/or any of the surrounding localities establish an Airport Authority for the operation of the Lynchburg Regional Airport, the City shall have the unilateral right to transfer or assign any or all of this Agreement to such Airport Authority. Further, such authority shall have the right to assume all of the City's responsibilities thereunder.

#### **ARTICLE XIII - SURRENDER OF POSSESSION**

Upon the expiration or termination of this Agreement, the Lessee's authority to use the Property and any rights described herein to the Airport shall immediately cease. The Lessee shall, upon such expiration or termination, promptly surrender the same to the City, in good condition, excepting ordinary wear and tear. With the exception of personal property and equipment belonging to the Lessee, the Property, all structures, buildings, facilities, utilities, and the like at the Airport shall remain the exclusive property of the City.

Except as otherwise provided in this Agreement, all equipment and personal property brought in, installed, or placed by the Lessee in, on, or about the Airport while this Agreement is in effect shall be deemed to be personal and remain the property of the Lessee. The Lessee shall have the right, at any time while this Agreement is in effect and for a period of sixty (60) days after the expiration or termination of the same, to remove any or all of its equipment and/or personal property from the Airport's premises. Lessee shall repair all damage, if any, resulting from such removal, and make reasonable restoration of the Airport's premises to the condition which existed prior to the Lessee's use of the Property and the Airport. Any and all equipment or personal property of the Lessee that is not removed by the Lessee within sixty (60) days subsequent to the expiration or termination of this Agreement shall, thereupon, become the property of the City with all other facilities located on the Airport's premises. The City may remove and/or dispose of such items without any liability. Removal by the City shall not relieve the Lessee from its obligation to pay the cost of repairing damage to the Property and the premises of the Airport caused by the removal, or from its obligation to pay the cost of restoring the Property and the Airport's premises to their pre-occupancy condition, ordinary wear and tear excepted. Any such costs will be paid to the City within thirty (30) days of a written demand.

#### **ARTICLE XIV – NOTICES**

Notices or demands provided to the Lessee under this Agreement shall be sufficient if sent by Certified Mail and addressed to the President of the Lessee or to such other representative or addressees as the Lessee may designate to the City in writing from time to time. As of the execution of this Agreement, the Lessee shall be notified at:

**Freedom Aviation, Inc.  
Attn: President  
310 Hangar Road  
Lynchburg, VA 24502**

**With a Copy to: Freedom Aviation, Inc.  
Attn: General Counsel  
Liberty University  
1971 University Boulevard  
Lynchburg, VA 24515**

Such notice or demand shall be deemed to have been given or made once sent by Certified Mail.

Notices or demands provided to the City under this Agreement shall be sufficient if sent by Certified Mail, postage prepaid, addressed to the Airport Director, and sent to:

**Lynchburg Regional Airport  
Attn: Airport Director  
350 Terminal Drive, Ste. 100  
Lynchburg, Virginia 24502**

Such notice or demand shall be deemed to have been given or made once sent by Certified Mail.

#### **ARTICLE XV- GENERAL PROVISIONS**

- A. **Height Restrictions.** The Lessee, for itself and its successors and permitted assigns, shall restrict the height of any structures, objects, or natural growth and other obstructions on the Property and the Airport to such a height that complies with Federal Aviation Regulations, Part 77.
- B. **Interference with Airport Activities.** The Lessee, for itself and its successors and permitted assigns, shall prevent any use of the Property or the Airport's premises that would interfere with or adversely affect the operation or maintenance of the Airport, or otherwise constitute a hazard, as determined by the City and/or the Federal Aviation Administration.
- C. **FAA.** Whenever the terms "Federal Aviation Administration" or "FAA" are used in this Agreement, they shall be construed as referring not only to the Federal Aviation Administration, but also to such other

appropriate government agencies which may be the successor or successors thereof.

- D. **Repairs to Airport.** Major airfield repairs or rebuilding may take place while this Agreement is in effect, and the Lessee accepts this Agreement subject to any inconvenience or loss of use of the Property, the Airport, or any part thereof which may become necessary because of said airfield repairs, rebuilding, construction, or expansion.
- E. **Headings.** Marginal headings contained in this Agreement are for convenience only and shall not be considered to amplify, relate, modify, or otherwise affect any of the terms, provisions or conditions of this Agreement.
- F. **Severability.** If any provision of this Agreement shall be construed to be invalid or unenforceable by a court of competent jurisdiction, then such provision shall be stricken and/or reformed as necessary by the City and the Lessee, and the remaining portions of this Agreement shall remain in full force and effect.
- G. **Governing Law and Jurisdiction.** This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia, and any legal proceedings shall be filed in the courts of the City of Lynchburg, Virginia and in no other forum.
- H. **Snow Removal.** It is expressly understood that there shall be no duty upon the City under this Agreement to remove snow or ice from the Property, except to the extent such snow removal is contained in the Airport's Snow Removal Plan (Common Areas).
- I. **Loss of Revenue.** The City shall not be liable for any loss of revenue to the Lessee resulting from City's actions or inactions concerning the maintenance and operation of the Airport, the Property, or the Airport facilities.
- J. **Entire Agreement.** All terms and conditions with respect to this Agreement are expressly contained herein, and both the Lessee agrees that no representative or agent of City or the Lessee has made any representation or promise with respect to this Agreement not expressly contained herein.
- K. **Government Approval.** It is understood that this Agreement is made subject to its approval by the FAA and the Virginia Department of Aviation and the City Council of the City of Lynchburg, if any such approval is needed.
- L. **Reservation of Rights.** It is distinctively understood that all privileges and uses at said Airport, except to the extent herein permitted to the Lessee, are expressly reserved by the City to grant or use in its discretion as the City, in its sole discretion, may deem advisable.
- M. **No Exclusive Rights.** Nothing contained in this Agreement shall be construed as granting or authorizing the granting of any exclusive right within the meaning of Section 308(a) of the Federal Aviation Act.
- N. **Governmental Agency Agreements.** The Lessee acknowledges that the City has entered into various agreements with the United States of America and the Commonwealth of Virginia with respect to the Airport. The City represents that it intends, from time-to-time hereafter, to enter into additional agreements with the same with respect to applications for funds for improvements to be made at said Airport, in accordance with pertinent statutes, rules, and regulations of respective and duly constituted competent governmental authorities having jurisdiction thereof. This Agreement is expressly made subject to all of those said agreements now existing or hereafter made.

- O. **Business Organization.** Upon execution of this Agreement, the Lessee shall provide to the City (if it has not already done so) documents confirming its corporate status and its authorization to conduct business in the Commonwealth of Virginia. The Lessee shall notify the City immediately of any change(s) in its organizational and/or corporate status, and shall notify the City immediately upon receipt of information that its authorization to conduct business in Virginia is or will be revoked.
- P. **Remedies not exclusive.** All rights and remedies described in this Agreement shall be deemed cumulative and additional to all other rights and/or remedies available at law or in equity.
- Q. **Binding Effect.** The terms, provisions and conditions of this Agreement shall bind and inure to the benefit of the respective parties hereto and to their representatives, successors, and permitted assigns.
- R. **Modification.** This Agreement may be modified by the City and the Lessee during its existence, but no modification shall be valid or enforceable unless made in writing and signed by both of the aforesaid entities. The Lynchburg City Council need not approve such modifications.
- S. **Independent Entities.** Nothing contained in this Agreement shall be construed as or deemed to make either the City or the Lessee the agent, partner, or joint venture of the other, except as may otherwise be provided in this Agreement. Unless otherwise provided in this Agreement, nothing contained in this Agreement shall give the Lessee any authority to represent the City before any court or governmental or regulatory agency without the express prior written authorization of the City. Neither the City nor the Lessee shall be responsible or held liable for the acts or omissions of the other. Further, in performing any services or engaging in any actions pursuant to this Agreement, the Lessee is and shall be acting as an independent contractor, responsible to all parties for its acts and omissions, and the City shall not be liable for the same.
- T. **Obligation to Amend.** In the event that the Federal Aviation Administration, or its successor, requires modifications or changes in this Agreement as a condition precedent to the granting of funds for the improvement of the Airport, or otherwise, the Lessee herein agrees to consent to such amendments, modifications, revisions, supplements, or deletions of any of the terms, provisions, and covenants of this Agreement as may be reasonably required; provided, however, that if such modifications or changes substantially change or adversely affect the financial condition of the Lessee hereunder, the Lessee shall have the option, upon sixty (60) days written notice to the City, to terminate this Agreement.
- U. **Notice of Violation of Federal Assurances.** In the event the FAA advises the City that letting the Property to the Lessee violates the assurances the City has given to the FAA not to grant exclusive rights at the Airport or in some other manner, the City shall have the right to terminate or modify this Agreement.
- V. **Third-Parties.** Nothing in this Agreement shall be deemed to create any rights to those who are not expressly made a party to this Agreement. The parties to this Agreement are the City and the Lessee.
- W. **Counterparts and signatures.** This Agreement may be executed in counterparts. Each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one Agreement. Further, this Agreement may be executed and/or sealed electronically. An electronic signature and/or seal shall be equally as enforceable as an original signature or seal.
- X. **Bond / Good and Sufficient Security.** Where requested by the City, the Lessee shall execute a surety or other bond for the benefit of the City, in an amount not to exceed \$1,000,000, to provide the City with good and sufficient security that the Team will adhere to its obligations and duties under this Agreement.
- Y. **City Council Approval.** It is understood that this Agreement is conditioned upon the approval of the Lynchburg City Council after a public hearing has been duly advertised and held pursuant to the requirements of § 15.2-1800, Code of Virginia, 1950, as amended.

