PRELIMINARY ENGINEERING REPORT

System DBP Improvements and Water Treatment Plant Upgrades

Richlands, Virginia

Prepared for

Town of Richlands, Virginia

T&L Project No. 14478
December 2019
Revised March 2020

THOMPSON & LITTON EST. 1956

PRELIMINARY ENGINEERING REPORT

Distribution System DBP Improvements and Water Treatment Plant Upgrades Richlands, Virginia

Prepared For
Town of Richlands, Virginia

This document and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Thompson & Litton and is not to be used in whole or in part for any other project without the written authorization of these parties.

THOMPSON & LITTON

103 East Main Street
P.O. Box 1307
Wise, Virginia 24293

T&L Project No. 14478

December 2019
Revised March 2020

TABLE OF CONTENTS

Page

Purpose and Scope **1**

1.0 Project Planning Area **3**

2.0 Existing Facilities **6**

3.0 Need for Project **9**

4.0 Distribution System Disinfection Byproducts Findings and Recommendations **10**

5.0 Proposed Project **12**

6.0 Conclusions and Recommendations **21**

Appendices **22**

Appendix A: Water Line Mapping Exhibits (2 Sheets)
Appendix B: Hydraulics
Appendix C: Water Plant Filter Equipment
Appendix D: Town Asset Management Plan (Water)
Appendix E: Town's Most Recent Audit

List of Exhibits

Exhibit I: Location Map 4
Exhibit II: Water Line Replacement 13

List of Tables

Table 1-1: Richlands, Virginia Population through 2040 3
Table 1-2: Ten-year Population Projections through 2040 5
Table 2-1: Town of Richlands, Virginia Current Rate Schedule for Water 7
Table 2-2: Costs for Annual O&M of Water System 7
Table 2-3: Existing Water Debt Service 8
Table 4-1: Recommended Low Tank Levels 11
Table 5-1: Preliminary Statement of Probable Project Cost 15
Table 5-2: Water FY 2019 Income 17

PURPOSE AND SCOPE

This Preliminary Engineering Report has been prepared in support of the Town of Richlands, Virginia's (Town) application for funding for the Richlands System DBP Improvements and Water Treatment Plant Upgrades Project. The scope of this report has been divided into two portions. The first is based on the scope identified in a Virginia Department of Health (VDH) planning grant – "Distribution System Disinfection Byproducts Evaluation". The second scope of work was identified during the first design progress meeting for the planning grant work. Therefore, in this report, the scope of work for each part will be described under separate headings.

The purpose of the scope identified in the planning grant was to evaluate the distribution system for options to improve water quality. To meet this purpose, this report discusses updating of the distribution system mapping and hydraulic model, as well as potential operational changes which can benefit water quality.

The additional scope which was identified during the first preliminary design progress meeting is summarized below.

1. Assist the Town with obtaining a core sample evaluation of the multimedia filters. The results of the analysis will determine whether media replacement is required. Provide cost estimate for media replacement. Assist the Town with obtaining an inspection of the filter underdrains. Provide cost estimate for underdrain rehabilitation or replacement, if required.
2. Identify locations for installation of zone meters in the water distribution system. Provide a cost estimate for purchase and installation of the meters.
3. Evaluation of options for sedimentation basin cleaning, including mechanical systems or a passive system. Evaluate options for sludge drying. Provide cost estimate for recommended basin cleaning and sludge drying systems.
4. Evaluate pump replacements at Brickyard and East End pump stations. Provide estimated cost for replacements.
5. Evaluate replacement of the Town's school system's water storage tank. Hydraulic evaluation and cost estimate will be provided.
6. Identify location and provide cost estimates for a 10-inch water line replacement near the Richlands mall and for an existing 10-inch river crossing.

The recommended project is described in detail, including construction and total project cost estimates.

The technical aspects for upgrades recommended in this report for the project community utilize normal engineering practice and meet guidelines established by the Virginia Department of Health, including those established in the Waterworks Regulations.

Costs for equipment and appurtenances used in developing the estimate of probable Cost are based on costs provided by vendors, the current cost range for those items in the geographic area for similar construction conditions and comparably sized projects, or professional experience.

Although this report has been prepared to accurately represents the project area, potential users, and project costs at the time of preparation, this report is preliminary in nature. Therefore, the technical aspects are subject to refinement during the actual engineering design phase. Projected costs must also be evaluated and updated to reflect the construction market for the period of time when the project will actually be bid and constructed.

The components of the water treatment plant upgrades are anticipated to be contained within the fenced site of the existing water treatment plant. Water line replacements will follow the routing of existing water lines. Any new waterline construction is anticipated to occur within previously disturbed areas. However, although these are potentially mitigating factors for environmental impacts, it is anticipated that an Environmental Assessment will be required for anticipated funding sources such as the Drinking Water State Revolving Fund.

1.0 PROJECT PLANNING AREA

a. Location

The Town of Richlands is the largest locality in Tazewell County, Virginia, and is located in the central portion of the County geographically. Tazewell County is in Southwest Virginia, bordered by Bland County to the east, Smyth County to the south, Russell County to the West, Buchanan County to the northwest, and McDowell and Mercer Counties, West Virginia, to the north.

The service area served by the Town's water treatment plant directly includes areas within the Town limits and areas adjacent to State Route 690 in Tazewell County to the south of Town, including Hidden Valley and portions of Kent's Ridge and Daw Road. Additionally, the facility serves as a wholesale supplier to portions of Tazewell County and to the Town of Cedar Bluff. Water produced by the Town is also sold for use in portions of Russell and Buchanan County by the Tazewell County Public Service Authority.

The locations of the Town's service area and the water treatment plant, which is adjacent to Business Route 460 at the intersection of Virginia Avenue and Farmer Streets near the center of the Town, are presented in Exhibit I.

b. Environmental Resources Present

The components of the water treatment plant upgrade project are anticipated to be contained within the fenced site of the existing water treatment plant. Water line extensions or replacements will be installed in previously disturbed areas and in the alignment of the replaced water line, where applicable. Although this mitigates potential environmental impacts, it should be expected that an Environmental Assessment will be necessary to satisfy funding requirements.

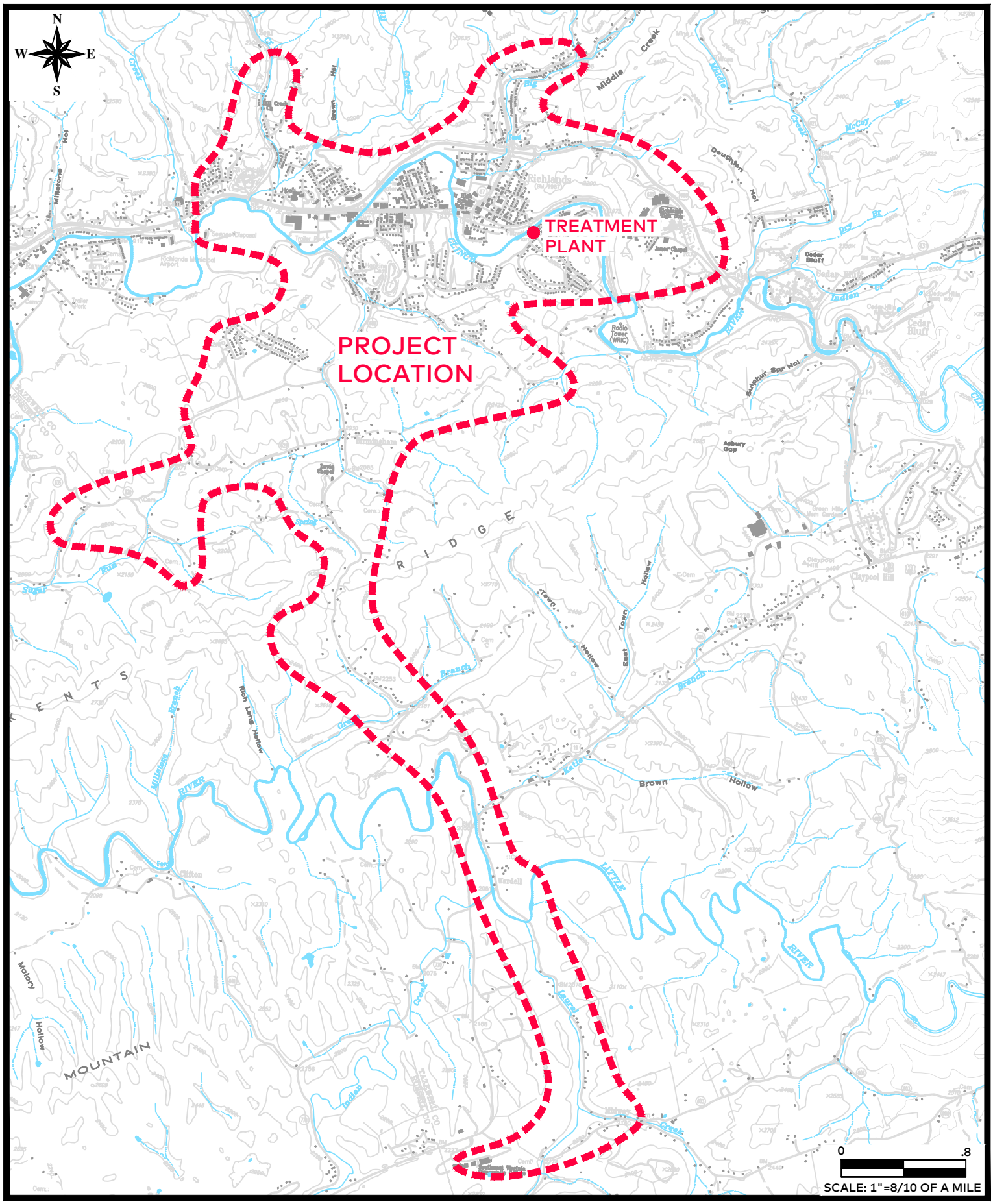
c. Population Trends

The population of the Town beginning in 1970 is presented in Table 2-1. US Census population data is shown for 1990-2010, while the projections for 2010-2040 are from the Demographic Research Group of the University of Virginia's Weldon Cooper Center for Public Service. The trend of the Town's projected population shows a decrease of 10 to 14 percent per decade.

Table 1-1. Richlands, Virginia Population Through 2040.

Year	Population
1990	4,456
2000	4,144
2010	5,823
2020*	5,236
2030*	4,604
2040*	3,972

** Projected*



PROJECT NO.	DATE
14478	DECEMBER 2019
FILE NAME	
Richlands Water Location Map	

SYSTEM DBP IMPROVEMENTS AND
WATER TREATMENT PLANT UPGRADES
RICHLANDS, VIRGINIA

LOCATION MAP

THOMPSON & LITTON

EXHIBIT 1

The projected population of the Town is compared with projections for the Commonwealth of Virginia, Tazewell County, and the Tazewell County Towns of Bluefield and Richlands, developed by the Weldon Cooper Center for Public Service. Tazewell County and Bluefield exhibit flat population trends similar to the Town of Tazewell, and the projected population of Bluefield is anticipated to decrease 17 percent over the period 2010 – 2040.

Therefore, the declining population of the Town through 2040 indicates that the existing capacity of the water treatment plant should be sufficient through 2040 and that increased capacity will not be evaluated in this report.

Table 1-2. Ten-year Population Projections through 2040

	2010	2020	2030	2040
Virginia	8,001,024	8,744,273	9,546,958	10,201,530
Tazewell County	45,078	43,062	42,400	41,167
Bluefield	5,434	4,770	4,068	3,365
Richlands	5,823	5,154	4,456	3,759

Sources: US Census data & http://www.coopercenter.org/demographics/virginia-population-projections (September 2017).

d. Community Engagement

The Town of Richlands does not have a formal plan for community engagement for this project. However, typical operating procedure from the past would utilize City Council meetings to highlight the project, its costs, funding strategies, and importance of the project.

2.0 EXISTING FACILITIES

a. Location

The Town's potable water service area is presented in Exhibit I.

The water service area for which treatment is provided includes the Town of Richlands, the Town of Cedar Bluff, the Hidden Valley and Birmingham communities, and portions Kent's Ridge and Daw Road as well as the communities of Raven and Doran and other rural areas in northwest Tazewell County through a contract with the Tazewell County Public Service Authority (PSA).

There are no additional areas currently identified for future water service. Therefore, no changes in the overall residential demand are expected.

b. History

The Town owns and operates the Richlands Regional Water Treatment Facility, a 2.5 million gallon per day (MGD) facility that utilizes conventional methods to treat and deliver potable water to the Town's distribution system. Partnering with the Town of Cedar Bluff and the Tazewell County Public Service Authority, the facility was constructed in 1994 and currently furnishes water to the Town of Cedar Bluff, the communities of Raven and Doran and other rural areas in the Northwestern district of Tazewell County through a contract with the Tazewell County Public Service Authority (PSA) and portions of Russell and Buchanan Counties as a wholesale supplier of treated water. The water treatment plant is currently operating at about 49% capacity based on fiscal 2019-2019 records and serves 2,465 in-town and 77 out-of-town customers. The plant also provides water treatment services to approximately 10,000 customers outside of the Town through the agreements with the Tazewell County PSA and neighboring counties.

c. Condition of Existing Facilities

The permitted average daily flow capacity in the water treatment plant is 2.5 MGD. Average potable water production at the water treatment plant during fiscal year 2018 was 1,225,639 gallons per day (1.23 MGD). As noted previously, the upgrade to the existing plant took place in 1994., The equipment installed in 1994 has been in operation for 26 years. This means that mechanical equipment installed during the upgrade is now operational beyond its expected lifespan, which is typically 20 years for mechanical equipment.

An asset management plan for the Town's water treatment plant has been created prior to this report and is provided in Appendix D.

Water Flows

For the 2019 fiscal year, the average production rate at the water treatment plant was 1.23 MGD. During that same period, billed water averaged 951,499 gallons per day. The resultant average water accountability for the system was 77%. The water treatment plant serves approximately 2542 customers (accounts, not persons) in and out of Town customers, while Cedar Bluff and the Tazewell County Public Service Authority are listed as bulk users.

d. Financial Status of Existing Facilities

The Town water fund's financial status is described from the current rate schedule, annual operations and maintenance (O&M) costs, capital improvement programs, tabulation of users, and existing debts. Each aspect is presented in turn. Capital improvement program items which fall into FY 19 or FY 20 are included in the project cost estimate in Section 5.0 of this report. The most recent audit of the Town is presented in Appendix E.

Table 2-1. Town of Richlands, Virginia Current Rate Schedule for Water

	In-Town	Out-of-Town
Minimum (0-2,000 gallons)	$16.00	$20.50
Each additional 1,000 gallons	$4.50	$6.00

Table 2-1 shows the current rates for water from the Town. The current average water usage is approximately 3,920 gallons per month, for which the monthly in-Town water bill is $24.64, and the out-of-Town bill is $32.02.

The 2018-2019 annual O&M expenditures for water operations was $874,420.62. A generalized listing is presented in the major categories in Table 2-2.

Table 2-2. Costs for Annual O&M of Water System

Category	Cost
Administration	$125,743.10
Electricity	$325,504.83
O&M Salaries and Wages	$182,307.28
Benefits (Insurance and Retirement)	$90,683.61
Chemicals and Testing	$952.13
Equipment	$13,159.58
Equipment Maintenance	$13,611.88
Communications and IT	$2,652.59
Fuel	$1,694.60
Building Maintenance	$6,665.59
Supplies	$62,294.97

Utilities	$47,421.19
Fees	$125,743.10
Miscellaneous	$1,729.27
TOTAL O&M	**$ 874,420.62**

The projects or items in the Town's water capital improvement program are listed below in Table 2-3. Debt service is paid by the Town as presented in Table 2-3.

Table 2-3. Existing Water Debt Service

Debt	Annual Debt Expense
Town BD – Kents Ridge	$ 44,844.00
Cedar Bluff BD – Water Debt	$1000.00
Tz Co PSA BD – Kents Ridge	$63,258.00
Birmingham Water Debt	$5,833.00
TOTAL	**$ 87,195.00**

3.0 NEED FOR PROJECT

a. Health, Sanitation, and Security

The planning grant application for this project originally focused on water treatment plant improvements to address haloacetic acids five (HAA5) violations in the distribution system. However, this issue was remedied by use of an existing sodium permanganate feed system. Subsequently, the focus of the planning grant application has been general water quality maintenance in the distribution system.

Maintenance of the water storage tanks is important to maintain the quality of potable water in the distribution system. The integrity of steel water tanks is highly dependent on a proper and intact coatings system, both interior and exterior. This project focuses on three of the Town's tanks, Airport, Farmer Street, and Downtown, with the remaining tanks to be addressed in the future.

b. Systems Operation and Maintenance

Although the water treatment plant has been properly operated and excellently maintained, all the mechanical equipment from the 1994 upgrade water treatment plant remain in operation past their expected service life. This has resulted in an increase of unplanned maintenance. Some items have been replaced, with a recent replacement of the gas chlorination system being an example.

One critical item to be addressed first are the water treatment plant's multimedia filters. The filter media itself has not been replaced since 1994 and the filter bottoms have not been inspected. Other items to be addressed as part of this report are as follows:

- The raw water intake,
- Sedimentation basin sludge removal systems,
- Relocation of a subgrade reduced pressure zone (RPZ) backflow preventer in the water treatment plant,
- Equipment replacement at two booster pump stations in the distribution system,
- Installation of zone meters in the water distribution system,
- Water line replacements and interconnections, and
- Upgrade of water line to provide high quality water and fireflow for the Richlands schools.

c. Projected Future Water Flows

As described above in the "Growth Areas and Population Trends" section of the Project Planning Area narrative of this report, the residential population is not projected to increase over the planning period through 2040, nor are the concomitant residential water flows projected to increase. The non-residential flows are not anticipated to increase whether by addition a significant new major non-residential customer or addition of a significant number of modest non-residential customers. The existing 2.5 MGD capacity is sufficient to treat the projected future water flows.

4.0 DISTRIBUTION SYSTEM DISINFECTION BYPRODUCTS FINDINGS AND RECOMMENDATIONS

This section addresses work performed as part of the VDH planning grant scope, which included measures to address water quality in the Town's distribution system.

a. Update system water mapping and hydraulic model in support of water quality improvements evaluations and complete water age modeling.