**IN WITNESS WHEREOF**, the parties hereto, or authorized agents on their behalf, do hereby execute this Agreement as of the date first above written.

**CITY OF LYNCHBURG**

By: [ \_\_\_\_\_ ]  
Wynter C. Benda  
City Manager

(SEAL)

ATTEST: [ \_\_\_\_\_ ]  
Alicia Finney  
Clerk of Council

Approved as to Form:

\_\_\_\_\_  
City Attorney/Designee

**FREEDOM AVIATION, INC.**

By: [ \_\_\_\_\_ ]  
Printed Name: \_\_\_\_\_  
Title: \_\_\_\_\_

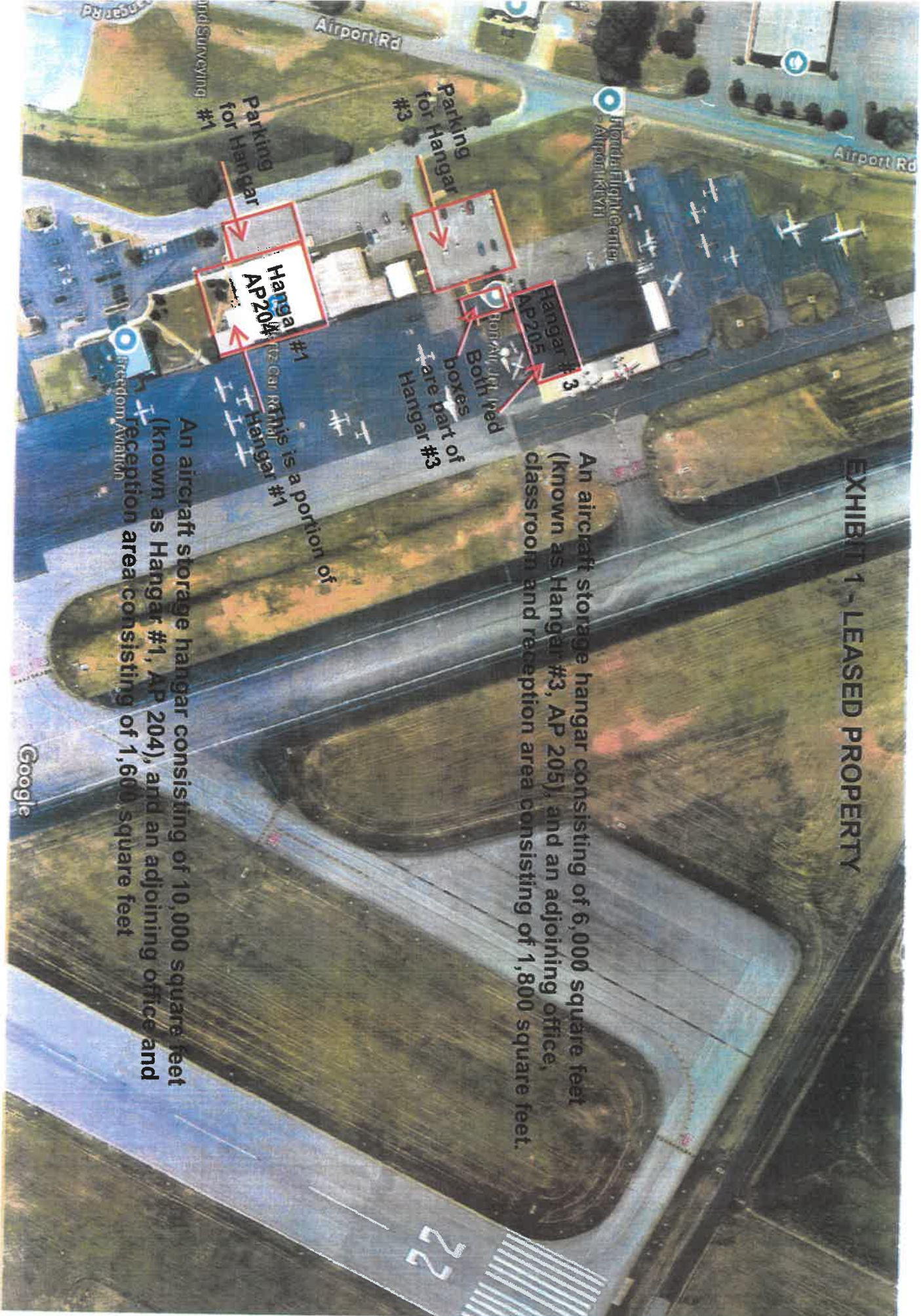
(SEAL)

ATTEST: [ \_\_\_\_\_ ]  
Printed Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**EXHIBIT 1 - LEASED PROPERTY**

An aircraft storage hangar consisting of 6,000 square feet (known as Hangar #3, AP 205), and an adjoining office, classroom and reception area consisting of 1,800 square feet.

An aircraft storage hangar consisting of 10,000 square feet (known as Hangar #1, AP 204), and an adjoining office and reception area consisting of 1,600 square feet



**EXHIBIT II**  
**Airport Minimum Standards**

**<https://flylyh.com/wp-content/uploads/2024/02/LYH.Min-Stnds.-Dec-6-2017-FINAL-As-Approved-7-18-PDF.pdf>**

## AGENDA ITEM SUMMARY

### MEETING DATE

October 14, 2025

### PRESENTED BY

William Martin, Community Development  
Director

### AGENDA ITEM # III.6

Naming of a Private Street as Waters Edge Circle

### RECOMMENDATION

*This item will appear for City Council vote on the October 28, 2025, general business agenda. Approval of the naming of a private street as Waters Edge Circle.*

### SUMMARY

Virginia Baptist Homes, Inc. is petitioning to name a private street as Waters Edge Circle. The Summit retirement home is constructing a new street to serve nine (9) new hybrid homes. Access for the street will be off of Grand Summit Drive, an existing private street.

### PRIOR ACTION(S)

September 24, 2025: The Planning Commission recommended approval (5-0, with 2 absent: Woodson, Young-Jefferson) of the street name.

September 3, 2025: The Technical Review Committee (TRC) recommended approval of the street name.

### FISCAL IMPACT

N/A

### CONTACT(S)

Eve Mergenthaler, Senior Planner  
William Martin, Community Development Director

### ATTACHMENT(S)

1. Resolution
2. Presentation Slides
3. Planning Commission Minutes, Report, and Attachments

### REVIEWED BY



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William Martin, Community Development Director

Date: September 25, 2025



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Kent White, Assistant City Manager

Date: October 03, 2025



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Alicia Finney, Clerk of Council

Date: October 07, 2025

RESOLUTION:

#R-25-\_\_\_\_\_

A RESOLUTION APPROVING THE NAMING OF A PRIVATE STREET LOCATED ON 1700 ENTERPRISE DRIVE AND ACCESSED FROM GRAND SUMMIT DRIVE.

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF LYNCHBURG that the name of a new private street located on 1700 Enterprise Drive and accessed from Grand Summit Drive shall be known as Waters Edge Circle.

Adopted:

Certified: \_\_\_\_\_  
Clerk of Council

# WATERS EDGE CIRCLE STREET NAMING

Tuesday, October 14, 2025



# PURPOSE & ACTION

## **Purpose:**

Petition of Virginia Baptist Homes, Inc. to name a private street as Waters Edge Circle.

## **Recommendation:**

The Planning Commission recommended approval (5-0, with 2 absent) of the street name.

## **Action:**

This item will appear for City Council vote on the October 28, 2025 general business agenda.



- UTILITY NOTES:**
1. SEE SHEETS C-100, C-101, C-102 FOR CALLOUTS ON PUBLIC UTILITIES.
  2. SEE SHEET C-200 FOR PUBLIC SANITARY SEWER RELOCATION AND NEW PUBLIC SANITARY SEWER EASEMENT.
  3. ALL OTHER PROPOSED WATER, SANITARY SEWER, AND STORM SEWER UTILITIES ARE PRIVATE.
  4. ON-SITE UTILITY DISTRIBUTION AND SERVICE LINES SHALL BE INSTALLED UNDERGROUND.
  5. ALL FIRE HYDRANTS ARE PRIVATE UNLESS LABELED AS PUBLIC.

DEPRESS SIDEWALK TO PAVEMENT ELEVATION FROM ACCESSIBLE TO ACCESSIBLE AISLE FOR ACCESSIBLE RAMP. (TYPICAL OF ALL LOCATIONS)

ABANDON ALL EXISTING WATER SERVICES (DOMESTIC, FIRE, IRRIGATION) TO 1320 ENTERPRISE DRIVE FROM SHARED WATERLINE CONNECTION. PLUG, CAP, RESTRAIN, AND INSTALL ANCHOR BLOCK.

PROPOSED 6" CUT-IN-TEE AND 6" WATERLINE TO REPLACE EXISTING SERVICE CONNECTION

TIE EXISTING 6" FIRE AND 3" DOMESTIC LINES INTO NEW 6" WATERLINE. COORDINATE CONNECTION WITH THE SUMMIT ADMINISTRATIVE STAFF FOR ANY SERVICE OUTAGES.



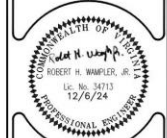
**ENGINEERING CONCEPTS, INC.**  
 84 GREENFIELD STREET  
 DALEVILLE, VIRGINIA 24083  
 540.473.1253



NAD83 (2011)  
 VIRGINIA SOUTH ZONE  
 GRID NORTH

No.	Description	Date
1	CITY COMMENTS	10/02/24
2	CITY COMMENTS	12/02/24

**SUMMIT BC-HH-MS  
 LYNCHBURG, VA**  
 SITE DIMENSIONAL PLAN



0 40 80  
 GRAPHIC SCALE  
 PROJECT: 24047  
**C-131**

This document, together with the contracts and design professional's seal, is intended only for the specific purpose and shall not be used for any other purpose without the written authorization and signature of the design professional.



Nea map

**MINUTES OF THE SEPTEMBER 24, 2025 PLANNING COMMISSION MEETING (MINUTES HAVE NOT BEEN APPROVED):**

**Consideration of naming a new private road at 1700 Enterprise Drive as Waters Edge Circle.**

Ms. Eve Mergenthaler, Senior Planner, provided the following summary to the Commission. Virginia Baptist Homes, Inc., is petitioning to name a new street as Waters Edge Circle. The Summit retirement community is constructing the street to serve nine (9) new hybrid homes. The new street will be private and will be accessed off of Grand Summit Drive, an existing private street. The Technical Review Committee (TRC) reviewed the petition on September 3, 2025, and had no comments of concern. The name is brought before the Planning Commission for a vote because it is not within a subdivision.

Chair Rogers asked what a "hybrid home" was.

Ms. Mergenthaler replied that individuals live there independently, but also have people coming in to help care for them.

Chair Rogers commented that there has been a lot of construction in that area.

Commissioner Gammon made the following motion, seconded by Commissioner Cox, and approved by the following vote:

**"Based on the preceding Findings of Fact, the Planning Commission recommends to City Council approval of the petition of Virginia Baptist Homes, Inc., to name a new private road as Waters Edge Circle."**

AYES: Cox, Gammon, Henderson, Perault, Rogers	5
NOES:	0
ABSTENTIONS:	0
ABSENT: Woodson, Young-Jefferson	2

**The Department of Community Development**  
**City Hall, Lynchburg, VA 24504** **434-455-3900**

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**To:** Planning Commission  
**From:** Planning Division  
**Date:** September 24, 2025  
**Re:** Naming of Waters Edge Circle

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**I. PETITIONER**

Virginia Baptist Homes, Inc., 3961 Stillman Parkway, Glen Allen, VA 23060

**Property Owner:**

Same as petitioner

**Representative:**

Bobby Wampler, PE, Engineering Concepts, Inc., 94 Greenfield Street, Daleville, VA 24803

**II. PURPOSE**

The Summit retirement community is constructing a new road to serve nine (9) new hybrid homes. Access will be off of Grand Summit Drive, an existing private street. The purpose is to name this as a private street and allow addressing of the new homes. It is brought before the Planning Commission for a vote because it is not within a subdivision.

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**Technical Review Committee.** The Technical Review Committee (TRC) reviewed the petition on September 3, 2025. All reviews were approved.

**III. ATTACHMENTS**

- 1. Exhibits**
- 2. Property Photograph**

This document, together with the concepts and design presented herein, is an instrument of service, is intended only for the specific purpose and used for which it was prepared. Review of and approval of this document without consultation and approval by Engineering Concepts, Inc. shall be without liability to Engineering Concepts, Inc.

- UTILITY NOTES:**
1. SEE SHEETS C-100, C-101, C-102 FOR CALLOUTS ON PUBLIC UTILITIES.
  2. SEE SHEET C-200 FOR PUBLIC SANITARY SEWER RELOCATION AND NEW PUBLIC SANITARY SEWER EASEMENT.
  3. ALL OTHER PROPOSED WATER, SANITARY SEWER, AND STORM SEWER UTILITIES ARE PRIVATE.
  4. ON-SITE UTILITY DISTRIBUTION AND SERVICE LINES SHALL BE INSTALLED UNDERGROUND.
  5. ALL FIRE HYDRANTS ARE PRIVATE UNLESS LABELED AS PUBLIC.

DEPRESS SIDEWALK TO PAVEMENT ELEVATION FROM ACCESS AISLE TO ACCESS AISLE FOR ACCESSIBLE RAMP (TYPICAL OF ALL LOCATIONS)

ABANDON ALL EXISTING WATER SERVICES (DOMESTIC, FIRE, IRRIGATION) TO 1320 ENTERPRISE DRIVE FROM SHARED WATERLINE CONNECTION. PLUG, CAP, RESTRAIN AND INSTALL ANCHOR BLOCK.

PROPOSED 8" CUT-IN-TEE AND 8" WATERLINE TO REPLACE EXISTING SERVICE CONNECTION

TIE EXISTING 8" FIRE AND 3" DOMESTIC LINES INTO NEW 8" WATERLINE. COORDINATE CONNECTION WITH THE SUMMIT ADMINISTRATIVE STAFF FOR ANY SERVICE OUTAGES.