Thompson & Litton consulted with Town maintenance and operating personnel to update existing water line mapping in the system. The resulting water line mapping is included in Appendix A. Similarly, the Town's hydraulic model was updated with Bentley WaterCAD V8i (SELECTseries 6) software. An exhibit showing the hydraulic model and modeling results for a 24-hour time simulation and fire flow evaluation are provided in Appendix B. The model was used to provide the evaluation discussed in C below.

b. Evaluation of measures available to reduce biofilm in existing water lines.

Because of biofilms' complex architecture, stabilized by its attached mechanisms and ability to adapt to the environmental conditions, they are very difficult to remove. By breaking down the organic materials that protect biofilm and bind deposits together, different treatment measures disrupt the fouling that affect water quality and harbor water-based and water-borne pathogens and viruses in addition to non-pathogenic bacteria that cause corrosion and taste and odor issues. Treatment options to reduce biofilm include:

- main flushing;
- disinfectant residual maintenance;
- main repair and replacement;
- minimization of dead ends/flow management;
- corrosion control program;
- proper storage tank O&M;
- control and mitigation of system hydraulic problems;
- nutrient suppression;
- cross connection control.

Cross-connection control programs and maintaining sanitary conditions during water main repair are some areas that must be improved to prevent biofilm accumulation. Distribution system barriers need to be strengthened at critical points, including repair and construction sites, valves, cross-connections and storage tanks.

c. Evaluation of the water quality effect of operational changes in the system, such as decreasing water tank levels.

A 24-hour time simulation was performed using the updated hydraulic model. The simulation was intended to match typical operation of the system as it currently stands. Parameters addressed include average water production at the water plant and demand by location as well as typical operating levels in system tanks and normal pump operations/durations.

A 240-hour water age evaluation was performed using the parameters developed in the 24-hour time simulation. The results of the water age evaluation are shown by graph for each system tank in Appendix B.

A fire flow evaluation was also performed in the model to determine available fire flows and associated required minimum tank water levels. These new minimum tank levels were then utilized in a new 24-hour time simulation and 240-hour water age evaluation. The reduced water ages are provided in a graph in Appendix B. A summary of current and recommended tank low levels is provided in Table 4-1. These are the normal minimum operating levels which are set to maintain adequate pressure and fire flow service if a 2-hour fire flow event were to take place when the water treatment plant is not in operation, such as late night or early morning.

Table 4-1. Recommended Low Tank Levels

Tank	Current Low Level (feet)	Recommended Low Level (feet)
Airport	20	15
Birmingham	17.25	16
Cedar Bluff	18	11
Downtown	11.25	10
Farmer Street	20	14
Hidden Valley	16.75	10

5.0 PROPOSED PROJECT

The proposed project addresses the items outlined as work additional to the planning grant scope in the Purpose and Scope section of this report.

a. Project Design

(1) Distribution System Layout

Existing Clinch River crossings which are not encased, and thus protected, are proposed for replacement. There is one 10-inch and one 6-inch crossing. Also, a section of existing 4- and 10-inch pipe near the Richlands mall and across US Route 19/260 from the hospital is also proposed. These water line replacements and connections are illustrated in Exhibit II. Additionally, a section of 10-inch line near the business incubator is also proposed for replacement.

The Town's schools are currently served by 4- and 6-inch water lines and a meter and valve vault. In order to provide potable and fireflow directly from the Town's distribution system, this line must be replaced with 8-inch water to allow for adequate fireflow protection of 1,000 gallons per minute. A fireflow bypass will also be required at the meter and valve vault.

Rehabilitation/upgrades at the Airport, Farmer Street, and Downtown tanks are also proposed. The Airport and Farmer Street tanks, which are painted steel are proposed to be surface prepared and recoated interior and exterior. The Downtown tank, which is a glass-fused steel tank, is proposed to be cleaned internally. A mechanical type mixing system is also proposed for each of these tanks to ensure that water ages in the tank are consistent and to prevent chlorine residual differentials.

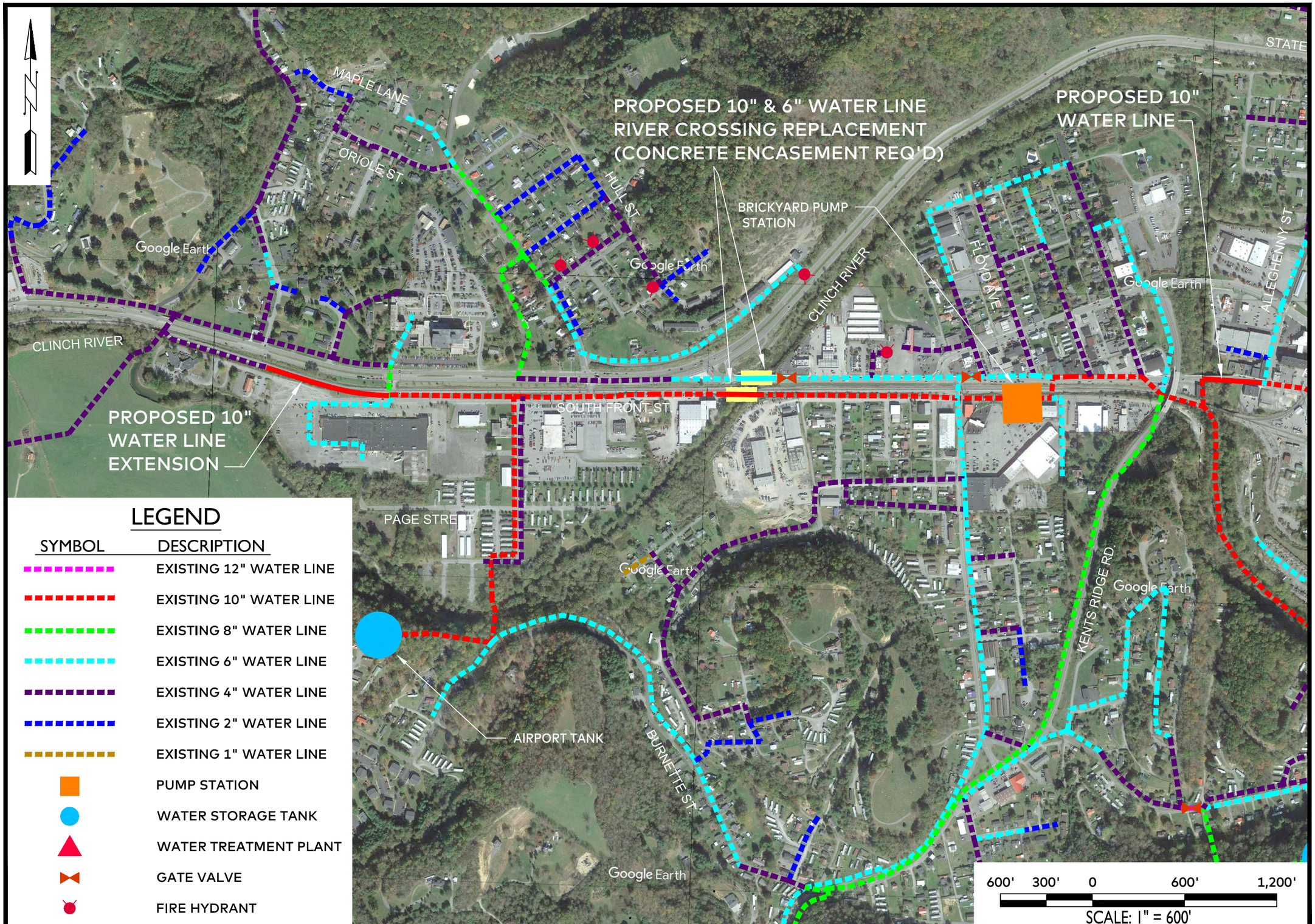
Six zone meters are proposed to be installed in the distribution system in order to help track water usage and water loss.

(2) Pumping Stations

Pumps, motor starters, and valving at the Brickyard pump station and the East End pump station are proposed for replacement. These items are worn and in need of replacement.

Treatment

A new enclosure and electrical hoist are proposed for the water treatment plant's raw water intake. The intake structure is currently exposed to the exterior, which complicates maintenance and operation. The existing manual hoist is used to remove intake screens for cleaning. The intake screens are very difficult to handle with a manual hoist because of their weight.



LEGEND

SYMBOL	DESCRIPTION
	EXISTING 12" WATER LINE
	EXISTING 10" WATER LINE
	EXISTING 8" WATER LINE
	EXISTING 6" WATER LINE
	EXISTING 4" WATER LINE
	EXISTING 2" WATER LINE
	EXISTING 1" WATER LINE
	PUMP STATION
	WATER STORAGE TANK
	WATER TREATMENT PLANT
	GATE VALVE
	FIRE HYDRANT

SYSTEM DBP IMPROVEMENTS AND WATER TREATMENT PLANT UPGRADES
RICHLANDS, VIRGINIA

WATER LINE REPLACEMENT & EXTENSION

Designed	JLD
Drawn	ESB
Checked	JLD
Date	DECEMBER 2019

Project No.
14478

THOMPSON & LITTON

EXHIBIT
2

Work at the sedimentation basins includes installation of a new sludge removal system and repair of leaking at several cracks. The basins are currently manually cleaned, which is unusual at a water plant of this capacity. Because the basins must be taken out of service, drained, and manually cleaned, the cleaning interval is long, once per three or six months typically. The waste is directed to the Town's sewer treatment plant, which experiences treatment upset due to the slug loading. A new sludge removal system is proposed which would consist of a perforated PVC manifold controlled by butterfly valves. This would provide for flushing of solids from the sedimentation basin by opening the valves and would allow for smaller, more frequent dosing of the water treatment plant solids to the sewer treatment plant.

The three filters at the water treatment plant should be examined by a specialty company providing filter inspection services. The filters have not had a complete media replacement since 1994. It is anticipated that the inspection will reveal that the media should be replaced and the filter underdrains should be rehabilitated or possibly replaced. A related cost for inspection is included in the project cost estimate. The filters are served by hydraulically actuated valves, which are legacy equipment and difficult to find parts for. It is proposed that the filter gallery valves and actuators be replaced with new electrically actuated valves.

Finally, the RPZ backflow preventer which protects the water supply at the plant was installed below grade during the 1994 plant upgrade. This can be considered a code violation and could be dangerous should the pit in which it is installed become flooded. The RPZ backflow preventer should be replumbed so that it is above-grade.

b. Total Project Cost Estimate

The preliminary statement of probable project cost for the project is presented in Table 5-1.

PRELIMINARY STATEMENT OF PROBABLE PROJECT COST
FOR THE
TOWN OF RICHLANDS
SYSTEM DBP IMPROVEMENTS AND WATER TREATMENT PLANT UPGRADES
TABLE 5-1

ESTIMATED CONSTRUCTION COST:

Item Descriptions	Unit	Unit Price	Unit Quantity	Extended Cost
Replace Filter Media & Underdrains	[redacted]			
Replace Filter Gallery Valves & Actuators				
Sedimentation Basin Sludge Removal System				
Sedimentation Basin Crack Repair - Epoxy Injection				
Relocate RPZ at Water Plant				
New Shelter and Electric Hoist at Raw Water Intake				
Brickyard Pump Station Rehabilitation				
East End Pump Station Rehabilitation				
Airport Tank Rehabilitation				
Airport Tank Mixing System				
Farmer Street Tank Rehabilitation				
Farmer Street Tank Mixing System				
Downtown Tank Cleaning				
DowntownTank Mixing System				
4-inch Zone Meter in Vault				
10-inch Water Line				
8-inch Water Line (Replace 4 & 6)				
School Meter Vault Fireflow Bypass				
10-inch Encased River Water Line Replacement				
6-inch Encased River Water Line Replacement				
Asset Management Plan Items				
Chlorine Analyzer				
Chemical Feed Pump				
Upgrade Filter Controls				
Upgrade SCADA				
Rebuild Raw Water Pump				
Maintenance Software				
Computers				
2-inch Water Line Replacement				
Miscellaneous				
Bonds, Taxes, Permits, and Insurance				
Mobilization and Temporary Facilities				

Estimated Subtotal Construction Cost	[redacted]
Construction Contingency (10%)	
Estimated Total Construction Cost	

ESTIMATED RELATED COST:

Administration (Cumberland Plateau Planning District Commission/Davis Bacon)	[redacted]
Advertisement, Procurement & Permit Fees (Town)	
Legal/Bond Counsel	
Filter Inspection & Report (Media & Underdrains, Completed by Others)	
Basic Engineering	
Resident Project Representative (12 months)	
Additional Engineering	
Geotechnical	
Surveying	
Permits (E&S, Stormwater, Railroad, VMRC)	
Special Studies	
Funding Assistance	
Record Drawings	
Operation & Maintenance Manual Update	
Lead Inspection	

Estimated Total Related Cost	[redacted]
ESTIMATED TOTAL PROBABLE PROJECT COST	

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

c. Annual Operating Budget

The projected annual operating budget for FY 2020 water operations is unchanged from the expenditures shown in Table 2-2.

Income

The rate schedule was provided in Table 2-1. Because the water treatment plant will not be serving new connections the debt service and related costs must be borne by the current customers through their rates. Table 5-2 presents the FY 2019 income statement for the Town.

Table 5-2 Water FY 2019 Income

Water Fund		
Revenues		
Account Number	**Account Description**	**Revenue**
Department 3701	**Revenue**	
20-3701-413300	Interest Income	$1,801.24
20-3701-413500	Contract Work – Water Plant	$57.00
20-3701-420050	Water Collections	$829,090.84
20-3701-420200	Penalties	$13,479.32
20-3701-420250	Service Charges	$4,658.75
20-3701-420300	Water Taps	$800.00
Total Dept. 3701	Revenue	$849,887.15
Department 3702	**Revenue**	
20-3702-413310	Interest Income Water Debt	$1370.77
20-3702-440000	Cedar Bluff Water Collection	$67,524.00
20-3702-440100	Taz PSA Water Collection	$478,710.00
20-3702-440200	Cedar Bluff Water Debt	$996.00
20-3702-440300	Taz Co PSA – Kents Ridge	$2,598.00
Total Dept 3702	Revenue	$551,198.77
Total Fund	**Water Fund**	**$1,401,085.92**

O&M Costs

O&M costs for the project are included in Table 2-2.

Debt Repayment

The debt service for the project is based on a total project cost of . The annual debt service for a 20-year term at three percent is .

d. Project Schedule

A project implementation schedule is presented on the following two pages.

TOWN OF RICHLANDS
DISTRIBUTION SYSTEM DISINFECTION BYPRODUCTS EVALUATION/WTP PER
T&L PROJECT #14478

PROPOSED PROJECT SCHEDULE

November 7, 2019

TASKS	TARGET DATES
Attend initial kick-off meeting	Completed
Engineer provides Town copy of existing water line mapping for Town's staff to update and note any changes in size or location of water lines	Completed
Town approves MOU #1 and issues Notice to Proceed	Completed
Town approves Amendment #1 to MOU #1 to include WTP upgrades in PER	Completed
Town & Engineer attends 30% review meeting (10:00 a.m.)	Completed
Engineer evaluates tank(s) condition in regards to painting needs	Completed
Engineer identifies pump station(s) within system that generator(s) are needed	Completed
Town's staff provides Engineer marked up water lines	Completed
Engineer incorporates marked up water line changes and completes new hydraulic model of Town's water system	Completed
Town's staff collects various water samples throughout system as requested by Engineer and provides lab results to Engineer	Completed
Engineer completes new orthophosphate chemical feed system	Completed
Engineer completes evaluation of the water quality effect of the operational changes in the system such as decreasing tank levels	Completed
Town & Engineer attends 75% review meeting (10:00 a.m.)	Completed
Town/VDH/Engineer attends 90% review meeting (10:00 a.m.)	Completed

TASKS	TARGET DATES
Engineer submits PER to VDH/AFO	12-20-19
Receive VDH/AFO approval of PER	02-20-20
Town Council authorizes submittal of VDH funding application	03-10-20
Town submits VDH funding application to make improvements and upgrades noted in PER	04-03-20

6.0 CONCLUSIONS AND RECOMMENDATIONS

Recommendations for Coordination

The existing water treatment plant must remain in service during construction of the upgrade. Construction scheduling must be coordinated carefully with the water treatment plant staff, with scheduled activity submitted by the contractor(s) in advance at progress meetings for review and approval by the water treatment plant operational representative and the construction contract administrator.

Some of the existing water treatment plant equipment may become inoperative prior to completion of all upgrade activities and should be identified and scheduled for installation early in the project schedule.

Recommendations for Plan of Action to Expedite Project

1. Submit an application for project funding at the earliest possible opportunity.
2. Adopt modifications, if needed, in the water rate schedule that incorporate the debt service for this project.
3. Communicate the scope of the project to non-customer stakeholders, such as the Public Service Authority and the County, to whom the project may have a financial impact.
4. Upon receipt of funding, initiate design of plans and specifications.