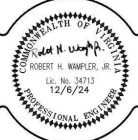


**ENGINEERING CONCEPTS, INC.**  
 94 GREENFIELD STREET  
 DALEVILLE, VIRGINIA 24063  
 540.473.1253

NAD83 (2011)  
 VIRGINIA SOUTH ZONE  
 GRID NORTH

No.	Description	Date
1	CITY COMMENTS	10/9/24
2	CITY COMMENTS	12/6/24

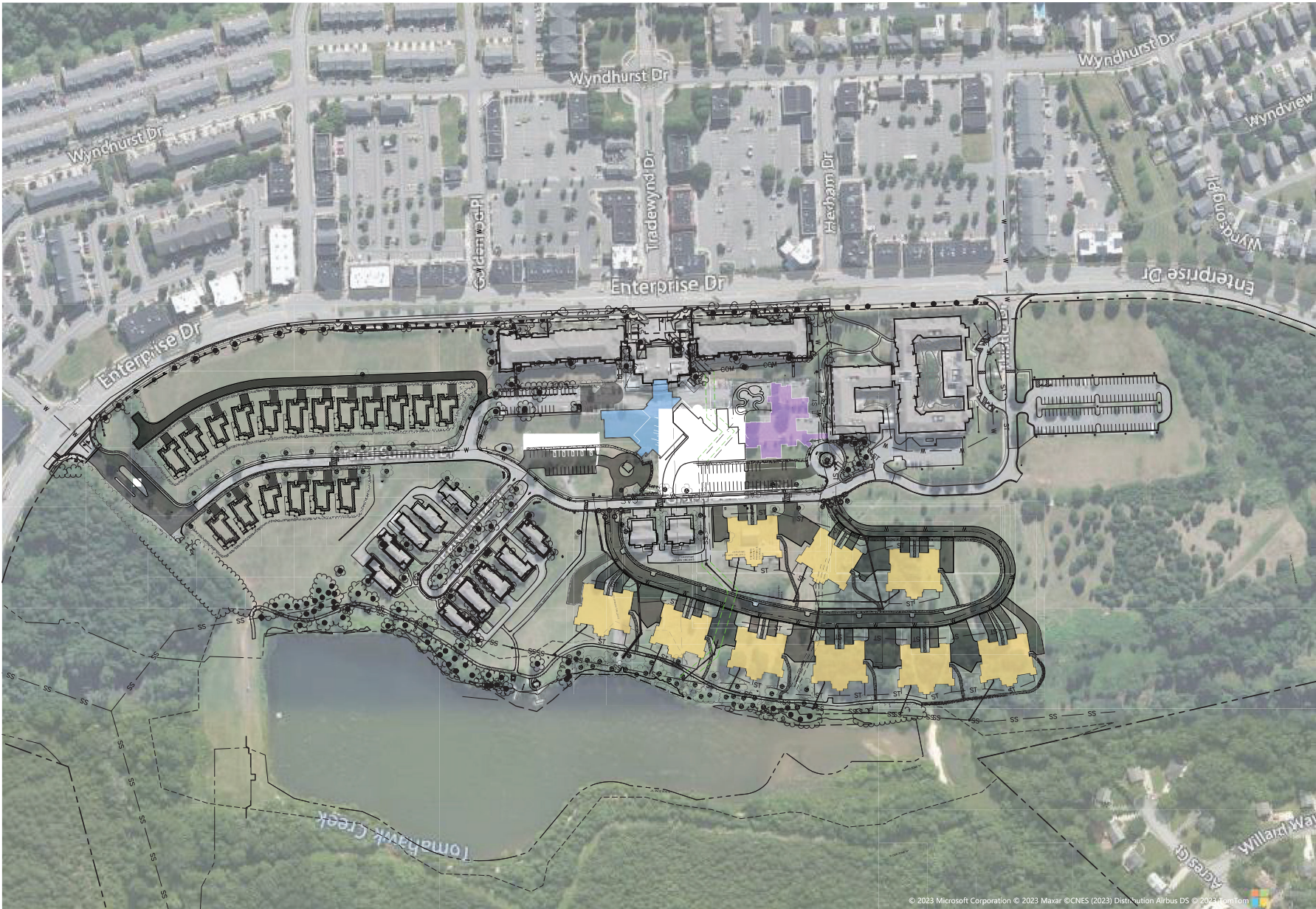
**SUMMIT BC-HH-MS  
 LYNCHBURG, VA**  
 SITE DIMENSIONAL PLAN



0 40 80  
 GRAPHIC SCALE

PROJECT: 24047

**C-131**





## AGENDA ITEM SUMMARY

### MEETING DATE

October 14, 2025

### PRESENTED BY

Marjette Upshur, Director of Economic Development & Tourism

### AGENDA ITEM # III.7

Virginia Enterprise Zone Boundary Amendment for City of Lynchburg Zones #2 and #46

### RECOMMENDATION

Conduct a Public Hearing and adopt a resolution regarding amendments to Virginia Enterprise Zones #2 and #46 to encompass the area as delineated and as described on maps entitled "Enterprise Zone Amendment, Zone # 2" and "Enterprise Zone Amendment, Zone #46," contingent upon approval by the Commonwealth of Virginia, Department of Housing and Community Development.

### SUMMARY

The City of Lynchburg has two enterprise zones identified by the state as # 2 and #46. Both zones were established by the state and provide incentives for businesses to locate, or to expand, thus stimulating economic development within the designated areas. Although the advantages of the enterprise zone designation have changed over the years, the two primary benefits for businesses are grants for job creation and real estate improvement.

The boundaries are eligible for amendment upon approval of the City Council and the Virginia Department of Housing and Community Development. Under the state's regulations, the zone size is limited to 7% of the locality's total land area. The areas proposed for deletion from the zone are ineligible public property where zone designation provides no benefit. In order to accomplish this amendment, City Council is required to conduct a public hearing regarding the proposed amendments.

### PRIOR ACTION(S)

Council amended Zone #2 and #46 boundaries in calendar year 2020.

### FISCAL IMPACT

N/A

### CONTACT(S)

Marjette Upshur, Director of Economic Development & Tourism

**ATTACHMENT(S)**

- 1. Presentation

**REVIEWED BY**



Date: October 03, 2025

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Marjette Upshur, Director of Economic Development & Tourism



Date: October 03, 2025

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Kent White, Assistant City Manager



Date: October 07, 2025

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Alicia Finney, Clerk of Council

# ENTERPRISE ZONE BOUNDARY ADJUSTMENTS

October 14, 2025



# PURPOSE & ACTION

## **Purpose:**

Conduct a public hearing to amend the boundaries of the City's two Enterprise Zones.

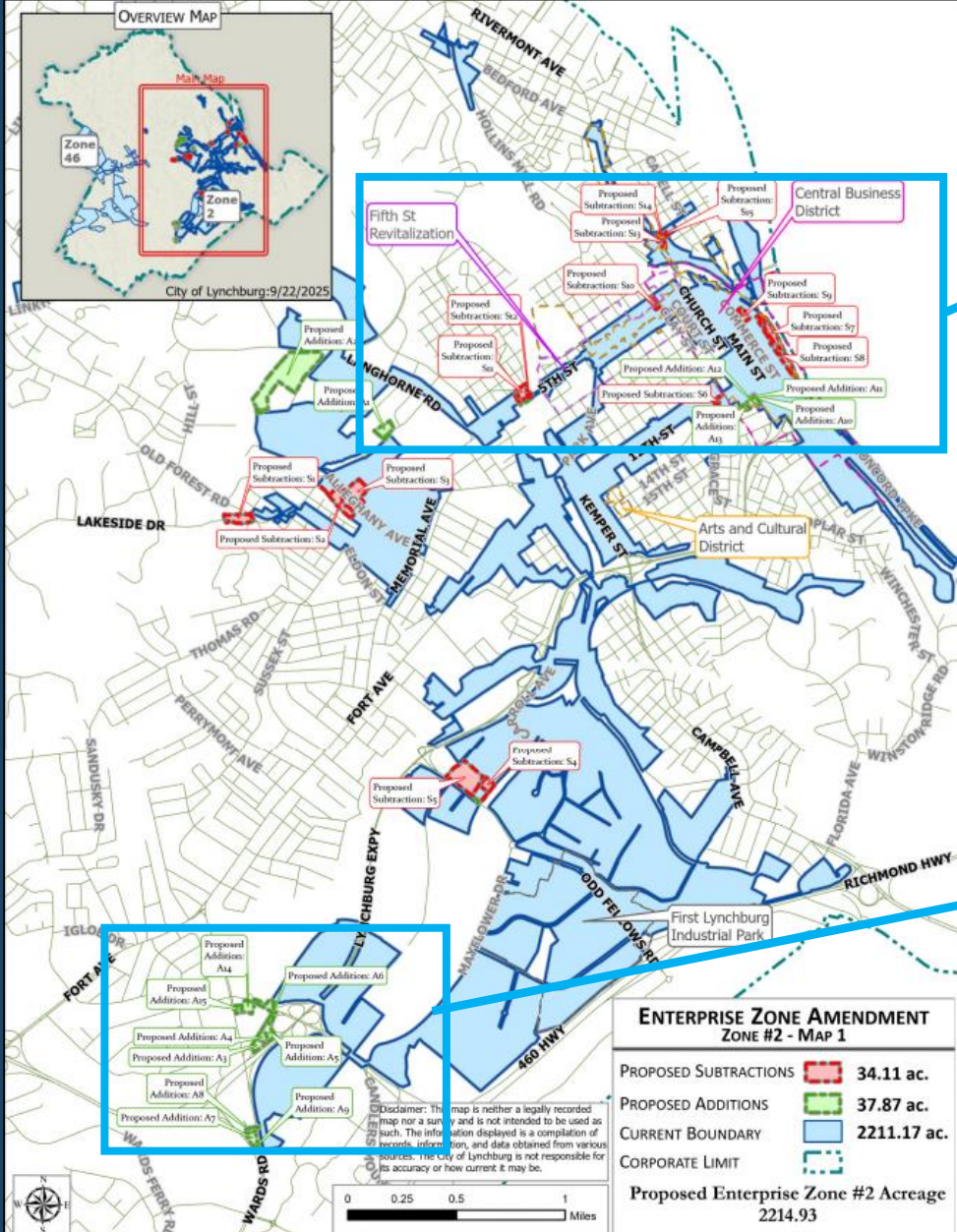
## **Why:**

Enterprise Zones are established by the state and provide incentives for businesses to locate or expand.

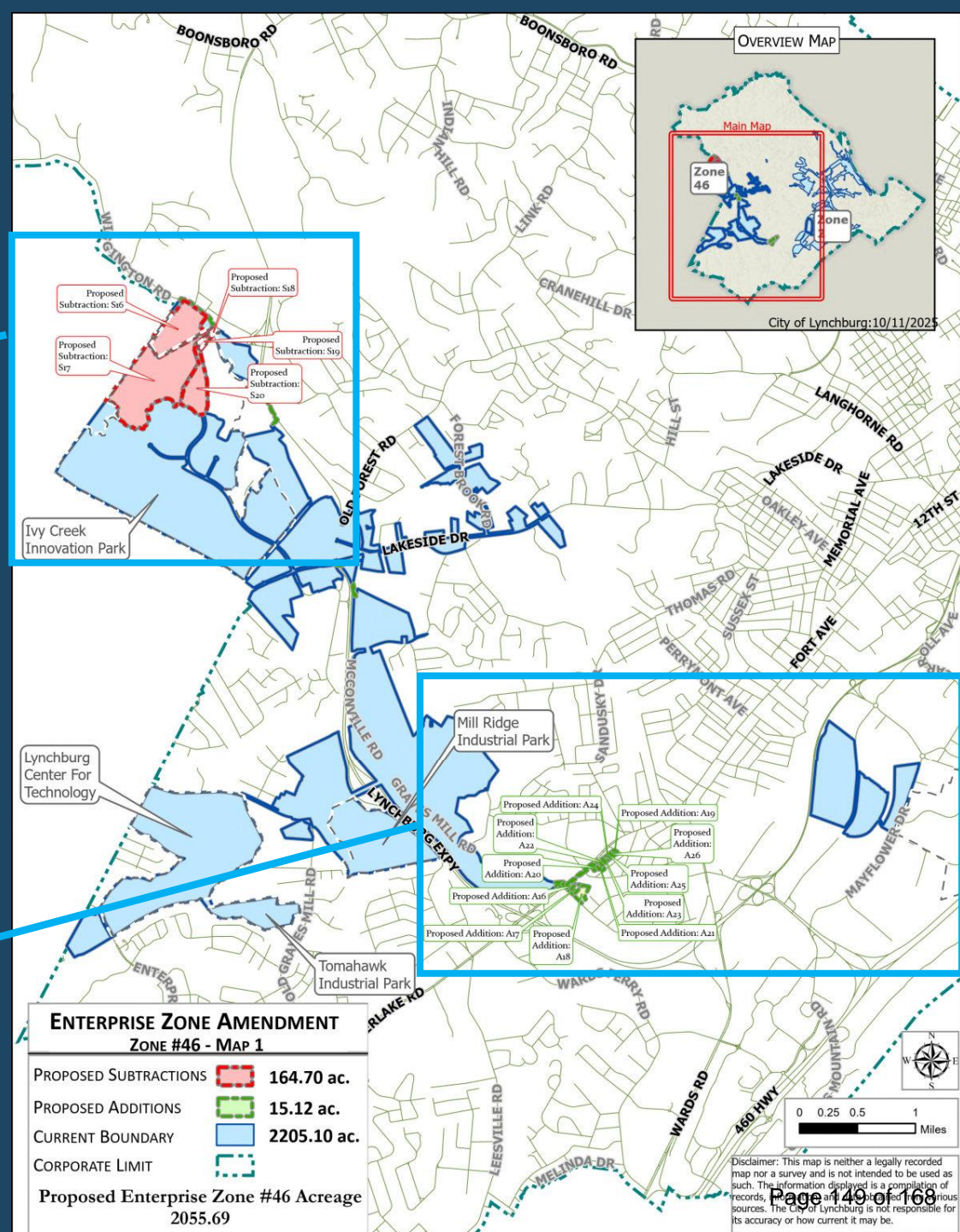
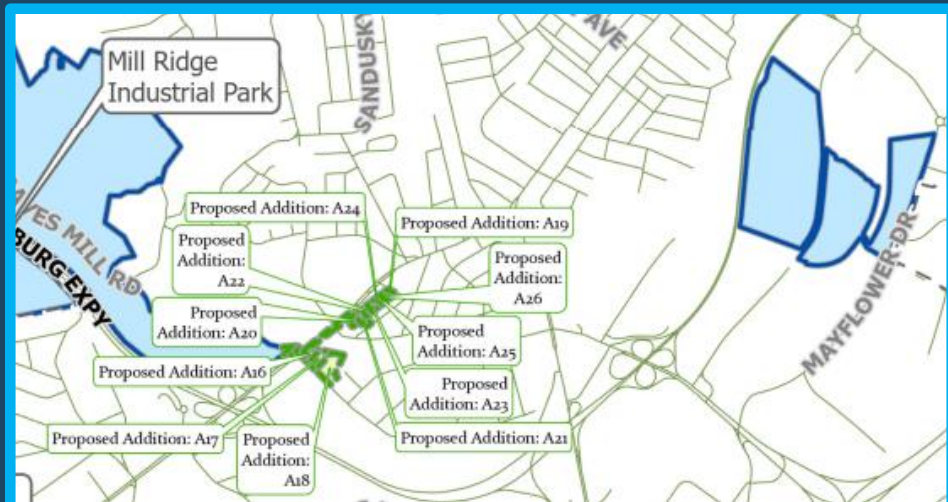
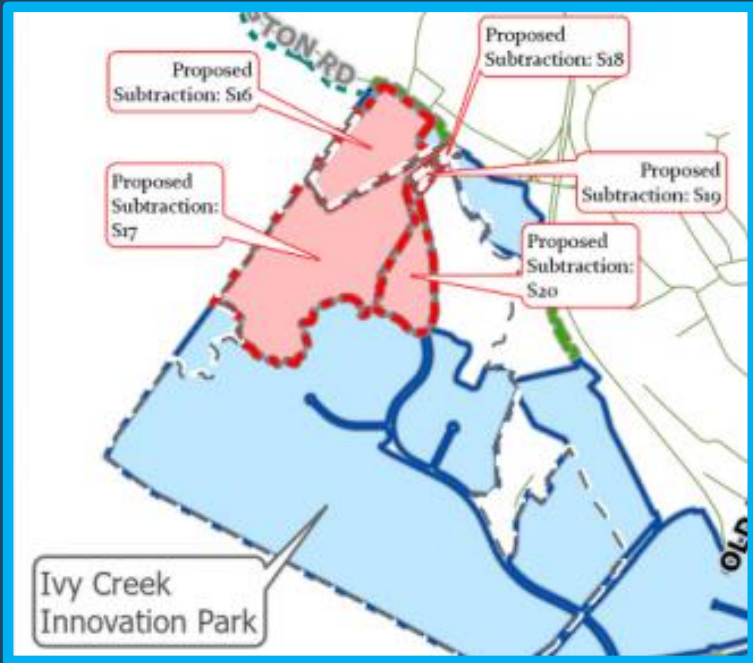
# SUMMARY

- Lynchburg has two enterprise zones identified by the state as #2 and #46.
- The zone's size is limited to 7% of the locality's total land area; it has no impact on land use regulation.
- Businesses located within an enterprise zone are eligible for state benefits, including job creation and real estate improvement grants.
- The zones were last amended in 2020.
- The proposed amendments add areas to each zone by removing ineligible public property where the zone designation provides no benefit.