APPENDICES

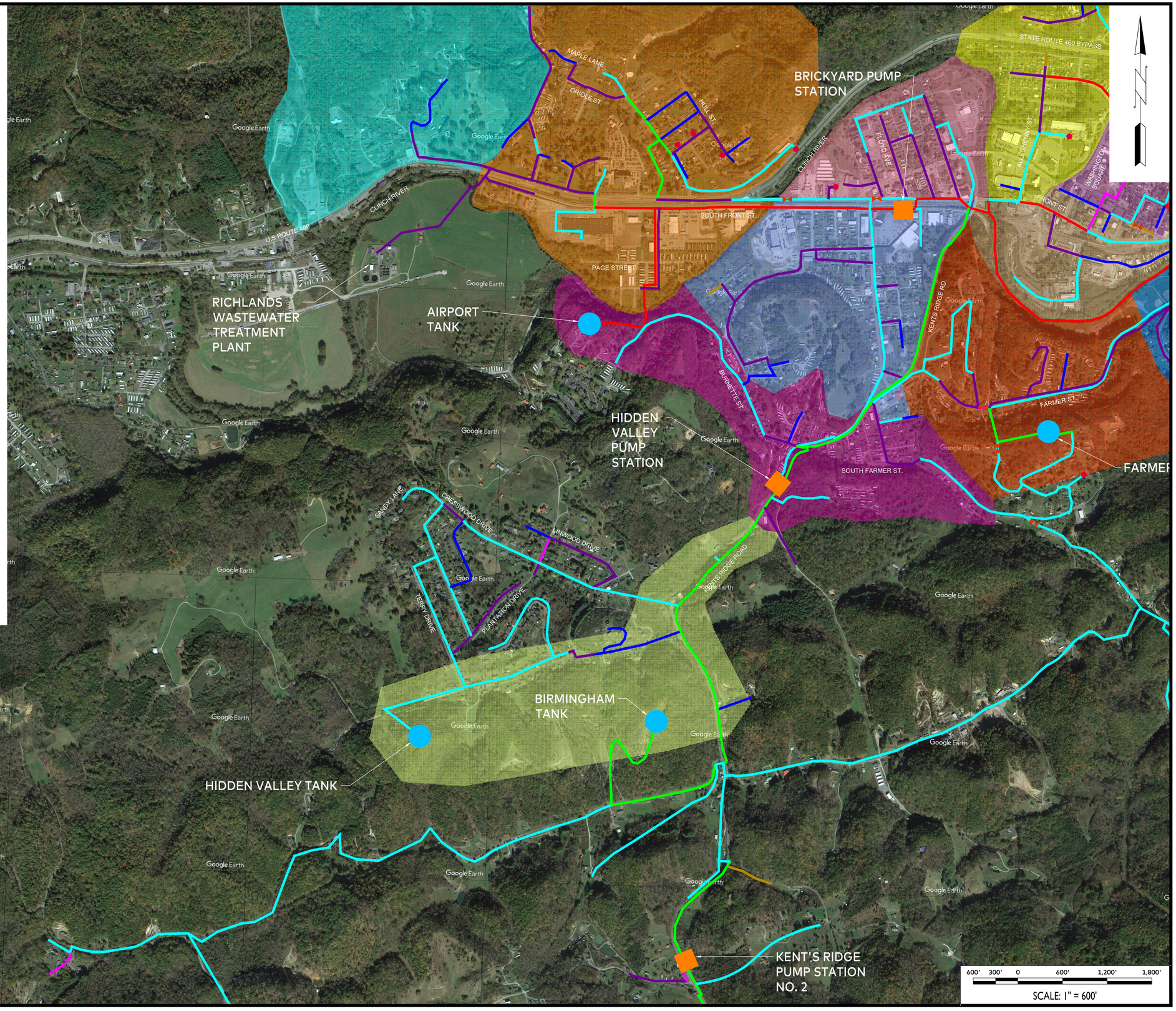
APPENDIX A

WATER LINE MAPPING EXHIBITS

LEGEND

SYMBOL	DESCRIPTION
	EXISTING 12" WATERLINE
	EXISTING 10" WATERLINE
	EXISTING 8" WATERLINE
	EXISTING 6" WATERLINE
	EXISTING 4" WATERLINE
	EXISTING 2" WATERLINE
	EXISTING 1" WATERLINE
	PUMP STATION
	WATER STORAGE TANK
	WATER TREATMENT PLANT
	GATE VALVE
	FIRE HYDRANT

BILLING AREA	DESIGNATION
	AREA 01
	AREA 02
	AREA 03
	AREA 04
	AREA 05
	AREA 06
	AREA 07
	AREA 08
	AREA 09
	AREA 10
	AREA 11
	AREA 12
	AREA 13
	AREA 14



SYSTEM DBP IMPROVEMENTS AND WATER TREATMENT PLANT UPGRADES
RICHLANDS, VIRGINIA

EXISTING WATER FACILITIES MAP

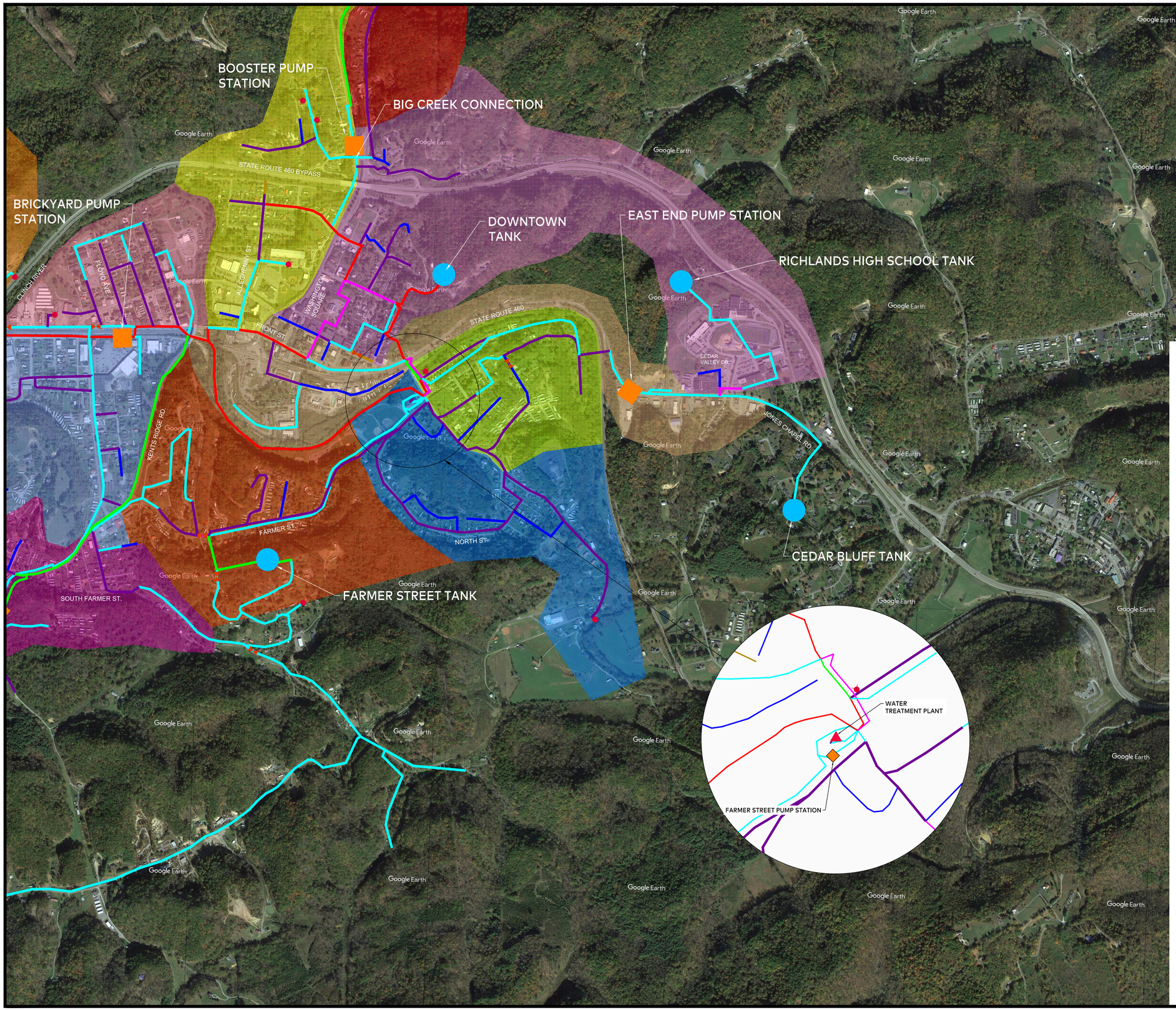
No.	Date	Purpose of Document Issue

Designed	
Drawn	
Checked	
Date	DECEMBER 2019

Project No. 14478

THOMPSON & LITTON

Sheet No. EXHIBIT 1



LEGEND

SYMBOL	DESCRIPTION
	EXISTING 12" WATERLINE
	EXISTING 10" WATERLINE
	EXISTING 8" WATERLINE
	EXISTING 6" WATERLINE
	EXISTING 4" WATERLINE
	EXISTING 2" WATERLINE
	EXISTING 1" WATERLINE
	PUMP STATION
	WATER STORAGE TANK
	WATER TREATMENT PLANT
	GATE VALVE
	FIRE HYDRANT

BILLING AREA	DESIGNATION
	AREA 01
	AREA 02
	AREA 03
	AREA 04
	AREA 05
	AREA 06
	AREA 07
	AREA 08
	AREA 09
	AREA 10
	AREA 11
	AREA 12
	AREA 13
	AREA 14

600' 300' 0 600' 1,200' 1,800'

SCALE: 1" = 600'

SYSTEM DBP IMPROVEMENTS AND WATER TREATMENT PLANT UPGRADES

RICHLANDS, VIRGINIA

EXISTING WATER FACILITIES MAP

No.	Date	Purpose of Document Issue

Designed	
Drawn	
Checked	
Date	DECEMBER 2019

Project No. 14478

THOMPSON & LITTON

Sheet No.

EXHIBIT II

APPENDIX B

HYDRAULICS

HYDRAULIC MODELING ANALYSIS CERTIFICATION

I hereby certify that the hydraulic modeling analysis for:

PER - Distribution System DBP Improvements & Water Treatment Plant Upgrades

Town of Richlands

1185695

supports the proposed design. The proposed additions/modifications to the distribution system will not cause the pressures at any new or existing connections to be less than those specified in 12VAC5-590-690 of the *Waterworks Regulations*. The model is sufficiently calibrated and accurate to represent the operating conditions of the water distribution system.

The hydraulic modeling method used: WaterCAD EPS & SS analysis,

the computer software used: Bentley WaterCAD V8i.

Refer to report for PE seal.

Signature: _____

Full Name: D. Brian McGough, PE

Date: March 24, 2020

(* This page must be **signed, sealed, and dated** by a professional engineer who oversees the completion of this hydraulic modeling analysis.)

Hydraulic Model Data Summary

Brief Description of Project: PER = Distribution System DBP Improvements & Water Treatment Plant Upgrades for Town of Richlands

This model data summary not to be used as a stand alone document to the PER. Refer to PER for project descriptions.

Hydraulic Model Input Summary:

- [x] Entire distribution system is modeled
- [ ] Part of the distribution system is modeled
- [ ] Node map is provided

If only part of the distribution is modeled, what is the basis for model development:

- [ ] Hydrant flow test: _____ gpm @ _____ psi residual pressure
- [ ] Gravity from storage tank: water surface elevation _____ feet
- [ ] Other: _____

Residential Water Demand: Q = _____ gpd per household

Based Upon
- [ ] Census data x ____ gpcd
- [ ] Historical Usage Data
- [x] Other: Demands in model are based on metered water production at the water plant and distributed throughout the service area based on connection locations.

Commercial and Industrial Demand: _____ gpd, or _____gpm

Total Demand: Q_{avg} = 853 gpm

Maximum Day Demand: Q_{avg} x 2 peak factor = 1,706 gpm

Based Upon:
- [x] 2.0 peaking factor
- [ ] Other: _____

Peak Hour Demand: Q_{avg} x _____ peak factor = _____ gpm

Not applicable

Based Upon:
- [ ] 4.0 peaking factor
- [ ] Other: _____

Is fire protection included in the project: [x] Yes [ ] No

If Yes, Design fire flow and duration: _____ gpm for _____ hours

This is an existing system.

Does the project include gravity storage? ☐ Yes ☑ No
(If more than one tank is included in the model, provide additional tank information on attached sheets.)

If Yes,
Storage tank nominal capacity: _____ gallons
Tank overflow elevation: _____ feet
Tank base elevation: _____ feet
Typical tank control low elevation: _____ feet
Typical tank control high elevation: _____ feet

Tanks and pumps in system are existing. Some pumps will be replaced in kind with same capacity.

Does the project include pumps? ☐ Yes ☑ No
(If more than one pumping station is included in the model, provide additional tank information on attached sheets.)

If Yes,
Number of pumps provided: _____
Single pump capacity: _____ gpm @ _____feet TDH
Combined pump capacity: _____ gpm @ _____feet TDH

Has the model been calibrated based on actual hydrant testing? ☐ Yes ☑ No
Pipe material: _____
Pipe Roughness Coefficient: C = _____

Hydraulic Model Output Summary:

Peak Flow Evaluation:

The model output must demonstrate that a 20 psi minimum pressure can be maintained at all locations during peak hour demand or maximum day demand plus a simultaneous fire flow event, whichever is greater. Typically, the starting tank elevation should be the normal low tank level. The model should perform an extended period simulation to run through the entire designated fire flow event (i.e., 500 gpm for 2-hours) during max day demand. A simple snap shot of max day + fire flow at the beginning of the fire duration may be appropriate in simple models. Model must also assign a node and appropriate demand at the highest elevation.

Reports submitted:

☑ Junction Report for Max Day + Fire Flow (or peak hour if greater)

☐ Pipe Report for Max Day + Fire Flow (or peak hour if greater)

☐ Tank Report, as needed

☐ Pump Report, as needed

☑ Fire Flow Report (in lieu of Junction Report)

Critical Node Output: Varies by pressure zone, see model output reports.

Node Identification: _____ Node Elevation: _____
Flow: _____ Pressure: _____

Effective Storage Evaluation:

Available effective storage is determined based on the minimum storage tank water surface elevation necessary to maintain a minimum pressure of 20 psi at all locations in the distribution system during maximum day flow.

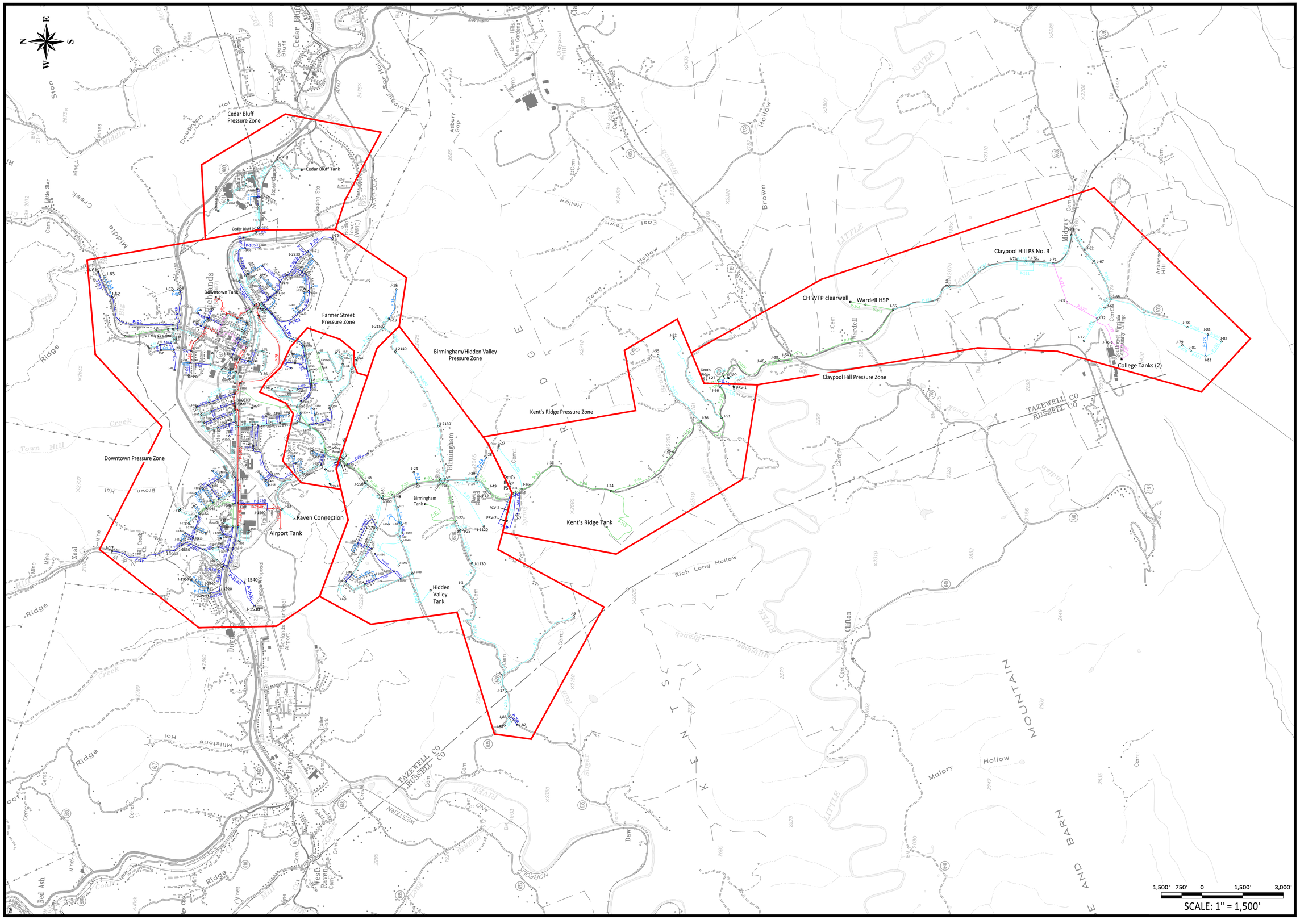
Reports submitted: Varies by pressure zone, see model output reports.

- ☐ Junction Report for Max Day
- ☐ Pipe Report for Max Day
- ☐ Tank Report
- ☐ Pump Report, as needed

Critical Node Output:

Node Identification: _____ Node Elevation: _____
Flow: _____ Pressure: _____

Storage Tank Identification: _____
(If more than one tank is included in the model, provide additional tank information on attached sheets.)
Minimum elevation necessary under maximum day domestic flow: _____ feet
Overflow elevation: _____ feet
Tank bottom elevation: _____ feet
Effective storage volume: _____ gallons



SYSTEM DBP IMPROVEMENTS AND WATER TREATMENT PLANT UPGRADES

RICHLANDS, VIRGINIA

NODE MAP

No.	Date	Purpose of Document Issue

Designed	
Drawn	
Checked	
Date	MARCH 2020

Project No.
14478

THOMPSON & LITTON

Sheet No.

EPS Existing for 14478 October 2019

Scenario Summary Report
Scenario: EPS Existing for 14478 October 2019

Scenario Summary	
ID	1085
Label	EPS Existing for 14478 October 2019
Notes	
Active Topology	<I> Base-Active Topology
Physical	<I> Base-Physical
Demand	Richlands Avg demand only
Initial Settings	24 hour EPS for 14478 Oct 2019
Operational	24 hour EPS 14478 Oct 2019
Age	<I> Base-Age Alternative
Constituent	<I> Base-Constituent
Trace	<I> Base-Trace Alternative
Fire Flow	<I> Base-Fire Flow
Energy Cost	<I> Base-Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base-User Data
Steady State/EPS Solver Calculation Options	24 hour EPS 14478 Oct 2019
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary			
Time Analysis Type	EPS	Simulation Start Date	10/1/2019
Friction Method	Hazen-Williams	Hydraulic Time Step	0.500 hours
Accuracy	0.001	Duration	24.000 hours
Trials	50	Calculation Type	Hydraulics Only

Pattern Detailed Report: Diurnal

Element Details			
ID	127	Notes	
Label	Diurnal		

<Pattern Summary>			
Start Time	12:00:00 AM	Pattern Category Type	Hydraulic
Starting Multiplier	0.130	Pattern Format	Stepwise

Pattern Curve

Time from Start (hours)	Multiplier
1.000	0.130
2.000	0.130
3.000	0.250
4.000	0.250
5.000	1.250
6.000	1.250
7.000	1.660
8.000	1.660
9.000	1.740
10.000	1.740
11.000	1.580
12.000	1.580
13.000	1.250
14.000	1.250
15.000	1.580
16.000	1.580
17.000	1.250
18.000	1.250
19.000	0.790
20.000	0.790
21.000	0.410
22.000	0.410
23.000	0.090
24.000	0.130

Pattern - Daily Multipliers

	Multiplier
Monday	1.000
Tuesday	1.000
Wednesday	1.000
Thursday	1.000
Friday	1.000
Saturday	1.000
Sunday	1.000

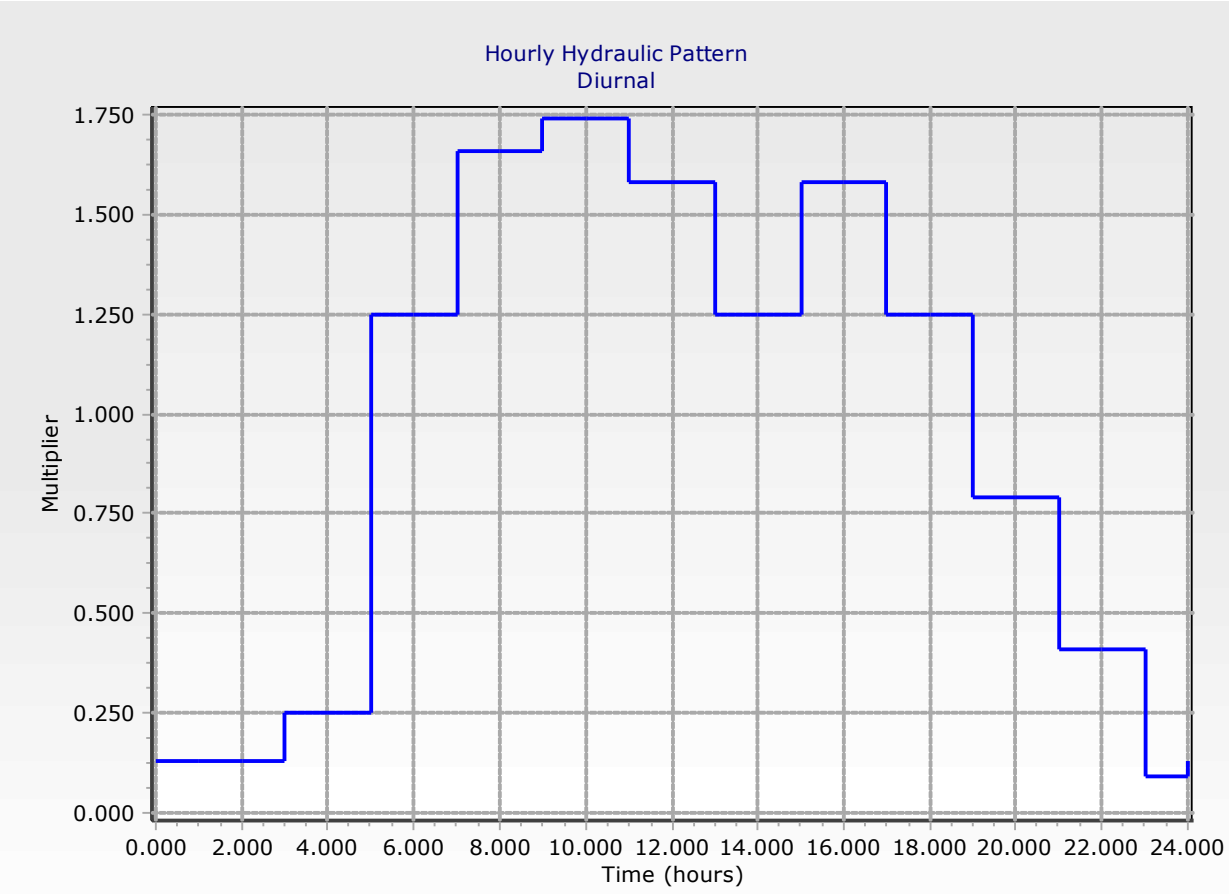
Pattern - Monthly Multipliers

	Multiplier

Pattern Detailed Report: Diurnal

Pattern - Monthly Multipliers

	Multiplier
January	1.000
February	1.000
March	1.000
April	1.000
May	1.000
June	1.000
July	1.000
August	1.000
September	1.000
October	1.000
November	1.000
December	1.000

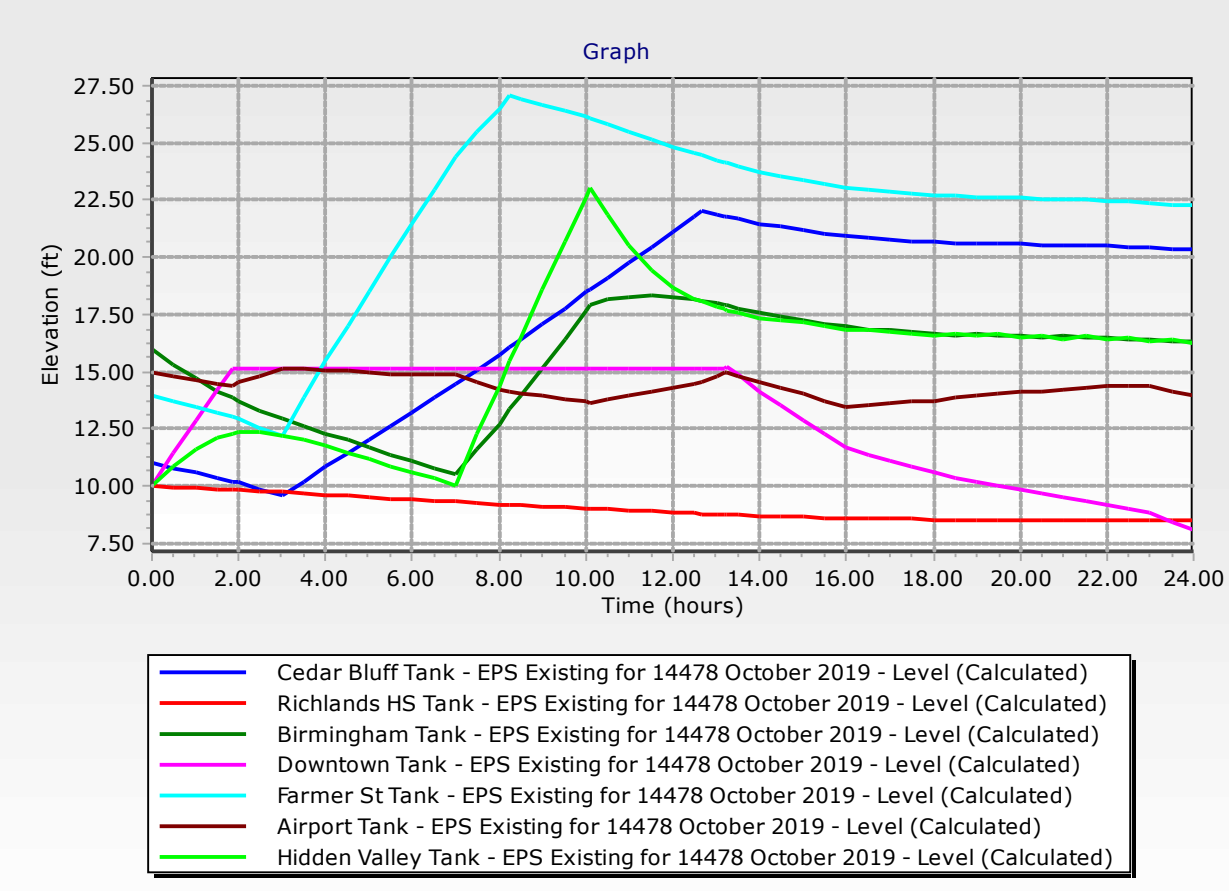


Tanks Level EPS Now

Time (hours)	Cedar Bluff Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Richlands HS Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Birmingham Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Downtown Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Farmer St Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Airport Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Hidden Valley Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)
0.00	11.00	10.00	16.00	10.00	14.00	15.00	10.00
0.50	10.79	9.96	15.31	11.44	13.73	14.82	10.90
1.00	10.58	9.92	14.71	12.85	13.46	14.66	11.59
1.50	10.37	9.88	14.18	14.19	13.20	14.52	12.10
1.85	10.23	9.85	13.87	15.12	13.01	14.42	12.33
2.00	10.16	9.84	13.75	15.12	12.93	14.54	12.39
2.50	9.88	9.79	13.34	15.12	12.57	14.84	12.37
3.00	9.61	9.74	12.98	15.12	12.22	15.14	12.24
3.50	10.22	9.68	12.64	15.12	13.86	15.11	12.03
4.00	10.84	9.63	12.33	15.12	15.47	15.07	11.79
4.50	11.44	9.58	12.02	15.12	17.02	15.02	11.49
5.00	12.04	9.52	11.71	15.12	18.53	14.98	11.19
5.50	12.64	9.47	11.40	15.12	20.02	14.93	10.88
6.00	13.24	9.41	11.09	15.12	21.47	14.89	10.57
6.50	13.87	9.36	10.79	15.12	22.95	14.89	10.32
7.00	14.49	9.31	10.51	15.12	24.40	14.89	10.06
7.50	15.10	9.26	11.61	15.12	25.45	14.57	12.25
8.00	15.70	9.21	12.75	15.12	26.48	14.26	14.38
8.25	16.03	9.19	13.35	15.12	27.08	14.14	15.46
8.50	16.38	9.17	13.95	15.12	26.95	14.08	16.52
9.00	17.08	9.13	15.18	15.12	26.68	13.95	18.62
9.50	17.78	9.09	16.43	15.12	26.41	13.83	20.67
10.00	18.47	9.05	17.70	15.12	26.15	13.70	22.66
10.10	18.60	9.04	17.95	15.12	26.08	13.66	23.03
10.50	19.13	9.00	18.13	15.12	25.81	13.79	21.83
11.00	19.78	8.95	18.28	15.12	25.47	13.95	20.52
11.50	20.44	8.90	18.32	15.12	25.13	14.11	19.47
12.00	21.09	8.85	18.25	15.12	24.79	14.27	18.69
12.50	21.81	8.81	18.15	15.12	24.53	14.50	18.18
12.65	22.03	8.80	18.10	15.12	24.45	14.57	18.07
13.00	21.88	8.77	17.98	15.12	24.26	14.85	17.84
13.20	21.80	8.76	17.90	15.12	24.15	15.00	17.73
13.25	21.77	8.75	17.88	15.25	24.12	14.99	17.70
13.50	21.67	8.73	17.78	14.89	23.99	14.84	17.57
14.00	21.46	8.69	17.57	14.16	23.72	14.52	17.32
14.50	21.33	8.67	17.40	13.53	23.55	14.27	17.26
15.00	21.20	8.64	17.25	12.91	23.38	14.02	17.13
15.50	21.06	8.62	17.11	12.29	23.22	13.76	16.99
16.00	20.93	8.59	16.97	11.68	23.05	13.50	16.85
16.50	20.86	8.58	16.86	11.39	22.96	13.57	16.86
17.00	20.79	8.57	16.81	11.11	22.87	13.64	16.75
17.50	20.73	8.55	16.73	10.84	22.78	13.70	16.70
18.00	20.66	8.54	16.66	10.57	22.70	13.75	16.62
18.50	20.64	8.54	16.61	10.38	22.68	13.85	16.68

Tanks Level EPS Now

Time (hours)	Cedar Bluff Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Richlands HS Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Birmingham Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Downtown Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Farmer St Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Airport Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)	Hidden Valley Tank - EPS Existing for 14478 October 2019 - Level (Calculated) (ft)
19.00	20.63	8.54	16.64	10.19	22.66	13.94	16.54
19.50	20.60	8.53	16.57	10.01	22.63	14.02	16.64
20.00	20.58	8.53	16.60	9.83	22.60	14.10	16.50
20.50	20.56	8.52	16.52	9.66	22.57	14.17	16.60
21.00	20.54	8.52	16.55	9.50	22.55	14.24	16.45
21.50	20.52	8.52	16.48	9.34	22.52	14.30	16.55
22.00	20.50	8.51	16.50	9.19	22.49	14.36	16.40
22.50	20.45	8.50	16.42	9.03	22.44	14.39	16.46
23.00	20.41	8.50	16.41	8.88	22.38	14.42	16.33
23.50	20.37	8.49	16.33	8.46	22.33	14.18	16.37
24.00	20.33	8.48	16.32	8.05	22.28	13.94	16.24



Tank Water Ages Now

Time (hours)	Cedar Bluff Tank - Water Age Now - Age (Calculated) (hours)	Birmingham Tank - Water Age Now - Age (Calculated) (hours)	Downtown Tank - Water Age Now - Age (Calculated) (hours)	Farmer St Tank - Water Age Now - Age (Calculated) (hours)	Airport Tank - Water Age Now - Age (Calculated) (hours)	Hidden Valley Tank - Water Age Now - Age (Calculated) (hours)
0.00	96.000	192.000	240.000	96.000	192.000	120.000
1.00	97.000	193.000	199.925	97.000	193.000	121.000
1.30	97.300	193.300	189.798	97.300	193.300	121.300
2.00	98.000	194.000	190.498	98.000	193.417	122.000
3.00	99.000	195.000	191.498	99.000	189.622	123.000
4.00	95.834	196.000	192.498	92.138	190.622	124.000
5.00	91.278	197.000	193.498	81.868	191.622	125.000
5.90	87.575	197.900	194.398	74.927	192.522	125.900
6.00	87.162	198.000	194.498	75.027	192.622	126.000
7.00	83.098	199.000	195.498	76.027	193.340	127.000
7.60	81.024	199.600	196.098	76.627	193.940	122.405
8.00	81.424	200.000	196.498	77.027	194.340	117.153
9.00	82.424	188.109	197.498	78.027	195.340	100.611
9.40	82.824	179.163	197.898	78.427	195.740	94.975
10.00	83.424	177.185	198.498	79.027	193.892	95.575
11.00	84.424	177.299	199.498	80.027	189.256	96.575
12.00	85.424	178.299	200.498	81.027	184.934	97.575
13.00	86.424	179.299	201.499	82.027	179.892	98.575
13.20	86.624	179.499	201.699	82.227	178.933	98.775
13.25	86.674	179.549	199.974	82.277	178.983	98.825
14.00	87.424	180.299	200.724	83.027	179.733	99.575
15.00	88.424	181.299	201.724	84.027	180.733	100.575
16.00	89.424	182.300	202.724	85.027	181.733	101.575
17.00	90.424	183.300	203.724	86.027	182.734	102.575
18.00	91.424	184.300	204.724	87.027	183.734	103.575
19.00	92.423	185.300	205.724	88.027	184.734	104.575
20.00	93.423	186.300	206.724	89.027	185.734	105.575
21.00	94.423	187.300	207.724	90.027	186.734	106.575
22.00	95.423	188.300	208.724	91.027	187.734	107.575
23.00	96.423	189.300	209.724	92.027	188.734	108.575
24.00	97.423	190.300	210.725	93.027	189.734	109.575
25.00	98.423	191.300	204.855	94.026	190.734	110.575
25.30	98.723	191.600	196.341	94.326	191.034	110.875
26.00	99.423	192.300	197.041	95.026	191.734	111.575
27.00	100.423	193.300	198.041	96.026	190.635	112.575
28.00	98.041	194.300	199.041	91.430	191.635	113.575
29.00	93.356	195.300	200.041	81.589	192.635	114.575
29.70	90.340	196.000	200.741	76.300	193.336	115.275
30.00	89.044	196.300	201.041	76.600	193.636	115.575
31.00	84.855	197.300	202.041	77.600	193.881	116.575
31.70	82.375	198.001	202.741	78.300	194.581	113.558
32.00	82.675	198.301	203.041	78.600	194.881	115.142
33.00	83.675	189.104	204.041	79.600	195.881	104.953
33.50	84.175	177.722	204.541	80.100	196.381	101.289
34.00	84.675	175.992	205.041	80.600	195.139	101.789
35.00	85.674	175.485	206.041	81.600	190.453	102.789