# PROPOSED ZONE #2 AMENDMENTS



# PROPOSED ZONE #46 AMENDMENTS



## AGENDA ITEM SUMMARY

### MEETING DATE

October 14, 2025

### PRESENTED BY

Timothy Mitchell, Director of Water Resources

### AGENDA ITEM # III.8

Industrial Water and Sewer Contract

### RECOMMENDATION

Approved the change of the corporate name on a previously approved industrial water and sewer contract from CertainTeed, LLC to Seven Hills Paperboard, LLC, an affiliate of CertainTeed.

### SUMMARY

On May 13, 2025, a Public Hearing was conducted for the purposes of entering into an industrial water and sewer contract with CertainTeed, LLC similar to the previous contract with WestRock Company. City Council approved the contract. In subsequent discussion with the industry, the actual name of the entity that should be named on the contract is Seven Hills Paperboard, LLC, an affiliate of CertainTeed, LLC. Other than the name change, the contract terms, conditions, and rates remain the same as was approved on May 13, 2025.

### PRIOR ACTION(S)

April 8, 2025 - City Council Work Session - Business Item Briefing  
May 13, 2025 - City Council Regular Meeting - Public Hearing

### FISCAL IMPACT

None

### CONTACT(S)

Timothy Mitchell, Director of Water Resources

### ATTACHMENT(S)

1. Proposed Ordinance - City of Lynchburg & Seven Hills Paperboard, LLC (Water and Sewer Rates)
2. Proposed Contract - City of Lynchburg & Seven Hills Paperboard, LLC (Water and Sewer Rates)
3. Water and Sewer Contract Presentation

### REVIEWED BY



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Timothy Mitchell, Director of Water Resources

Date: October 02, 2025



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Gregory Patrick, Deputy City Manager

Date: October 08, 2025



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Alicia Finney, Clerk of Council

Date: October 09, 2025

AN ORDINANCE APPROVING A WATER AND SEWER CONTRACT, DATED OCTOBER 14, 2025, BETWEEN THE CITY OF LYNCHBURG AND SEVEN HILLS PAPERBOARD, LLC

**ORDINANCE:**

**#O-25-036**

WHEREAS, on May 13, 2025, after a public hearing was duly held, the Lynchburg City Council adopted an Ordinance (#O-25-036) which, in part, approved a contract between the City of Lynchburg and CertainTeed, LLC that, among other terms, set fixed rates for water and wastewater services that equaled the City’s cost of providing water and wastewater services; *and*

WHEREAS, after such Ordinance’s adoption and before the contract’s execution, it was determined Seven Hills Paperboard, LLC, an affiliate entity of CertainTeed, LLC, was the necessary party for the above described contract with the City of Lynchburg; *and*

WHEREAS, the purpose of this Ordinance is to correct the circumstances previously described and approve an updated contract that includes the appropriate parties and technical changes.

THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF LYNCHBURG, VIRGINIA:

1. That the Water & Sewer Contract, dated October 14, 2025, between the City of Lynchburg and Seven Hills Paperboard, LLC, is hereby approved, and expressly incorporated herein by reference. Such contract, among other terms, sets fixed rates for water and wastewater services that will equal the City’s cost of providing water and wastewater services. The Water & Sewer Contract is designed to be long-term in nature and the rates described therein are to be adjusted every five (5) years until the contract terminates as provided therein. The proposed “usage rates” for water and wastewater services for CertainTeed for the first five (5) years of the contract (January 1, 2025 to December 31, 2029) are as follows:

Usage Rates					
	2025	2026	2027	2028	2029
Water Rate/HCF	\$1.79	\$1.85	\$1.89	\$1.95	\$1.98
Water Rate/1000 gallons	\$2.39	\$2.47	\$2.53	\$2.61	\$2.65
Sewer Rate/HCF	\$2.64	\$2.88	\$3.01	\$3.03	\$3.05
Sewer Rate/1000 gallons	\$3.53	\$3.85	\$4.02	\$4.05	\$4.08
Excess BOD Per 100/lbs. over 300 mg/l	\$38.82	\$42.85	\$46.01	\$46.25	\$46.41
Excess TSS Per 100/lbs. over 400 mg/l	\$35.29	\$39.05	\$40.50	\$40.65	\$40.95

A monthly Non-Process Charge will be billed. The Non-Process Charge is intended to recover the cost for treating wastewater from water sources at the Mill that are unrelated to the Company’s manufacturing process. The formula to calculate the monthly Non-Process Charge shall be as follows: Number of Employees x Days/Month Basis x Gallons/Day Basis x Current Sewer Rate.

2. That the City Manager is authorized to execute the said contract on behalf of the City, and take any further actions necessary to finalize the same.

3. That this Ordinance shall become effective upon its adoption.

Adopted:

Certified:

\_\_\_\_\_

Clerk of Council

## WATER & SEWER CONTRACT

THIS CONTRACT, is made and entered into on the 14th day of October, 2025, by and between **Seven Hills Paperboard, LLC**, a company duly authorized to engage in business in the Commonwealth of Virginia and an affiliate of CertainTeed, LLC, hereinafter referred to as the “Company”, and the **City of Lynchburg**, a municipal corporation of the Commonwealth of Virginia, hereinafter referred to as the “City”, who are the sole parties to this Contract.

### RECITALS

- A. The Company’s production facilities located on Concord Turnpike, hereinafter referred to as the “Mill”, pump wastewater directly to the City of Lynchburg’s Regional Water Resource Recovery Facility, hereinafter referred to as the “WRRF”, and does not benefit from the City’s wastewater collection and conveyance lines. The costs of the City’s wastewater collection and conveyance lines are not included in the stated sewer rates.
- B. It is the intent of the parties to have fixed rates for water and wastewater services that will equal the City’s cost of providing water and wastewater services to the Company. It is also the intent of both parties to have a long-term renewable contract that can be adjusted every five (5) years for changes in cost until such time as the Contract is terminated as provided herein. The initial contract period for this Contract will be from January 1, 2025, through December 31, 2029.
- C. The rate methodology used in this Contract is consistent with the requirements of that certain Special Consent Order between the City and the VA-DEQ, dated July 15, 2015, and the authority described under Code of Virginia §§ 15.2-2119 and 15.2-2143.

**NOW, THEREFORE, WITNESSETH:** that for and in consideration of the terms, conditions, and provisions hereof, the Company and the City agree as follows:

### ARTICLE I. OPERATION OF THE WATER AND WASTEWATER FACILITIES

- A. The City will operate the water and wastewater facilities that it owns or controls in compliance with all applicable statutes, ordinances, rules, and regulations, present and future, and meet all applicable standards and requirements, present and future, of the Commonwealth of Virginia Department of Environmental Quality (VA-DEQ), the Virginia Department of Health (VDH), and other applicable regulatory agencies.
- B. The City will maintain the water and wastewater facilities in good working order and condition, will make necessary repairs thereto, and shall operate the facilities at all times properly and at a capacity that will permit the Company to meet its water needs and to dispose of wastewater from the Mill as provided in Article II and III of this Contract, except as provided for in Article VI (Force Majeure).

- C. The Company agrees that the operation and maintenance of the pump station and force main is the responsibility of the Company.

ARTICLE II. COMPANY WATER USE

- A. The Company agrees to draw all of its water needs at the Mill from the City and the City agrees to supply the Company with all of its water supply needs.
- B. The quality of water delivered to the Company under this Contract shall be the same as that furnished to domestic customers and shall meet the requirements of the VDH and/or the U.S. Environmental Protection Agency (USEPA) and other State and Federal agencies which have jurisdiction over public water supplies.

ARTICLE III. TREATMENT OF COMPANY’S WASTEWATER

- A. The Company will pre-treat its wastewater in accordance with the City’s ordinances and regulations, its Wastewater Discharge Permit, and shall not discharge to the WRRF any wastewater that would be harmful to the operation of the WRRF. Nor shall the Company cause the City to be in violation of its permit with VA-DEQ or any federal or state regulatory agency.
- B. Beginning January 1, 2025, the City agrees to provide the Company with wastewater treatment up to the levels shown below at the “Usage Rates” described in Article IV(A):

Daily Wastewater Flow Limit	1.0 mgd
Daily TSS Limit	15,000 lbs/day (TSS = Total Suspended Solids)
Daily TSS Exceedance Limit	20,000 lbs/day
Daily BOD Limit	15,000 lbs/day (BOD = Biological Oxygen Demand)
Daily BOD Exceedance Limit	17,000 lbs/day

- C. Should flows and/or loadings exceed these limits, then the City will proceed with action on the following events:
  - (1) When levels are above Peak Daily Limits a Corrective Action Required Letter will be generated.
  - (2) When levels are above Exceedance Limits a Notice of Violation Letter will be generated.
- D. Effective January 1, 2025, the Company agrees to comply with a modified Wastewater Discharge Permit with the limits as stated above.