Tank Water Ages Now

Time (hours)	Cedar Bluff Tank - Water Age Now - Age (Calculated) (hours)	Birmingham Tank - Water Age Now - Age (Calculated) (hours)	Downtown Tank - Water Age Now - Age (Calculated) (hours)	Farmer St Tank - Water Age Now - Age (Calculated) (hours)	Airport Tank - Water Age Now - Age (Calculated) (hours)	Hidden Valley Tank - Water Age Now - Age (Calculated) (hours)
36.00	86.674	176.486	207.041	82.600	186.084	103.789
37.00	87.674	177.486	208.041	83.600	180.991	104.789
37.20	87.874	177.686	208.241	83.800	180.021	104.989
37.25	87.924	177.736	206.691	83.850	180.071	105.039
38.00	88.674	178.486	207.441	84.600	180.821	105.789
39.00	89.674	179.486	208.441	85.600	181.822	106.789
40.00	90.674	180.486	209.441	86.600	182.822	107.789
41.00	91.674	181.486	210.441	87.600	183.822	108.789
42.00	92.674	182.486	211.441	88.600	184.822	109.789
43.00	93.674	183.486	212.441	89.600	185.822	110.789
44.00	94.674	184.486	213.441	90.600	186.822	111.789
45.00	95.674	185.486	214.441	91.600	187.822	112.789
46.00	96.674	186.486	215.441	92.600	188.822	113.789
47.00	97.674	187.486	216.441	93.600	189.822	114.789
48.00	98.674	188.486	217.442	94.600	190.822	115.789
49.00	99.674	189.486	211.322	95.600	191.822	116.789
49.40	100.074	189.886	199.486	96.000	192.222	117.188
50.00	100.674	190.486	200.086	96.600	192.822	117.788
51.00	101.674	191.486	201.086	97.600	191.932	118.788
52.00	99.271	192.486	202.087	92.893	192.932	119.788
53.00	94.534	193.487	203.087	82.854	193.932	120.788
53.70	91.495	194.187	203.787	77.459	194.632	121.488
54.00	90.189	194.487	204.087	77.759	194.932	121.788
55.00	85.963	195.487	205.087	78.759	195.165	122.788
55.60	83.804	196.087	205.687	79.359	195.765	121.093
56.00	84.204	196.487	206.087	79.759	196.165	120.643
57.00	85.204	187.419	207.087	80.759	197.165	109.450
57.50	85.704	176.159	207.587	81.259	197.665	105.343
58.00	86.204	174.457	208.087	81.759	196.301	105.843
59.00	87.204	173.974	209.087	82.759	191.545	106.843
60.00	88.204	174.974	210.087	83.759	187.112	107.843
61.00	89.204	175.974	211.087	84.759	181.949	108.843
61.20	89.404	176.174	211.287	84.959	180.967	109.043
61.25	89.454	176.224	209.744	85.009	181.017	109.093
62.00	90.204	176.974	210.494	85.759	181.767	109.843
63.00	91.204	177.974	211.494	86.759	182.767	110.843
64.00	92.204	178.974	212.494	87.759	183.767	111.843
65.00	93.204	179.974	213.494	88.759	184.767	112.843
66.00	94.204	180.974	214.494	89.759	185.767	113.843
67.00	95.204	181.974	215.494	90.759	186.767	114.843
68.00	96.204	182.974	216.494	91.759	187.767	115.843
69.00	97.204	183.974	217.494	92.759	188.768	116.843
70.00	98.204	184.974	218.494	93.759	189.768	117.843
71.00	99.204	185.975	219.494	94.759	190.768	118.843
72.00	100.204	186.975	220.494	95.759	191.768	119.843
73.00	101.204	187.975	214.371	96.759	192.768	120.843
73.30	101.504	188.275	205.517	97.059	193.068	121.143

Tank Water Ages Now

Time (hours)	Cedar Bluff Tank - Water Age Now - Age (Calculated) (hours)	Birmingham Tank - Water Age Now - Age (Calculated) (hours)	Downtown Tank - Water Age Now - Age (Calculated) (hours)	Farmer St Tank - Water Age Now - Age (Calculated) (hours)	Airport Tank - Water Age Now - Age (Calculated) (hours)	Hidden Valley Tank - Water Age Now - Age (Calculated) (hours)
74.00	102.204	188.975	206.217	97.759	193.768	121.843
75.00	103.204	189.975	207.217	98.759	192.525	122.843
76.00	100.727	190.975	208.217	93.948	193.525	123.843
77.00	95.906	191.975	209.217	83.743	194.525	124.843
77.70	92.800	192.675	209.917	78.262	195.225	125.543
78.00	91.465	192.975	210.217	78.562	195.525	125.843
79.00	87.150	193.975	211.217	79.562	195.740	126.843
79.60	84.943	194.575	211.817	80.162	196.340	125.057
80.00	85.343	194.975	212.217	80.562	196.740	124.316
81.00	86.343	186.005	213.217	81.562	197.740	112.494
81.50	86.843	174.851	213.717	82.062	198.240	108.091
82.00	87.343	173.167	214.217	82.562	196.876	108.591
83.00	88.343	172.697	215.217	83.562	192.110	109.591
84.00	89.343	173.698	216.217	84.562	187.669	110.591
85.00	90.343	174.698	217.217	85.562	182.496	111.591
85.20	90.543	174.898	217.417	85.762	181.512	111.791
85.25	90.593	174.948	215.806	85.812	181.562	111.841
86.00	91.343	175.698	216.556	86.562	182.312	112.591
87.00	92.343	176.698	217.556	87.562	183.312	113.591
88.00	93.343	177.698	218.556	88.562	184.312	114.591
89.00	94.343	178.698	219.556	89.562	185.312	115.591
90.00	95.343	179.698	220.556	90.562	186.312	116.591
91.00	96.343	180.698	221.556	91.562	187.312	117.591
92.00	97.343	181.698	222.556	92.562	188.312	118.591
93.00	98.343	182.698	223.557	93.562	189.312	119.591
94.00	99.343	183.698	224.557	94.562	190.312	120.591
95.00	100.343	184.698	225.557	95.562	191.312	121.591
96.00	101.343	185.698	226.557	96.562	192.312	122.591
97.00	102.343	186.698	220.188	97.562	193.312	123.591
97.30	102.643	186.998	211.021	97.862	193.612	123.891
98.00	103.343	187.698	211.721	98.562	194.313	124.591
99.00	104.343	188.698	212.721	99.562	193.118	125.590
100.00	101.811	189.699	213.721	94.605	194.118	126.590
101.00	96.908	190.699	214.721	84.348	195.118	127.590
101.70	93.750	191.399	215.421	78.805	195.819	128.290
102.00	92.393	191.699	215.721	79.105	196.119	128.590
103.00	88.008	192.699	216.721	80.105	196.342	129.591
103.70	85.408	193.399	217.422	80.805	197.042	126.060
104.00	85.708	193.699	217.722	81.105	197.342	126.817
105.00	86.708	184.787	218.722	82.105	198.342	114.552
105.50	87.208	173.723	219.222	82.605	198.842	109.939
106.00	87.708	172.051	219.722	83.105	197.557	110.439
107.00	88.708	171.583	220.722	84.105	192.765	111.439
108.00	89.708	172.583	221.722	85.105	188.299	112.439
109.00	90.708	173.583	222.722	86.105	183.098	113.439
109.20	90.908	173.783	222.922	86.305	182.108	113.639
109.25	90.958	173.833	221.257	86.355	182.158	113.689

Tank Water Ages Now

Time (hours)	Cedar Bluff Tank - Water Age Now - Age (Calculated) (hours)	Birmingham Tank - Water Age Now - Age (Calculated) (hours)	Downtown Tank - Water Age Now - Age (Calculated) (hours)	Farmer St Tank - Water Age Now - Age (Calculated) (hours)	Airport Tank - Water Age Now - Age (Calculated) (hours)	Hidden Valley Tank - Water Age Now - Age (Calculated) (hours)
110.00	91.708	174.583	222.007	87.105	182.909	114.439
111.00	92.708	175.583	223.007	88.105	183.909	115.439
112.00	93.708	176.583	224.007	89.105	184.909	116.438
113.00	94.708	177.583	225.007	90.105	185.909	117.438
114.00	95.708	178.584	226.007	91.105	186.909	118.438
115.00	96.708	179.584	227.007	92.105	187.909	119.438
116.00	97.708	180.584	228.007	93.105	188.909	120.438
117.00	98.708	181.584	229.008	94.105	189.909	121.438
118.00	99.708	182.584	230.008	95.105	190.909	122.438
119.00	100.708	183.584	231.008	96.105	191.909	123.438
120.00	101.708	184.584	232.008	97.105	192.909	124.438
121.00	102.708	185.584	225.416	98.105	193.909	125.438
121.40	103.108	185.984	212.766	98.505	194.309	125.838
122.00	103.708	186.584	213.366	99.105	194.909	126.438
123.00	104.708	187.584	214.366	100.105	193.913	127.438
124.00	102.190	188.584	215.367	94.905	194.913	128.438
125.00	97.284	189.584	216.367	84.531	195.913	129.438
125.80	93.709	190.384	217.167	78.240	196.713	130.238
126.00	92.813	190.584	217.367	78.440	196.913	130.438
127.00	88.433	191.584	218.367	79.440	197.357	131.439
127.60	86.192	192.184	218.967	80.040	197.957	129.550
128.00	86.592	192.584	219.367	80.440	198.357	128.457
129.00	87.592	183.775	220.367	81.440	199.357	115.917
129.50	88.092	172.789	220.867	81.940	199.857	111.168
130.00	88.592	171.136	221.367	82.440	198.449	111.668
131.00	89.592	170.687	222.367	83.440	193.590	112.668
132.00	90.592	171.687	223.367	84.440	189.064	113.668
133.00	91.592	172.687	224.367	85.440	183.799	114.668
133.20	91.792	172.887	224.567	85.640	182.797	114.868
133.25	91.842	172.937	222.920	85.690	182.847	114.918
134.00	92.592	173.687	223.671	86.440	183.598	115.668
135.00	93.592	174.687	224.671	87.440	184.598	116.668
136.00	94.592	175.687	225.671	88.440	185.598	117.668
137.00	95.592	176.687	226.671	89.440	186.598	118.668
138.00	96.592	177.687	227.671	90.440	187.598	119.668
139.00	97.592	178.688	228.671	91.440	188.598	120.668
140.00	98.592	179.688	229.671	92.440	189.598	121.668
141.00	99.592	180.688	230.671	93.440	190.598	122.668
142.00	100.592	181.688	231.671	94.440	191.598	123.668
143.00	101.592	182.688	232.671	95.440	192.598	124.668
144.00	102.592	183.688	233.671	96.440	193.598	125.668
145.00	103.592	184.688	227.117	97.440	194.598	126.668
145.30	103.892	184.988	217.702	97.740	194.898	126.968
146.00	104.592	185.688	218.402	98.440	195.598	127.668
147.00	105.592	186.688	219.402	99.440	194.294	128.668
148.00	103.023	187.688	220.402	94.397	195.294	129.668
149.00	98.066	188.688	221.402	84.257	196.294	130.668

Tank Water Ages Now

Time (hours)	Cedar Bluff Tank - Water Age Now - Age (Calculated) (hours)	Birmingham Tank - Water Age Now - Age (Calculated) (hours)	Downtown Tank - Water Age Now - Age (Calculated) (hours)	Farmer St Tank - Water Age Now - Age (Calculated) (hours)	Airport Tank - Water Age Now - Age (Calculated) (hours)	Hidden Valley Tank - Water Age Now - Age (Calculated) (hours)
149.70	94.872	189.388	222.102	78.799	196.994	131.368
150.00	93.500	189.688	222.402	79.099	197.294	131.668
151.00	89.063	190.688	223.402	80.099	197.465	132.668
151.60	86.794	191.288	224.002	80.699	198.065	130.754
152.00	87.194	191.688	224.402	81.099	198.465	129.564
153.00	88.194	182.940	225.402	82.099	199.465	116.835
153.50	88.694	172.021	225.902	82.599	199.965	111.990
154.00	89.194	170.380	226.402	83.099	198.564	112.490
155.00	90.194	169.939	227.402	84.099	193.718	113.490
156.00	91.194	170.939	228.402	85.099	189.202	114.490
157.00	92.194	171.939	229.403	86.099	183.947	115.490
157.20	92.394	172.139	229.603	86.299	182.948	115.690
157.25	92.444	172.189	227.893	86.349	182.998	115.740
158.00	93.194	172.939	228.643	87.099	183.748	116.490
159.00	94.194	173.939	229.643	88.099	184.748	117.490
160.00	95.194	174.939	230.643	89.099	185.748	118.490
161.00	96.194	175.939	231.643	90.099	186.748	119.490
162.00	97.194	176.939	232.643	91.099	187.748	120.490
163.00	98.194	177.939	233.643	92.099	188.748	121.490
164.00	99.194	178.939	234.643	93.099	189.748	122.490
165.00	100.194	179.940	235.643	94.099	190.748	123.490
166.00	101.194	180.940	236.644	95.099	191.748	124.490
167.00	102.194	181.940	237.644	96.099	192.748	125.490
168.00	103.194	182.940	238.644	97.099	193.748	126.490
169.00	104.194	183.940	231.868	98.099	194.748	127.490
169.30	104.494	184.240	222.176	98.399	195.048	127.790
170.00	105.194	184.940	222.876	99.099	195.748	128.490
171.00	106.194	185.940	223.876	100.099	194.510	129.490
172.00	103.589	186.940	224.876	95.173	195.510	130.490
173.00	98.581	187.940	225.876	84.952	196.510	131.490
173.70	95.354	188.640	226.576	79.417	197.210	132.190
174.00	93.968	188.940	226.876	79.717	197.510	132.490
175.00	89.488	189.940	227.876	80.717	197.697	133.490
175.70	86.832	190.640	228.576	81.417	198.397	129.818
176.00	87.132	190.940	228.876	81.717	198.698	130.316
177.00	88.132	182.221	229.876	82.717	199.698	117.445
177.40	88.532	173.488	230.276	83.117	200.098	113.753
178.00	89.132	171.560	230.876	83.717	198.248	114.353
179.00	90.132	171.684	231.876	84.717	193.430	115.353
180.00	91.132	172.684	232.876	85.717	188.940	116.353
181.00	92.132	173.684	233.876	86.717	183.714	117.353
181.20	92.332	173.884	234.076	86.917	182.720	117.553
181.25	92.382	173.934	232.318	86.967	182.770	117.603
182.00	93.132	174.684	233.068	87.717	183.520	118.353
183.00	94.132	175.685	234.068	88.717	184.520	119.353
184.00	95.132	176.685	235.068	89.717	185.520	120.353
185.00	96.132	177.685	236.068	90.717	186.520	121.353

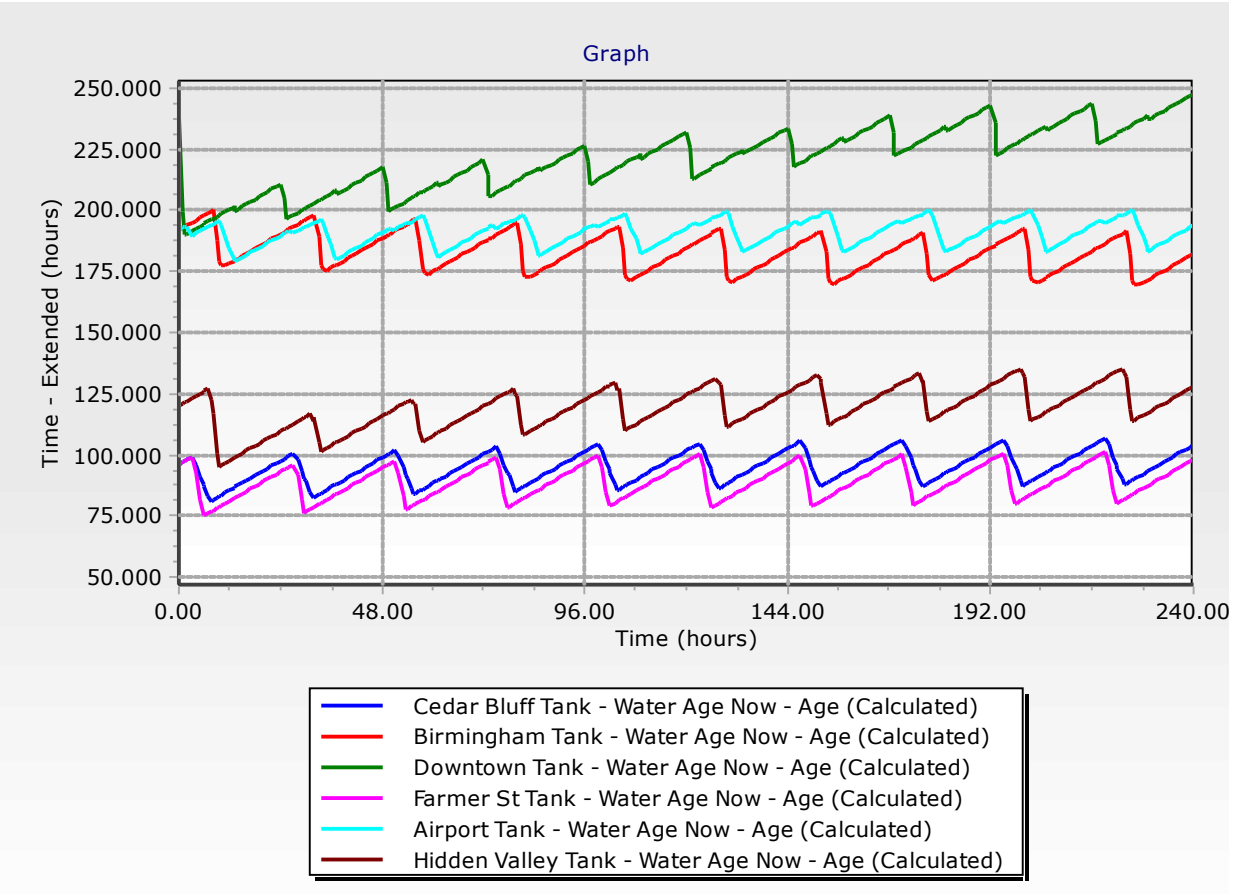
Tank Water Ages Now

Time (hours)	Cedar Bluff Tank - Water Age Now - Age (Calculated) (hours)	Birmingham Tank - Water Age Now - Age (Calculated) (hours)	Downtown Tank - Water Age Now - Age (Calculated) (hours)	Farmer St Tank - Water Age Now - Age (Calculated) (hours)	Airport Tank - Water Age Now - Age (Calculated) (hours)	Hidden Valley Tank - Water Age Now - Age (Calculated) (hours)
186.00	97.132	178.685	237.068	91.717	187.520	122.353
187.00	98.132	179.685	238.068	92.717	188.520	123.352
188.00	99.132	180.685	239.068	93.717	189.520	124.352
189.00	100.132	181.685	240.068	94.717	190.520	125.352
190.00	101.132	182.685	241.069	95.717	191.520	126.352
191.00	102.132	183.685	242.069	96.717	192.520	127.352
192.00	103.131	184.685	243.069	97.717	193.520	128.352
193.00	104.131	185.685	236.101	98.717	194.520	129.352
193.40	104.531	186.085	222.806	99.117	194.920	129.753
194.00	105.131	186.685	223.406	99.717	195.520	130.353
195.00	106.131	187.685	224.406	100.716	194.593	131.353
196.00	103.557	188.685	225.406	95.793	195.593	132.353
197.00	98.570	189.685	226.406	85.398	196.593	133.353
197.70	95.368	190.385	227.107	79.810	197.293	134.053
198.00	93.993	190.685	227.407	80.110	197.593	134.353
199.00	89.543	191.686	228.407	81.110	197.795	135.353
199.60	87.266	192.286	229.007	81.710	198.395	133.327
200.00	87.666	192.686	229.407	82.110	198.795	132.086
201.00	88.666	183.728	230.407	83.110	199.795	118.888
201.50	89.166	172.573	230.907	83.610	200.295	113.832
202.00	89.666	170.890	231.407	84.110	198.885	114.332
203.00	90.666	170.421	232.407	85.110	194.020	115.332
204.00	91.666	171.421	233.407	86.110	189.487	116.332
205.00	92.666	172.421	234.407	87.110	184.213	117.332
205.20	92.866	172.621	234.607	87.310	183.210	117.532
205.25	92.916	172.671	232.878	87.360	183.260	117.582
206.00	93.666	173.421	233.628	88.110	184.010	118.332
207.00	94.666	174.421	234.628	89.110	185.010	119.332
208.00	95.666	175.421	235.628	90.110	186.010	120.332
209.00	96.666	176.421	236.628	91.110	187.010	121.332
210.00	97.666	177.421	237.628	92.110	188.010	122.332
211.00	98.666	178.421	238.629	93.110	189.010	123.332
212.00	99.666	179.422	239.629	94.110	190.010	124.332
213.00	100.666	180.422	240.629	95.110	191.010	125.332
214.00	101.666	181.422	241.629	96.110	192.010	126.332
215.00	102.666	182.422	242.629	97.110	193.010	127.332
216.00	103.666	183.422	243.629	98.110	194.010	128.332
217.00	104.666	184.422	236.741	99.110	195.010	129.332
217.30	104.966	184.722	226.895	99.410	195.310	129.632
218.00	105.666	185.422	227.595	100.110	196.010	130.332
219.00	106.666	186.422	228.595	101.110	194.657	131.332
220.00	104.055	187.422	229.595	95.867	195.657	132.332
221.00	99.040	188.422	230.596	85.418	196.657	133.332
221.70	95.807	189.122	231.296	79.805	197.357	134.032
222.00	94.419	189.422	231.596	80.105	197.657	134.332
223.00	89.928	190.422	232.596	81.105	197.820	135.332
223.60	87.630	191.022	233.196	81.705	198.420	133.309