ARTICLE IV. SERVICE CHARGES (EFF. JANUARY 1, 2025 TO DECEMBER 31, 2029)

A. The City will charge the Company the following “Usage Rates” for water and sewer services:

Usage Rates					
	2025	2026	2027	2028	2029
Water Rate/HCF	\$1.79	\$1.85	\$1.89	\$1.95	\$1.98
Water Rate/1000 gallons	\$2.39	\$2.47	\$2.53	\$2.61	\$2.65
Sewer Rate/HCF	\$2.64	\$2.88	\$3.01	\$3.03	\$3.05
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Excess TSS Per 100/lbs. over 400 mg/l	\$35.29	\$39.05	\$40.50	\$40.65	\$40.95

B. A monthly Non-Process Charge will be billed. The Non-Process Charge is intended to recover the cost for treating wastewater from water sources at the Mill that are unrelated to the Company’s manufacturing process. The formula to calculate the monthly Non-Process Charge shall be as follows: Number of Employees x Days/Month Basis x Gallons/Day Basis x Current Sewer Rate.

Non-Process Monthly Charge Calculation Example

# Employees as of January 1	Days/Month Basis	Gallons/Day Basis	Current City Sewer Rate/HCF*	Non-Process Monthly Charge
90	29.25	25	\$8.30	\$730.27

(\*748 gallons per HCF)

- (1) The Company will provide the actual number of full-time employees as of January 1st each year.
- (2) Day/Month Basis is based on the following: (365 days/year – 14 days for holiday shutdown)/12 months.
- (3) City Sewer Rates typically update July 1st of every year. Regardless when sewer rate changes incur, the current City sewer rates will be used.

C. The methodology used to determine the rates shown in paragraph A of this Article IV is based on the Company’s Water and Sewer Contract Rate Calculations prepared by PJ SUN LLC, dated December 27, 2023 (see Appendix A).

- D. To continue to receive the contract rates described above, the Company shall guarantee a minimum annual water consumption of 149,600,000 gallons or 200,000 hcf and a minimum annual wastewater flow of 149,600,000 gallons or 200,000 hcf. The minimum annual water consumption and the minimum annual wastewater flow shall be the total volume consumed or discharged respectively from January 1st to December 31st of each year. Should the annual total for either fall below the respective amount, the Company's contract volume rate shall be recalculated for the water consumption and/or wastewater discharge so that the combined total bill from January 1st to December 31st will be equivalent to 200,000 hcf. The Company shall then be billed for the difference. The Contract volume rate shall then revert to the Contract rates established in the Usage Rate table above beginning January 1<sup>st</sup> immediately following the period of low consumption.
- E. The amount of water drawn by the Company will be determined based on monthly readings performed by the City of all water meters at the Company's Plant.
- F. The City shall be responsible for the accuracy of water meters and will provide the Company with a certification, upon request, as to the accuracy of the meters. The accuracy of the meters will be maintained to the standards of the American Water Works Association (AWWA) Standards for Water Meters.
- G. Wastewater flows shall be measured by an in-line magnetic flow meter located at the WRRF dedicated to flow only from the Mill's pump station. The WRRF shall have the meter calibrated as recommended by the manufacturer at least once per calendar year. The flow meter shall have a totalizer that shall record at least once per day to use for the calculation of daily flows.
- H. In the event the device identified in Article IV(G) fails or is otherwise deemed incorrect in measuring daily flows, for billing purposes, flows will be estimated based on other available data to include but not be limited to the current or previous month's daily average, fresh water usage or other agreeable methods. If the Mill believes the flow to be incorrect due to malfunction of their equipment (such as a check valve), the Mill must notify the industrial monitoring coordinator in writing about the malfunctions as soon as known and before the bill is generated (on or about the 10th of the month). The information should include the date of the equipment malfunction, cause, corrective action, and date of correction. On a case by case circumstance, the City will consider a reasonable adjustment to the flow for each day if deemed appropriate.
- I. TSS and BOD shall be sampled and analyzed at the WRRF in accordance with procedures specified in the latest version of "Standard Methods for the Examination of Water and Wastewater" as published jointly by the American Public Health Association, the AWWA and the Water Environment Federation, or any other method mutually acceptable to the City and the Company. Charges for BOD and TSS will be calculated using actual measured sewer flow, measured as described herein. Calculations from these tests along with the

totalized flow from the Wastewater flow measuring device described herein shall be used to calculate the monthly invoice, excess flow, excess loadings, permitted loadings, and any other parameters included herein or in the discharge permit. BOD and TSS charges shall be calculated based on the total calculated BOD and TSS minus the amount of normal strength domestic wastewater, which is defined as 300 mg/l for BOD and 400 mg/l for TSS as indicated below and as provided for in City Code.

$$\text{lbs. of BOD} = \text{Total BOD, lbs.} - ((\text{monthly sewer flow, MG}) \times \text{avg. BOD (300 mg/l)} \times 8.34)$$

$$\text{lbs. of TSS} = \text{Total TSS, lbs.} - ((\text{monthly sewer flow, MG}) \times \text{avg. TSS (400, mg/l)} \times 8.34)$$

- J. For wastewater related charges, the City will issue a monthly miscellaneous invoice which includes all wastewater charges to the Company. Undisputed wastewater bills unpaid within five (5) days after due date as shown on the bill will be subject to a five percent (5%) penalty.
- K. For water related charges, the City will read the water meters and issue an automated system bill for monthly water use to the Company. Undisputed water bills unpaid within five (5) days after due date as shown on the bill will be subject to a five percent (5%) penalty.
- L. The City will bill the Company for water and sewer services based on the provisions described in this Article IV. The Company must notify the City in writing within twenty (20) days of receipt of any bill for which there are questions to avoid potential penalties.

#### ARTICLE V. CONTRACT EXTENSION

- A. Effective January 1, 2030, and every five-year increment thereafter, the water and sewer rates will be adjusted to reflect changes in cost unless the contract is terminated as described herein. However, should any of the City's calculated cost of service rates increase by more than five percent (5%) in any year due to events that were not known or were indeterminable as of the date the water and sewer rates were revised per this section of the Contract, the Contract water and sewer rates will be adjusted to reflect changes in cost of service prior to the end of the five-year increment period. Costs associated with any additional evaluation(s) shall be divided equally between the City and the Company.
- B. The intent of the City and the Company is to adjust the rates to cost of service levels every five (5) years based on the same methodology included in Appendix A to this Contract.
- C. The City reserves the right to reevaluate this Contract and circumstances prior to renewal and reserves the right to terminate this Contract upon giving the Company two (2) years prior written notice should the evaluation indicate that it is not in the City's best interest to continue this Contract.

- D. The Company may terminate this Contract by giving the City two (2) years prior written notice.
- E. The City agrees to contract with an independent rate consultant every five (5) years to perform the analysis required to adjust the water and sewer rates to cost of service levels for the ensuing five (5) years. As part of the consultant's analysis, the methodology for calculating the water and sewer rates will be evaluated and agreed upon by the City and the Company as to its applicability to prevailing conditions. In the event both parties cannot agree on changes that may be proposed by either party, the methodology in Appendix A of this Contract shall prevail.
- F. The City will provide the Company with the rate analysis described in this Contract six months before the effective date of the renewal provision specified in this Article V. If the City and the Company cannot agree on what the rates should be by the effective date of the renewal provision, and if the Company notes objections in writing to the consultant's analysis regarding the new rates no later than sixty (60) days prior to the effective date of the renewal provision, then a provisional rate equal to one hundred ten percent (110%) of the rates in effect prior to such effective date will be used to bill the Company for services until such time that agreement on the rates is reached, which agreement shall be reached within six (6) months of the City's receipt of the Company's objections. If agreement is not reached by such date, the City and the Company shall agree as to the identity of a third-party consultant, which shall be a recognized consulting firm with experience in municipal water and sewer rate analyses, and such third-party consultant shall be employed to provide, within ninety (90) days of its employment, a separate analysis of rates which shall be binding on both parties. The City and the Company shall share equally in the costs for such third-party consultant. The rates resulting from such analysis shall become effective, and the City will retroactively adjust all bills submitted to the Company for the difference between the provisional and actual rates agreed upon.