Tank Water Ages Now

Time (hours)	Cedar Bluff Tank - Water Age Now - Age (Calculated) (hours)	Birmingham Tank - Water Age Now - Age (Calculated) (hours)	Downtown Tank - Water Age Now - Age (Calculated) (hours)	Farmer St Tank - Water Age Now - Age (Calculated) (hours)	Airport Tank - Water Age Now - Age (Calculated) (hours)	Hidden Valley Tank - Water Age Now - Age (Calculated) (hours)
224.00	88.030	191.422	233.596	82.105	198.820	131.924
225.00	89.030	182.531	234.596	83.105	199.820	118.615
225.50	89.530	171.466	235.096	83.605	200.320	113.541
226.00	90.030	169.800	235.596	84.105	198.918	114.041
227.00	91.030	169.343	236.596	85.105	194.065	115.041
228.00	92.030	170.343	237.596	86.105	189.543	116.041
229.00	93.030	171.343	238.596	87.105	184.281	117.041
229.20	93.230	171.543	238.796	87.305	183.280	117.241
229.25	93.280	171.593	237.011	87.355	183.330	117.291
230.00	94.030	172.343	237.761	88.105	184.080	118.041
231.00	95.030	173.343	238.761	89.105	185.080	119.041
232.00	96.030	174.343	239.761	90.105	186.080	120.041
233.00	97.030	175.343	240.761	91.105	187.080	121.041
234.00	98.030	176.343	241.761	92.105	188.080	122.041
235.00	99.030	177.343	242.761	93.105	189.080	123.041
236.00	100.030	178.343	243.761	94.105	190.080	124.041
237.00	101.030	179.343	244.762	95.105	191.080	125.041
238.00	102.030	180.343	245.762	96.105	192.081	126.041
239.00	103.030	181.343	246.762	97.105	193.081	127.041
240.00	104.030	182.344	247.762	98.105	194.081	128.041

Tank Water Ages Now



FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
Big Ck Conn	1,945.00	Downtown	0.00	2,180.13	102
Hospital	1,955.00	Downtown	11.62	2,170.71	93
J-1	2,163.75	99	0.00	2,174.60	5
J-1	1,943.00	Downtown	0.00	2,170.98	99
J-2	2,075.00	Birm/Hidden Valley	0.00	2,352.23	120
J-2	1,986.00	Downtown	0.00	2,170.98	80
J-3	2,140.00	Birm/Hidden Valley	1.17	2,352.22	92
J-3	1,949.00	Downtown	0.00	2,170.98	96
J-4	2,040.00	Birm/Hidden Valley	0.00	2,352.22	135
J-4	1,958.00	Downtown	0.00	2,170.98	92
J-5	2,085.00	Birm/Hidden Valley	1.11	2,352.22	116
J-7	2,150.00	Birm/Hidden Valley	0.70	2,350.68	87
J-7	1,947.00	Downtown	0.00	2,170.98	97
J-8	1,991.00	Downtown	0.00	2,170.98	78
J-9	1,929.00	Downtown	0.00	2,170.97	105
J-10	1,925.00	99	0.00	1,926.46	1
J-10	1,930.00	Downtown	0.00	2,170.76	104
J-11	2,040.00	Birm/Hidden Valley	4.50	2,350.69	134
J-11	1,953.00	Downtown	0.00	2,170.96	94
J-12	2,080.00	Birm/Hidden Valley	0.87	2,350.68	117
J-12	2,058.00	Downtown	0.00	2,170.71	49
J-13	2,220.00	Birm/Hidden Valley	1.86	2,350.68	57
J-13	1,990.00	Downtown	0.00	2,054.49	28
J-14	2,080.00	Birm/Hidden Valley	0.37	2,350.68	117
J-14	1,926.00	Downtown	0.00	2,161.95	102
J-15	1,928.00	Downtown	0.00	2,161.95	101
J-16	2,061.00	3	0.00	2,246.42	80
J-17	2,075.00	Birm/Hidden Valley	0.39	2,352.22	120
J-17	2,067.00	3	0.00	2,246.39	78
J-18	2,000.00	Birm/Hidden Valley	0.17	2,350.65	152
J-18	2,062.00	Birm/Hidden Valley	0.00	2,349.47	124
J-19	1,980.00	Birm/Hidden Valley	0.50	2,350.65	160
J-19	2,183.00	Birm/Hidden Valley	0.00	2,349.47	72
J-20	1,930.00	3	0.00	2,246.42	137

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-20	2,166.00	Birm/Hidden Valley	0.00	2,349.21	79
J-21	2,071.00	Birm/Hidden Valley	0.00	2,349.21	120
J-22	2,080.00	Birm/Hidden Valley	0.00	2,352.23	118
J-22	2,100.00	Birm/Hidden Valley	0.00	2,349.21	108
J-23	2,030.00	Birm/Hidden Valley	0.00	2,350.99	139
J-23	2,025.00	Birm/Hidden Valley	0.00	2,350.35	141
J-24	2,400.00	Kent's Ridge	0.00	2,736.00	145
J-24	2,083.00	Birm/Hidden Valley	0.00	2,350.35	116
J-25	2,280.00	Kent's Ridge	0.00	2,736.00	197
J-25	2,063.00	Birm/Hidden Valley	0.00	2,352.23	125
J-26	2,180.00	Kent's Ridge	0.00	2,736.00	241
J-26	2,199.00	Kent's Ridge	0.00	2,736.00	232
J-27	2,185.00	Claypool Hill	0.00	2,473.00	125
J-27	2,185.00	Kent's Ridge	0.00	2,736.00	238
J-28	2,030.00	Claypool Hill	0.00	2,473.00	192
J-28	2,093.00	Birm/Hidden Valley	0.00	2,350.68	111
J-29	2,141.00	Birm/Hidden Valley	0.00	2,348.75	90
J-30	2,020.00	3	2.32	2,246.42	98
J-30	1,935.00	Downtown	0.00	2,170.74	102
J-31	2,260.00	Kent's Ridge	0.00	2,736.00	206
J-31	1,987.00	3	0.00	2,246.40	112
J-32	1,930.00	Downtown	0.00	2,186.16	111
J-33	1,978.00	Downtown	0.00	2,186.71	90
J-34	1,945.00	Downtown	0.00	2,180.06	102
J-35	1,940.00	Downtown	0.00	2,180.05	104
J-36	1,933.00	Downtown	0.00	2,184.98	109
J-37	1,940.00	Downtown	0.00	2,166.68	98
J-37	1,941.00	Downtown	0.00	2,185.34	106
J-39	2,080.00	Birm/Hidden Valley	0.00	2,350.68	117
J-39	1,947.00	Downtown	0.00	2,180.68	101
J-40	1,987.00	3	2.32	2,246.44	112
J-40	1,947.00	Downtown	0.00	2,184.34	103
J-41	2,220.00	Kent's Ridge	0.00	2,736.00	223
J-41	1,967.00	Downtown	0.00	2,181.19	93
J-42	1,945.00	Birm/Hidden Valley	0.00	2,349.93	175
J-42	1,951.00	Downtown	0.00	2,181.19	100

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-43	2,000.00	Birm/Hidden Valley	0.00	2,349.96	151
J-43	1,955.00	Downtown	0.00	2,181.69	98
J-44	2,060.00	Birm/Hidden Valley	0.00	2,349.93	125
J-44	1,951.00	Downtown	0.00	2,180.27	99
J-45	1,965.00	Birm/Hidden Valley	0.00	2,349.93	167
J-45	1,931.00	Downtown	0.00	2,180.21	108
J-46	2,050.00	Claypool Hill	0.00	2,473.00	183
J-46	1,939.00	Downtown	0.00	2,180.13	104
J-47	1,945.00	Downtown	0.00	2,180.13	102
J-48	1,980.00	Downtown	0.00	2,180.13	87
J-49	2,100.00	Birm/Hidden Valley	0.00	2,350.68	108
J-49	2,040.00	Downtown	0.00	2,180.13	61
J-50	2,150.00	3	2.32	2,246.46	42
J-50	2,076.00	Downtown	0.00	2,180.13	45
J-51	2,300.00	Kent's Ridge	0.00	2,736.00	189
J-51	2,082.00	Downtown	0.00	2,180.13	42
J-52	2,500.00	Kent's Ridge	0.00	2,736.00	102
J-52	2,011.00	Downtown	0.00	2,180.13	73
J-53	2,033.00	Birm/Hidden Valley	0.00	2,350.67	137
J-53	2,035.00	Downtown	0.00	2,180.13	63
J-54	1,946.00	Downtown	0.00	2,180.13	101
J-55	2,280.00	Kent's Ridge	0.00	2,736.00	197
J-55	1,952.00	Downtown	0.00	2,180.13	99
J-56	2,185.00	Kent's Ridge	0.00	2,736.00	238
J-56	2,012.00	Downtown	0.00	2,180.13	73
J-57	2,200.00	Birm/Hidden Valley	0.00	2,350.68	65
J-57	2,027.00	Downtown	0.00	2,180.13	66
J-58	1,940.00	3	0.00	2,166.60	98
J-58	1,999.00	Downtown	0.00	2,180.13	78
J-59	1,950.00	Birm/Hidden Valley	0.00	2,349.93	173
J-59	1,940.00	Downtown	0.00	2,180.13	104
J-60	1,935.00	Downtown	2.32	2,187.17	109
J-60	1,945.00	Downtown	0.00	2,180.13	102
J-61	1,975.00	Birm/Hidden Valley	0.00	2,349.93	162
J-61	2,005.00	Downtown	0.00	2,180.13	76
J-62	2,194.00	Claypool Hill	0.00	2,473.00	121
J-62	1,986.00	Downtown	0.00	2,180.13	84
J-63	2,165.00	Claypool Hill	0.00	2,473.00	133
J-63	2,008.00	Downtown	0.00	2,180.13	74
J-64	2,040.00	Claypool Hill	0.00	2,473.00	187

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-65	2,048.00	Claypool Hill	0.00	2,473.00	184
J-65	2,026.00	3	0.00	2,246.20	95
J-66	2,080.00	Claypool Hill	0.00	2,473.00	170
J-66	2,114.00	3	0.00	2,246.50	57
J-67	2,213.00	Claypool Hill	0.00	2,473.00	112
J-67	2,142.00	3	0.00	2,246.50	45
J-68	2,292.00	Claypool Hill	0.00	2,473.00	78
J-68	2,120.00	3	0.00	2,246.50	55
J-68A	2,164.00	Claypool Hill	0.00	2,473.00	134
J-69	2,232.00	99	0.00	2,246.50	6
J-70	1,940.00	Downtown	1.55	2,184.62	106
J-70	2,151.00	3	0.00	2,246.50	41
J-71	2,108.00	Claypool Hill	0.00	2,473.00	158
J-71	2,081.00	Downtown	0.00	2,186.70	46
J-72	2,295.00	Claypool Hill	0.00	2,473.00	77
J-72	1,968.00	Downtown	0.00	2,186.70	95
J-73	2,230.00	Claypool Hill	0.00	2,473.00	105
J-73	2,043.71	Cedar Bluff Tank	0.00	2,230.80	81
J-74	2,100.00	Claypool Hill	0.00	2,473.00	161
J-74	2,055.00	Cedar Bluff Tank	0.00	2,230.80	76
J-75	2,100.00	Claypool Hill	0.00	2,473.00	161
J-75	2,085.00	Cedar Bluff Tank	0.00	2,240.00	67
J-76	2,430.00	99	0.00	2,473.00	19
J-76	2,071.00	Cedar Bluff Tank	0.00	2,240.00	73
J-77	2,370.00	Claypool Hill	0.00	2,473.00	45
J-77	1,936.00	Downtown	0.00	2,180.23	106
J-78	2,213.00	Claypool Hill	0.00	2,473.00	112
J-79	2,336.00	Claypool Hill	0.00	2,473.00	59
J-80	1,940.00	Downtown	2.32	2,184.93	106
J-81	2,332.00	Claypool Hill	0.00	2,473.00	61
J-82	2,320.00	Claypool Hill	0.00	2,473.00	66
J-83	2,330.00	Claypool Hill	0.00	2,473.00	62
J-84	2,278.00	Claypool Hill	0.00	2,473.00	84
J-85	1,975.00	Birm/Hidden Valley	0.00	2,349.93	162
J-86	2,040.00	Birm/Hidden Valley	0.20	2,352.22	135
J-87	2,020.00	Birm/Hidden Valley	0.20	2,352.22	144
J-88	2,040.00	Birm/Hidden Valley	0.20	2,352.22	135
J-90	1,935.00	Downtown	0.00	2,187.14	109
J-100	1,945.00	Downtown	1.55	2,187.06	105
J-110	1,945.00	Downtown	1.55	2,187.01	105
J-120	2,015.00	3	1.55	2,246.42	100
J-130	2,000.00	3	2.32	2,246.40	107
J-140	2,035.00	3	2.32	2,246.39	91
J-150	1,945.00	Downtown	2.32	2,186.82	105

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-160	1,960.00	Downtown	2.32	2,186.76	98
J-170	1,975.00	Downtown	2.32	2,186.71	92
J-180	2,000.00	Downtown	2.32	2,186.70	81
J-190	2,000.00	Downtown	2.32	2,186.70	81
J-200	2,000.00	Downtown	2.32	2,186.70	81
J-210	2,005.00	Downtown	2.32	2,186.71	79
J-220	1,985.00	Downtown	2.32	2,186.78	87
J-230	2,020.00	Downtown	2.32	2,185.50	72
J-240	2,020.00	Downtown	2.32	2,185.50	72
J-250	2,025.00	Downtown	2.32	2,183.40	69
J-260	1,985.00	3	2.32	2,246.34	113
J-270	1,975.00	3	2.32	2,246.25	117
J-280	1,965.00	3	2.32	2,246.25	122
J-290	2,080.00	3	2.32	2,246.26	72
J-300	2,100.00	3	2.32	2,246.26	63
J-310	2,095.00	3	2.32	2,246.27	65
J-320	1,960.00	3	2.32	2,246.24	124
J-330	1,955.00	3	0.77	2,246.24	126
J-340	1,950.00	3	2.32	2,246.21	128
J-350	1,975.00	3	2.32	2,246.20	117
J-360	2,025.00	Birm/Hidden Valley	3.88	2,350.65	141
J-370	1,955.00	3	2.32	2,246.21	126
J-380	1,970.00	3	2.32	2,246.16	119
J-390	1,955.00	3	3.88	2,167.59	92
J-400	1,945.00	Downtown	2.32	2,168.12	97
J-410	1,940.00	Downtown	2.32	2,168.57	99
J-420	1,950.00	Downtown	3.88	2,168.90	95
J-430	1,950.00	Downtown	3.88	2,169.28	95
J-440	1,950.00	Downtown	2.32	2,168.11	94
J-450	1,955.00	Downtown	2.32	2,168.03	92
J-460	1,945.00	Downtown	2.32	2,168.57	97
J-470	1,930.00	Downtown	3.88	2,167.95	103
J-480	1,929.00	Downtown	3.88	2,167.56	103
J-490	1,925.00	Downtown	2.32	2,161.95	103
J-500	2,005.00	3	2.32	2,157.05	66
J-510	1,927.00	3	2.32	2,096.39	73
J-520	1,921.00	Downtown	2.32	2,161.95	104
J-530	2,040.00	3	2.32	2,156.99	51
J-540	1,940.00	3	2.32	2,166.34	98
J-550	1,965.00	Birm/Hidden Valley	2.77	2,349.93	167
J-560	1,975.00	Birm/Hidden Valley	1.66	2,349.90	162
J-570	2,094.00	Birm/Hidden Valley	4.44	2,349.56	111
J-580	2,110.00	Birm/Hidden Valley	2.22	2,349.43	104

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-590	2,160.00	Birm/Hidden Valley	2.22	2,349.21	82
J-600	2,170.00	Birm/Hidden Valley	2.22	2,348.86	77
J-610	2,265.00	Birm/Hidden Valley	2.22	2,348.86	36
J-620	1,937.00	3	2.32	2,151.46	93
J-630	1,945.00	3	2.32	2,109.40	71
J-640	1,950.00	3	2.32	2,151.36	87
J-650	1,990.00	Downtown	2.32	2,171.75	79
J-670	1,960.00	Downtown	6.20	2,180.29	95
J-680	1,965.00	Downtown	3.88	2,180.27	93
J-690	1,965.00	Downtown	4.65	2,180.13	93
J-700	1,955.00	Downtown	3.88	2,180.13	97
J-710	1,935.00	Downtown	2.32	2,180.13	106
J-720	1,925.00	Downtown	3.88	2,180.13	110
J-730	1,930.00	Downtown	3.88	2,180.13	108
J-740	1,927.00	Downtown	2.32	2,180.13	110
J-750	1,955.00	Downtown	2.32	2,178.21	97
J-760	1,925.00	Downtown	2.32	2,180.21	110
J-770	1,930.00	Downtown	3.88	2,180.22	108
J-780	1,935.00	Downtown	2.32	2,180.23	106
J-790	1,940.00	Downtown	3.88	2,180.24	104
J-800	1,950.00	Downtown	2.32	2,180.27	100
J-810	1,990.00	Downtown	3.88	2,181.69	83
J-820	2,045.00	Downtown	2.32	2,180.06	58
J-830	1,975.00	Downtown	2.32	2,180.10	89
J-840	2,025.00	Downtown	2.32	2,180.09	67
J-850	1,965.00	Downtown	2.32	2,180.11	93
J-860	1,950.00	Downtown	3.88	2,180.12	100
J-870	1,980.00	Downtown	2.32	2,180.04	87
J-880	1,970.00	Downtown	3.88	2,180.99	91
J-890	1,955.00	Downtown	2.32	2,180.93	98
J-900	1,970.00	Downtown	2.32	2,181.23	91
J-910	1,930.00	Downtown	2.32	2,184.98	110
J-920	1,920.00	Downtown	2.32	2,185.30	115
J-930	1,930.00	Downtown	2.32	2,184.98	110
J-940	1,930.00	Downtown	2.32	2,187.17	111
J-950	1,930.00	Downtown	2.32	2,186.32	111
J-960	2,025.00	Downtown	2.32	2,181.75	68
J-970	2,010.00	Downtown	2.32	2,186.71	76
J-980	2,165.00	Birm/Hidden Valley	1.66	2,349.44	80
J-990	2,190.00	Birm/Hidden Valley	1.66	2,349.40	69
J-1000	2,095.00	Birm/Hidden Valley	2.22	2,349.43	110

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1010	2,180.00	Birm/Hidden Valley	2.22	2,348.77	73
J-1020	2,115.00	Birm/Hidden Valley	2.22	2,348.68	101
J-1030	2,120.00	Birm/Hidden Valley	2.22	2,348.65	99
J-1040	2,105.00	Birm/Hidden Valley	2.22	2,349.13	106
J-1050	2,112.00	Birm/Hidden Valley	1.66	2,349.28	103
J-1060	2,125.00	Birm/Hidden Valley	1.66	2,348.77	97
J-1070	2,105.00	Birm/Hidden Valley	1.66	2,348.69	105
J-1080	2,105.00	Birm/Hidden Valley	2.77	2,348.68	105
J-1090	2,170.00	Birm/Hidden Valley	1.66	2,349.13	78
J-1100	2,050.00	Birm/Hidden Valley	1.66	2,350.91	130
J-1120	2,075.00	Birm/Hidden Valley	1.66	2,350.90	119
J-1130	2,075.00	Birm/Hidden Valley	1.66	2,352.22	120
J-1280	1,945.00	Downtown	3.88	2,179.46	101
J-1290	1,953.00	Downtown	3.88	2,179.44	98
J-1300	1,955.00	Downtown	3.88	2,179.42	97
J-1310	1,950.00	Downtown	3.88	2,171.13	96
J-1320	1,947.00	Downtown	3.88	2,171.36	97
J-1330	1,940.00	Downtown	3.88	2,171.56	100
J-1340	1,945.00	Downtown	2.32	2,178.85	101
J-1350	1,930.00	Downtown	2.32	2,176.09	106
J-1360	1,930.00	Downtown	2.32	2,174.95	106
J-1370	1,935.00	Downtown	2.32	2,175.36	104
J-1380	1,930.00	Downtown	2.32	2,175.36	106
J-1390	1,933.00	Downtown	2.32	2,174.08	104
J-1400	1,925.00	Downtown	2.32	2,174.08	108
J-1410	1,934.00	Downtown	2.32	2,172.66	103
J-1420	1,931.00	Downtown	2.32	2,172.65	105
J-1430	1,937.00	Downtown	3.88	2,171.03	101
J-1440	1,930.00	Downtown	3.88	2,171.01	104
J-1450	1,925.00	Downtown	3.88	2,171.11	106
J-1460	1,950.00	Downtown	2.32	2,171.11	96
J-1470	1,955.00	Downtown	2.32	2,171.11	94
J-1480	1,945.00	Downtown	2.32	2,186.33	104
J-1490	1,945.00	Downtown	2.32	2,186.33	104
J-1500	1,990.00	Downtown	2.32	2,186.33	85
J-1510	2,035.00	Cedar Bluff Tank	3.88	2,230.80	85
J-1520	2,070.00	Cedar Bluff Tank	6.20	2,230.80	70

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1530	1,920.00	Downtown	3.88	2,170.78	109
J-1540	1,913.00	Downtown	0.77	2,170.80	112
J-1550	1,925.00	Downtown	3.88	2,171.22	107
J-1560	1,920.00	Downtown	3.10	2,171.12	109
J-1570	1,925.00	Downtown	6.20	2,171.13	106
J-1580	1,920.00	Downtown	3.88	2,171.04	109
J-1590	1,920.00	Downtown	3.88	2,171.04	109
J-1600	1,940.00	3	0.00	2,166.60	98
J-1610	1,940.00	Birm/Hidden Valley	0.00	2,349.93	177
J-1620	1,930.00	Downtown	2.32	2,171.15	104
J-1630	1,930.00	Downtown	0.00	2,171.00	104
J-1640	1,932.00	Downtown	2.32	2,170.98	103
J-1650	1,985.00	Downtown	2.32	2,170.94	80
J-1660	2,040.00	Downtown	2.32	2,170.92	57
J-1670	2,075.00	Downtown	1.55	2,170.89	41
J-1680	2,040.00	Downtown	2.32	2,170.89	57
J-1690	1,970.00	Downtown	0.77	2,170.94	87
J-1700	1,970.00	Downtown	0.77	2,170.95	87
J-1710	1,936.00	Downtown	2.32	2,170.98	102
J-1720	1,937.00	Downtown	2.32	2,170.98	101
J-1730	1,938.00	Downtown	1.55	2,170.98	101
J-1740	1,933.00	Downtown	1.55	2,170.97	103
J-1750	1,930.00	Downtown	7.75	2,171.05	104
J-1760	1,923.00	Downtown	0.00	2,171.01	107
J-1770	1,960.00	Downtown	38.75	2,170.95	91
J-1780	1,922.00	Downtown	2.32	2,170.82	108
J-1790	1,923.00	Downtown	2.32	2,170.76	107
J-1810	1,940.00	Downtown	1.55	2,170.96	100
J-1820	1,945.00	Downtown	1.55	2,170.96	98
J-1830	1,950.00	Downtown	1.55	2,170.72	95
J-1840	1,925.00	Downtown	1.55	2,170.74	106
J-1850	1,918.00	Downtown	3.10	2,170.76	109
J-1860	1,922.00	Downtown	0.77	2,170.76	108
J-1870	1,920.00	Downtown	0.77	2,170.80	109
J-1880	1,915.00	Downtown	0.00	2,171.65	111
J-1890	1,925.00	Downtown	0.00	2,170.81	106
J-1900	1,925.00	Downtown	2.32	2,170.82	106
J-1910	1,923.00	Downtown	2.32	2,171.05	107
J-1920	1,948.00	Downtown	1.55	2,170.75	96
J-1930	1,969.00	Downtown	2.32	2,170.74	87
J-1940	2,010.00	Downtown	2.32	2,170.63	69
J-1950	2,040.00	Downtown	0.77	2,170.05	56
J-1960	1,965.00	Downtown	3.10	2,170.71	89
J-1970	1,934.00	Downtown	0.77	2,186.85	109
J-1980	1,970.00	Downtown	2.32	2,186.64	94
J-1990	1,970.00	Downtown	2.32	2,186.60	94

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2000	2,040.00	Downtown	0.00	2,186.33	63
J-2010	2,040.00	Cedar Bluff Tank	76.67	2,230.80	83
J-2030	2,083.00	Cedar Bluff Tank	0.00	2,240.00	68
J-2040	2,085.00	Cedar Bluff Tank	1.55	2,240.00	67
J-2050	2,082.00	Cedar Bluff Tank	1.55	2,240.00	68
J-2060	2,000.00	1	0.77	2,246.43	107
J-2100	2,005.00	3	0.77	2,246.42	104
J-2120	2,033.00	Birm/Hidden Valley	0.56	2,350.69	137
J-2130	2,020.00	Birm/Hidden Valley	0.56	2,350.67	143
J-2140	2,188.00	Birm/Hidden Valley	0.56	2,350.66	70
J-2150	2,151.00	Birm/Hidden Valley	0.56	2,350.65	86
J-2200	1,980.00	Downtown	0.00	2,180.09	87
J-2210	2,035.00	Downtown	0.00	2,180.09	63
J-2220	2,085.00	Downtown	0.00	2,180.09	41
J-2230	2,055.00	Downtown	0.00	2,186.70	57
J-2250	1,955.00	3	1.55	2,167.20	92
Raven Connection	2,005.00	Downtown	518.63	2,041.56	16