#### ARTICLE VI. FORCE MAJEURE

- A. The City will not be liable for its failure to provide any of the services under this Contract if such failure to provide services is the result of an act of God, war or public enemy, seizure of legal process, strikes, lockouts, labor disputes, work stoppages, riots or civil disturbances, equipment or system failures, power failures or any other event beyond the City's control.
- B. Neither the Company nor the City shall be liable for damages to the other for any act, omission, or circumstances occasioned by or in consequence of any act of God, strikes, lockouts, acts of public enemies, wars, blockades, insurrections, riots, epidemics, landslides, lightning, civil disturbances, explosions, breakage or accident to machinery or lines or pipe, the binding order of any court or government authority which has been

resisted in good faith by all reasonable legal means, and any other cause, whether of the kind herein enumerated or otherwise, not reasonably within the control of the party claiming suspension and which by the exercise of due diligence such party is unable to prevent or overcome. Failure to prevent or settle a strike or strikes shall not be considered to be a matter within the control of the party claiming suspension. Such causes or contingencies affecting the performance hereunder by either the Company or the City, however, shall not relieve it of liability in the event of its negligence or in the event of its failure to use due diligence, nor shall such causes or contingencies affecting such performance relieve either party from its obligation to make payments of amounts then due with respect to water and sewer services therefore delivered.

#### ARTICLE VII. MISCELLANEOUS

- A. For information purposes only, the Company will provide the City with estimates of its future water demands, wastewater flows, and loads annually and the City will inform the Company of any events or circumstances that it becomes aware of that could cause the water and wastewater rates described herein to be materially different than the cost of providing water and wastewater services to the Company.
- B. Appendix A is incorporated herein and made a part of this Contract.
- C. If any part, provision, or portion of this Contract is deemed unenforceable by a Court of competent jurisdiction, then the parties agree all remaining parts, provisions, and portions of this Contract shall remain in full force and effect.
- D. This Contract embodies the entire understanding of the parties hereto, and, except for attached appendices, there are no future or other agreements or understandings, written or oral in effect between the parties related to the subject matter hereof. Further, this Contract supersedes all previous agreements that may have existed between the parties hereto with respect to the subject of equal formality signed by the parties hereto or by their duly authorized officers or representatives.
- E. Modifications, additions, amendments, and/or alternations to any of the provisions of this Contract shall be in writing and signed by duly authorized representatives of the parties.
- F. This Contract shall be governed in its entirety by the laws of the Commonwealth of Virginia. Any litigation arising between the parties hereto, in relation to this Contract, shall be filed in the courts of the City of Lynchburg, Virginia.
- G. The Company shall not discriminate, nor permit discrimination, against any person in its employment practices, in any of its contractual arrangements, in any services or accommodations it offers the public, or in any of its other business operations on the grounds of race, color, sex, national origin, or any other basis prohibited by state or federal law, nor exclude any person from participation in, deny the benefits of, or otherwise subject any person to discrimination in providing services on the grounds of race, color, sex,

national origin, or any other basis prohibited by state or federal law. Additionally, the Company shall not discriminate against and will make all reasonable efforts to accommodate persons with disabilities as required by Americans with Disabilities Act (ADA).

H. The Company shall pay promptly when due any and all taxes related to its operations. Further, the Company shall maintain all necessary licenses, permits, approvals, and the like connected to its operations, this Contract, or both.

I. All notices or other writings required to be given under this Contract shall be given by date-and-time stamped facsimile, hand delivery with signed receipt, overnight or other courier with signed receipt, or by return receipt certified or registered mail, addressed to the proper party to the following addresses, or at such other address as may be subsequently given pursuant to this Section, and shall be deemed given within seven (7) days of being sent or provided:

If to the City:

City of Lynchburg, Virginia  
Attn: Director of Water Resources  
525 Taylor Street  
Lynchburg, VA 24504

If to the Company:

CertainTeed Interior Products Group  
Attn: Ryan Long, Plant Manager  
1801 Concord Turnpike  
Lynchburg, VA 24504

J. The titles of articles, sections, paragraphs, etc. of this Contract are for reference purposes only and shall be of no binding effect.

K. The parties hereto shall be deemed and construed as independent contractors with respect to one another for all purposes and nothing contained in this Contract shall be determined to create a partnership or joint venture between the Company and the City with respect to the parties' activities under this Contract. The Company and the City are each responsible for their own respective liabilities under this Contract.

L. The waiver by either the Company or the City of any default or breach by the other party of any of the provisions of this Contract shall not be deemed a continuing waiver or waiver of any other breach by the other party of the same or another provision hereof.

M. This Contract shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and assigns. Further, this Contract, nor any part thereof, may not be assigned without the written consent of the non-assigning party.

N. No third-party beneficiaries are intended by this Contract.

- O. The parties hereto agree to abide by all laws, regulations, and industry standards which may be applicable to their operations under this Contract.
- P. Prior to this Contract's execution, this Contract shall be approved by an Ordinance adopted by the Lynchburg City Council after a public hearing has been advertised and held pursuant to the requirements of Va. Code Sec. 15.2-107.
- Q. The parties agree this Contract may be executed by electronic signature. Without limitation, "electronic signature" shall include faxed versions of an original signature or electronically scanned and transmitted versions (e.g., via pdf) of an original signature. This Contract may be executed in counterparts. Each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one document.

**IN WITNESS WHEREOF**, the parties hereto, or authorized agents on their behalf, do hereby execute this Contract as of the date first above written.

(Remainder of Page Intentionally Left Blank)

**SEVEN HILLS PAPERBOARD, LLC**  
An Affiliate of CertainTeed, LLC

Signature: \_\_\_\_\_

Printed Name: Richard Brunel

Title: Vice President and Chief Procurement Officer

(SEAL)

ATTEST:

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

**CITY OF LYNCHBURG**

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

(SEAL)

ATTEST:

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

APPROVED AS TO FORM:

\_\_\_\_\_  
City Attorney / Designee

# CERTAINTEED WATER AND SEWER CONTRACT

October 14, 2025



# PURPOSE & ACTION

## **Purpose:**

On May 13, 2025 Council approved a long-term industrial water and sewer contract with CertainTeed. We are requesting approval to change the name of the entity from CertainTeed, LLC to Seven Hills Paperboard, LLC, an affiliate of CertainTeed, LLC.

## **Why:**

During the process of finalizing the contract for signatures with CertainTeed, it was determined that the actual entity that should be named in the contract is Seven Hills Paperboard, LLC an affiliate of CertainTeed.

# INDUSTRIAL RATES

## CITY CURRENT RATES:

- Water volume (HCF) = \$3.45
- Sewer volume (HCF) = \$8.65
- Excess BOD = \$26.30
- Excess TSS = \$28.50

## CURRENT CONTRACT RATES:

- Water volume (HCF): \$1.80
- Sewer volume (HCF): \$2.42
- Excess BOD = \$35.16
- Excess TSS = \$31.98

Usage Rates					
	2025	2026	2027	2028	2029
Water Rate/HCF	\$1.79	\$1.85	\$1.89	\$1.95	\$1.98
Water Rate/1000 gallons	\$2.39	\$2.47	\$2.53	\$2.61	\$2.65
Sewer Rate/HCF	\$2.64	\$2.88	\$3.01	\$3.03	\$3.05
Sewer Rate/1000 gallons	\$3.53	\$3.85	\$4.02	\$4.05	\$4.08
Excess BOD Per 100/lbs. over 300 mg/l	\$38.82	\$42.85	\$46.01	\$46.25	\$46.41
Excess TSS Per 100/lbs. over 400 mg/l	\$35.29	\$39.05	\$40.50	\$40.65	\$40.95

Note: As part of the rate negotiations we provided options to phase in rate increases which resulted in lower rates in the initial years but higher rates in the outer years. The overall result is the same calculated revenue over the 5 year period.

# SUMMARY

Water Resources recommends City Council adopt an ordinance revising the named entity on the previously approved industrial water and sewer contract from CertainTeed, LLC to Seven Hills Paperboard, LLC, an affiliate of CertainTeed, LLC.