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-1	Downtown Tank	J-1	10.0	122	130.0	-1,067.29	0.007
P-1	J-1720	J-1	6.0	124	130.0	1.55	0.000
P-2	J-1	J-820	10.0	786	130.0	-1,067.29	0.007
P-2	J-1	J-1730	6.0	336	130.0	1.55	0.000
P-3	J-950	J-1490	6.0	1,613	130.0	-7.57	0.000
P-3	J-1	J-2	6.0	671	130.0	0.00	0.000
P-4	J-810	J-820	10.0	508	130.0	702.00	0.003
P-4	J-2	H-1	6.0	71	130.0	0.00	0.000
P-5	J-1720	J-3	2.0	335	120.0	0.00	0.000
P-6	J-1640	J-4	8.0	258	130.0	7.70	0.000
P-7	J-4	J-1650	4.0	629	130.0	7.70	0.000
P-8	J-4	J-7	2.0	465	130.0	0.00	0.000
P-9	J-4	J-8	6.0	2,339	130.0	0.00	0.000
P-10	Clearwell	J-10	12.0	64	120.0	1,769.63	0.008
P-10	J-1630	J-1760	8.0	838	130.0	-20.43	0.000
P-11	J-1740	J-9	2.0	414	120.0	0.00	0.000
P-12	J-1130	J-3	6.0	1,070	120.0	3.26	0.000
P-13	J-3	J-4	6.0	4,500	120.0	2.10	0.000
P-13	J-10	J-1790	1.0	163	130.0	0.00	0.000
P-14	J-4	J-5	6.0	3,558	120.0	1.11	0.000
P-14	J-1820	J-11	2.0	319	130.0	0.00	0.000
P-16	J-1960	J-12	4.0	2,455	130.0	0.00	0.000
P-17	Raven Connection	J-13	6.0	588	130.0	-518.63	0.022
P-18	J-13	J-510	6.0	1,906	130.0	-518.63	0.022
P-19	J-11	J-2130	6.0	1,946	130.0	6.22	0.000
P-19	J-13	J-650	6.0	68	130.0	0.00	0.000
P-20	J-520	J-14	1.0	219	130.0	0.00	0.000
P-21	J-520	J-15	1.0	313	130.0	0.00	0.000
P-22	J-30	J-16	2.0	466	120.0	0.00	0.000
P-23	J-11	J-14	6.0	1,300	120.0	3.80	0.000
P-23	J-140	J-17	4.0	719	130.0	0.00	0.000
P-24	J-14	J-12	6.0	600	120.0	0.87	0.000
P-24	J-43	J-18	6.0	1,097	130.0	63.12	0.000
P-25	J-18	J-1050	6.0	421	130.0	63.12	0.000
P-26	J-18	J-19	2.0	829	150.0	0.00	0.000
P-27	J-4	J-17	6.0	579	120.0	0.99	0.000
P-27	J-1040	J-20	6.0	198	130.0	-61.46	0.000
P-28	J-20	J-1050	6.0	168	130.0	-61.46	0.000
P-29	J-2150	J-19	6.0	400	120.0	0.67	0.000
P-30	J-20	J-2100	6.0	2,142	120.0	0.00	0.000
P-30	J-20	J-22	4.0	521	130.0	0.00	0.000
P-31	J-19	J-18	2.0	1,000	120.0	0.17	0.000
P-31	J-22	J-21	2.0	662	130.0	0.00	0.000
P-32	J-43	J-23	8.0	1,092	130.0	-119.01	0.000
P-33	J-7	J-13	4.0	966	120.0	-0.70	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-33	J-23	J-53	8.0	908	130.0	-119.01	0.000
P-34	J-23	J-24	2.0	402	130.0	0.00	0.000
P-35	J-22	Birmingham Tank	8.0	2,285	120.0	-142.35	0.001
P-35	J-1100	J-1120	6.0	2,374	130.0	1.66	0.000
P-36	J-1100	J-23	8.0	175	130.0	-137.42	0.000
P-36	J-2	J-25	6.0	100	130.0	0.00	0.000
P-38	J-22	J-23	8.0	2,320	120.0	137.42	0.001
P-38	J-41	J-26	8.0	277	130.0	0.00	0.000
P-39	J-26	J-31	8.0	1,523	130.0	-0.01	0.000
P-40	J-30	J-2060	6.0	594	120.0	-9.15	0.000
P-40	J-26	J-27	6.0	1,835	130.0	0.00	0.000
P-41	J-24	J-25	8.0	2,815	130.0	0.01	0.000
P-42	J-25	J-26	8.0	1,434	130.0	0.01	0.000
P-43	J-39	J-28	1.0	813	130.0	0.00	0.000
P-44	J-1010	J-29	4.0	455	130.0	6.78	0.000
P-45	J-29	J-1070	4.0	709	130.0	8.56	0.000
P-46	J-29	J-1060	2.0	150	130.0	-1.78	0.000
P-47	J-1840	J-30	6.0	651	130.0	0.00	0.000
P-48	J-31	J-24	8.0	2,566	130.0	-0.01	0.000
P-48	J-40	J-31	4.0	62	130.0	26.50	0.001
P-49	J-31	J-260	4.0	82	130.0	26.35	0.001
P-50	J-40	J-50	8.0	476	120.0	-38.75	0.000
P-50	J-130	J-31	4.0	656	130.0	-0.15	0.000
P-51	J-60	J-32	12.0	293	130.0	1,183.04	0.003
P-53	J-950	J-32	6.0	1,078	130.0	34.86	0.000
P-54	J-970	J-33	2.0	644	130.0	0.00	0.000
P-56	J-36	J-930	6.0	993	130.0	0.00	0.000
P-57	J-32	J-37	12.0	225	130.0	1,217.91	0.004
P-58	J-37	J-80	12.0	119	130.0	1,172.42	0.003
P-59	J-920	J-37	6.0	132	130.0	-45.49	0.000
P-60	J-50	Farmer St Tank	8.0	694	120.0	-41.08	0.000
P-60	J-800	J-39	4.0	316	130.0	-38.52	0.001
P-62	J-39	J-49	8.0	627	130.0	2.55	0.000
P-62	J-39	J-40	2.0	112	140.0	-38.52	0.033
P-63	J-40	J-910	4.0	493	130.0	-38.52	0.001
P-65	J-41	J-880	6.0	309	130.0	77.24	0.001
P-66	J-900	J-41	6.0	68	130.0	77.24	0.001
P-68	J-1290	J-1300	10.0	338	130.0	79.36	0.000
P-68	J-42	J-41	2.0	257	130.0	0.00	0.000
P-69	J-810	J-43	2.0	383	130.0	0.00	0.000
P-70	J-10	High Service Pump	6.0	107	130.0	1,769.63	0.213
P-70a	High Service Pump	J-60	6.0	107	130.0	1,769.63	0.213
P-71	J-680	J-44	4.0	557	130.0	0.00	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-72	J-760	J-45	6.0	437	130.0	0.00	0.000
P-73	J-720	J-46	4.0	303	130.0	0.00	0.000
P-74	J-1280	J-35	10.0	280	130.0	-562.83	0.002
P-74	Big Ck Conn	J-47	6.0	407	130.0	0.00	0.000
P-75	J-34	J-35	10.0	181	130.0	63.80	0.000
P-75	J-47	J-48	6.0	215	130.0	0.00	0.000
P-76	J-790	J-34	6.0	405	130.0	63.80	0.000
P-77	J-60	PSV-1	10.0	459	130.0	499.03	0.002
P-77	J-48	J-50	4.0	274	130.0	0.00	0.000
P-78	PSV-1	J-35	10.0	3,730	130.0	499.03	0.002
P-78	J-50	J-49	4.0	761	130.0	0.00	0.000
P-79	J-1300	BOOSTER PUMP	10.0	132	130.0	0.00	0.000
P-79	J-50	J-51	2.0	477	130.0	0.00	0.000
P-80	J-60	J-940	10.0	253	130.0	31.95	0.000
P-80	J-51	J-52	4.0	198	130.0	0.00	0.000
P-81	BOOSTER PUMP	J-1310	10.0	112	130.0	0.00	0.000
P-81	J-52	J-48	4.0	420	130.0	0.00	0.000
P-82	J-52	J-53	6.0	421	130.0	0.00	0.000
P-83	J-1280	J-37	8.0	4,090	130.0	385.37	0.003
P-83	Big Ck Conn	J-54	6.0	182	130.0	0.00	0.000
P-84	J-54	J-55	8.0	518	130.0	0.00	0.000
P-85	J-55	J-56	8.0	1,150	130.0	0.00	0.000
P-86	J-57	J-58	1.0	249	130.0	0.00	0.000
P-87	J-710	J-59	6.0	849	130.0	0.01	0.000
P-88	J-59	Big Ck Conn	6.0	164	130.0	0.01	0.000
P-89	J-58	J-59	4.0	1,645	130.0	0.00	0.000
P-90	Big Ck Conn	J-60	6.0	163	130.0	0.01	0.000
P-92	J-60	J-62	4.0	2,934	130.0	0.00	0.000
P-93	J-62	J-61	4.0	1,096	130.0	0.00	0.000
P-94	J-62	J-63	2.0	831	130.0	0.00	0.000
P-95	J-350	J-65	6.0	1,732	130.0	0.00	0.000
P-96	J-65	J-360	6.0	357	130.0	0.00	0.000
P-97	J-65	J-66	6.0	894	130.0	0.00	0.000
P-98	J-66	J-67	6.0	240	130.0	0.00	0.000
P-99	J-67	J-68	6.0	1,060	130.0	0.00	0.000
P-100	J-60	J-90	6.0	93	130.0	53.29	0.000
P-100	J-68	J-50	6.0	148	130.0	0.00	0.000
P-102	J-67	J-69	6.0	1,490	130.0	0.00	0.000
P-103	J-42	J-45	8.0	930	130.0	0.00	0.000
P-103	J-69	Farmer St Tank	8.0	337	130.0	0.00	0.000
P-104	J-66	J-70	6.0	292	130.0	0.00	0.000
P-105	J-550	J-45	6.0	93	130.0	-2.77	0.000
P-105	J-2230	J-71	4.0	348	130.0	0.32	0.000
P-106	J-27	J-46	8.0	2,336	130.0	0.00	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-106	J-71	J-72	4.0	1,137	130.0	0.00	0.000
P-107	J-46	J-28	8.0	516	130.0	0.00	0.000
P-107	J-71	J-190	2.0	973	120.0	0.32	0.000
P-108	J-1510	J-73	6.0	281	130.0	-3.88	0.000
P-109	J-58	J-1610	4.0	57	130.0	0.00	0.000
P-109	J-73	J-1520	6.0	849	130.0	-3.88	0.000
P-110	J-90	J-100	4.0	284	130.0	17.00	0.000
P-110	J-73	J-74	6.0	511	130.0	0.00	0.000
P-111	J-1600	J-58	4.0	57	130.0	0.00	0.000
P-111	J-1520	J-75	8.0	98	140.0	0.00	0.000
P-112	J-75	J-2030	8.0	303	140.0	0.00	0.000
P-113	J-24	Kent's Ridge Tank	8.0	3,900	130.0	-0.01	0.000
P-113	J-75	J-76	2.0	551	150.0	0.00	0.000
P-114	J-780	J-77	2.0	297	135.0	0.00	0.000
P-115	Kent's Ridge PS 1	J-27	8.0	85	130.0	0.00	0.000
P-115	J-1750	J-1910	10.0	836	150.0	20.27	0.000
P-117	Kent's Ridge PS 2	J-41	8.0	99	130.0	0.00	0.000
P-118	J-26	J-51	8.0	1,554	130.0	0.01	0.000
P-120	J-100	J-110	4.0	246	130.0	14.93	0.000
P-121	J-52	J-51	6.0	3,840	130.0	0.00	0.000
P-122	J-2120	J-53	8.0	61	130.0	119.01	0.000
P-127	J-26	J-55	6.0	3,030	130.0	0.00	0.000
P-128	J-51	J-56	8.0	1,512	130.0	0.00	0.000
P-129	J-56	Kent's Ridge PS 1	8.0	82	130.0	0.00	0.000
P-130	J-110	J-120	4.0	1,706	130.0	0.00	0.000
P-131	J-56	PRV-1	6.0	82	130.0	0.00	0.000
P-133	J-27	J-56	4.0	167	130.0	0.00	0.000
P-134	J-49	J-57	8.0	1,700	130.0	2.55	0.000
P-135	J-57	Kent's Ridge PS 2	8.0	104	130.0	0.00	0.000
P-136	J-41	PRV-2	6.0	99	130.0	0.00	0.000
P-138	J-57	J-41	4.0	203	130.0	0.00	0.000
P-140	J-120	J-130	4.0	864	130.0	4.50	0.000
P-141	PRV-3	J-1610	6.0	57	130.0	0.00	0.000
P-142	J-1610	J-59	8.0	217	130.0	0.00	0.000
P-143	J-59	J-42	8.0	159	130.0	0.00	0.000
P-144	J-59	J-44	6.0	831	130.0	0.00	0.000
P-146	J-2120	J-11	6.0	147	130.0	14.52	0.000
P-147	J-37	J-1600	8.0	720	130.0	64.80	0.000
P-148	J-45	J-61	8.0	852	130.0	-2.78	0.000
P-149	J-61	J-43	8.0	380	130.0	-55.89	0.000
P-150	J-130	J-140	4.0	533	130.0	2.33	0.000
P-151	J-560	J-61	6.0	86	130.0	-53.11	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-152	J-540	J-37	8.0	151	130.0	-320.57	0.002
P-153	J-64	J-65	8.0	4,295	120.0	0.00	0.000
P-154	CH WTP clearwell	Wardell HSP	8.0	10	130.0	0.00	0.000
P-155	Wardell HSP	J-65	8.0	1,200	120.0	0.00	0.000
P-156	J-65	J-66	6.0	2,364	120.0	0.00	0.000
P-157	J-66	J-74	6.0	3,104	120.0	0.00	0.000
P-158	J-74	Claypool Hill PS No. 3	6.0	120	130.0	0.00	0.000
P-159	Claypool Hill PS No. 3	J-75	6.0	30	120.0	0.00	0.000
P-160	J-90	J-1970	4.0	250	130.0	36.29	0.001
P-161	J-75	J-74	6.0	60	130.0	0.00	0.000
P-162	J-75	J-71	6.0	950	120.0	0.00	0.000
P-163	J-71	J-63	6.0	1,399	120.0	2.26	0.000
P-164	J-63	J-62	6.0	746	120.0	2.26	0.000
P-165	J-62	J-67	6.0	532	120.0	2.26	0.000
P-166	J-67	J-68A	6.0	1,547	120.0	2.26	0.000
P-167	J-68A	J-78	6.0	3,057	120.0	0.00	0.000
P-168	J-78	J-84	6.0	796	120.0	0.00	0.000
P-169	J-84	J-82	6.0	571	120.0	0.00	0.000
P-170	J-150	J-160	4.0	294	130.0	14.52	0.000
P-173	J-83	J-81	6.0	575	120.0	0.00	0.000
P-174	J-81	J-79	6.0	370	120.0	0.00	0.000
P-175	J-83	J-84	2.0	800	120.0	0.00	0.000
P-176	J-71	J-73	12.0	1,536	120.0	-2.26	0.000
P-177	J-73	J-72	12.0	1,257	120.0	-2.26	0.000
P-179	J-72	J-76	12.0	1,129	120.0	0.00	0.000
P-180	J-160	J-170	4.0	438	130.0	9.87	0.000
P-181	J-76	College Tanks (2)	12.0	725	120.0	0.00	0.000
P-182	J-82	J-83	6.0	841	120.0	0.00	0.000
P-183	J-72	J-77	6.0	954	130.0	0.00	0.000
P-184	J-28	J-64	8.0	547	130.0	0.00	0.000
P-185	J-72	J-68	6.0	488	120.0	-2.26	0.000
P-186	J-68	J-68A	6.0	386	120.0	-2.26	0.000
P-187	J-57	J-13	4.0	300	130.0	2.56	0.000
P-188	J-22	J-2	6.0	361	130.0	4.93	0.000
P-190	J-170	J-180	4.0	373	130.0	5.22	0.000
P-191	J-2	J-1130	6.0	1,340	130.0	4.93	0.000
P-192	J-42	J-85	4.0	900	130.0	0.00	0.000
P-193	PRV-1	FCV-1	6.0	51	130.0	0.00	0.000
P-194	FCV-1	J-27	6.0	34	130.0	0.00	0.000
P-195	PRV-2	FCV-2	6.0	44	130.0	0.00	0.000
P-196	FCV-2	J-57	6.0	60	130.0	0.00	0.000
P-197	J-1600	FCV-3	6.0	29	130.0	0.00	0.000
P-198	FCV-3	PRV-3	6.0	28	130.0	0.00	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-199	J-14	J-39	6.0	148	130.0	2.56	0.000
P-200	J-180	J-190	4.0	699	130.0	2.58	0.000
P-201	J-17	J-86	6.0	1,019	130.0	0.60	0.000
P-202	J-86	J-87	4.0	418	130.0	0.20	0.000
P-203	J-86	J-88	6.0	343	130.0	0.20	0.000
P-210	J-190	J-200	4.0	172	130.0	0.57	0.000
P-220	J-200	J-210	4.0	706	130.0	-4.08	0.000
P-230	J-210	J-220	4.0	884	130.0	-8.72	0.000
P-240	J-220	J-110	4.0	1,242	130.0	-13.38	0.000
P-250	J-100	J-150	1.0	646	130.0	0.52	0.000
P-260	J-210	J-230	1.0	201	130.0	2.31	0.006
P-270	J-230	J-240	1.0	706	130.0	-0.01	0.000
P-280	J-240	J-220	1.0	208	130.0	-2.34	0.006
P-290	J-200	J-250	1.0	543	130.0	2.32	0.006
P-310	J-260	J-270	4.0	666	130.0	11.46	0.000
P-320	J-270	J-280	6.0	258	130.0	9.13	0.000
P-340	J-290	J-300	6.0	653	130.0	7.92	0.000
P-350	J-260	J-310	4.0	466	130.0	12.57	0.000
P-360	J-310	J-290	6.0	375	130.0	10.24	0.000
P-370	J-280	J-320	6.0	268	130.0	12.40	0.000
P-380	J-320	J-330	6.0	544	130.0	10.07	0.000
P-390	J-330	J-340	4.0	278	130.0	9.30	0.000
P-400	J-340	J-350	4.0	1,002	130.0	2.32	0.000
P-420	J-340	J-370	6.0	332	130.0	4.65	0.000
P-430	J-370	J-380	2.0	218	130.0	2.32	0.000
P-450	J-390	J-320	4.0	322	130.0	0.00	0.000
P-460	J-390	J-400	6.0	651	130.0	-87.36	0.001
P-470	J-400	J-410	6.0	487	130.0	-94.33	0.001
P-480	J-410	J-420	6.0	324	130.0	-98.98	0.001
P-490	J-420	J-430	6.0	201	130.0	-137.58	0.002
P-500	J-400	J-440	4.0	267	130.0	4.65	0.000
P-510	J-440	J-450	2.0	380	130.0	2.32	0.000
P-520	J-410	J-460	4.0	302	130.0	2.32	0.000
P-530	J-430	J-470	4.0	771	130.0	45.27	0.002
P-540	J-470	J-480	4.0	86	130.0	76.12	0.005
P-550	J-480	J-490	4.0	1,361	130.0	72.25	0.004
P-560	J-490	J-500	4.0	1,348	130.0	67.59	0.004
P-570	J-500	J-510	2.0	650	130.0	62.94	0.093
P-580	J-490	J-520	4.0	301	130.0	2.33	0.000
P-590	J-500	J-530	2.0	276	130.0	2.32	0.000
P-600	J-470	J-420	4.0	903	130.0	-34.73	0.001
P-620	J-540	J-1600	6.0	541	130.0	-64.80	0.000
P-640	J-560	J-570	6.0	1,100	130.0	51.44	0.000
P-650	J-570	J-580	6.0	779	130.0	38.01	0.000
P-660	J-580	J-590	6.0	1,178	130.0	39.23	0.000
P-670	J-590	J-600	4.0	352	130.0	33.57	0.001

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-680	J-600	J-610	6.0	688	130.0	2.22	0.000
P-690	J-540	J-620	4.0	115	130.0	464.98	0.129
P-700	J-620	J-630	4.0	331	130.0	460.33	0.127
P-710	J-620	J-640	2.0	459	130.0	2.32	0.000
P-720	J-630	J-510	6.0	745	130.0	458.01	0.017
P-750	J-70	J-670	6.0	1,379	130.0	181.42	0.003
P-760	J-670	J-680	12.0	354	130.0	125.14	0.000
P-770	J-680	J-690	12.0	1,144	130.0	192.30	0.000
P-780	J-690	J-700	10.0	551	130.0	17.07	0.000
P-790	J-700	J-710	10.0	452	130.0	4.67	0.000
P-800	J-710	J-720	10.0	556	130.0	2.33	0.000
P-810	J-720	J-730	10.0	451	130.0	-1.55	0.000
P-820	J-730	J-740	4.0	465	130.0	2.32	0.000
P-830	J-730	J-750	1.0	316	130.0	2.32	0.006
P-840	J-730	J-760	4.0	758	130.0	-10.07	0.000
P-850	J-760	J-770	6.0	458	130.0	-12.40	0.000
P-860	J-770	J-780	6.0	313	130.0	-16.27	0.000
P-870	J-780	J-790	6.0	204	130.0	-18.60	0.000
P-880	J-790	J-800	10.0	514	130.0	-86.27	0.000
P-890	J-800	J-670	10.0	505	130.0	-50.08	0.000
P-900	J-70	J-810	10.0	488	130.0	987.13	0.006
P-910	J-810	J-820	6.0	425	130.0	201.69	0.004
P-920	J-820	J-830	12.0	415	130.0	-165.93	0.000
P-930	J-830	J-690	12.0	340	130.0	-170.58	0.000
P-950	J-700	J-860	4.0	170	130.0	8.52	0.000
P-960	J-850	J-860	4.0	166	130.0	-2.32	0.000
P-970	J-860	J-870	2.0	378	130.0	2.32	0.000
P-990	J-880	J-680	4.0	180	130.0	71.04	0.004
P-1000	J-880	J-890	2.0	279	130.0	2.32	0.000
P-1010	J-810	J-900	6.0	668	130.0	79.57	0.001
P-1030	J-910	J-920	6.0	1,486	130.0	-43.17	0.000
P-1040	J-910	J-930	6.0	247	130.0	2.33	0.000
P-1050	J-70	J-940	8.0	331	130.0	0.00	0.000
P-1060	J-940	J-950	4.0	1,079	130.0	29.62	0.001
P-1070	J-160	J-960	1.0	825	130.0	2.32	0.006
P-1080	J-170	J-970	4.0	877	130.0	2.32	0.000
P-1090	J-570	J-980	4.0	1,402	130.0	8.99	0.000
P-1100	J-980	J-990	2.0	361	130.0	1.66	0.000
P-1110	J-980	J-580	4.0	372	130.0	5.66	0.000
P-1120	J-580	J-1000	4.0	173	130.0	2.22	0.000
P-1130	J-600	J-1010	6.0	842	130.0	29.13	0.000
P-1140	J-1010	J-1020	6.0	1,626	130.0	20.13	0.000
P-1150	J-1020	J-1030	6.0	472	130.0	22.03	0.000
P-1160	J-1030	J-1040	6.0	1,267	130.0	-57.57	0.000
P-1180	J-590	J-1060	2.0	1,035	130.0	3.44	0.000
P-1200	J-1020	J-1070	4.0	365	130.0	-4.12	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-1210	J-1070	J-1080	4.0	960	130.0	2.77	0.000
P-1220	J-1040	J-1090	6.0	1,898	130.0	1.66	0.000
P-1420	J-1280	J-1290	10.0	173	130.0	108.33	0.000
P-1450	J-1310	J-1320	6.0	123	130.0	-137.15	0.002
P-1460	J-1320	J-1330	6.0	328	130.0	-74.84	0.001
P-1470	J-1280	J-1340	6.0	1,277	130.0	65.25	0.000
P-1480	J-1340	J-1290	4.0	1,010	130.0	-25.09	0.001
P-1490	J-1340	J-1350	4.0	466	130.0	88.02	0.006
P-1500	J-1350	J-1360	6.0	1,448	130.0	85.69	0.001
P-1510	J-1330	J-1410	4.0	227	130.0	-78.72	0.005
P-1520	J-1300	J-1370	4.0	909	130.0	75.48	0.004
P-1530	J-1370	J-1380	6.0	394	130.0	2.32	0.000
P-1540	J-1320	J-1390	4.0	777	130.0	-66.18	0.003
P-1550	J-1390	J-1400	4.0	393	130.0	2.32	0.000
P-1560	J-1390	J-1370	4.0	323	130.0	-70.83	0.004
P-1570	J-1360	J-1410	4.0	428	130.0	83.37	0.005
P-1580	J-1410	J-1420	4.0	466	130.0	2.32	0.000
P-1590	J-430	J-1430	6.0	526	130.0	-186.73	0.003
P-1600	J-1430	J-1440	6.0	2,010	130.0	6.70	0.000
P-1610	J-1430	J-1450	10.0	1,971	130.0	-68.68	0.000
P-1620	J-1430	J-1460	10.0	613	130.0	-128.63	0.000
P-1630	J-1460	J-1470	6.0	238	130.0	2.32	0.000
P-1640	J-1460	J-1310	10.0	136	130.0	-133.28	0.000
P-1650	J-1480	J-1490	4.0	532	130.0	-2.32	0.000
P-1660	J-1490	J-1500	4.0	415	130.0	2.32	0.000
P-1670	J-1500	J-2000	6.0	518	130.0	0.00	0.000
P-1690	J-1530	J-1540	4.0	949	130.0	-3.88	0.000
P-1700	J-650	Airport Tank	10.0	741	130.0	-208.46	0.000
P-1710	J-650	J-1880	10.0	313	130.0	206.14	0.000
P-1720	J-1560	J-1570	4.0	1,111	130.0	-3.10	0.000
P-1730	J-1580	J-1590	6.0	705	130.0	-3.88	0.000
P-1740	J-1030	Hidden Valley Tank	6.0	1,717	130.0	77.38	0.001
P-1750	J-80	J-70	12.0	92	130.0	1,170.09	0.003
P-1760	J-60	Farmer St Pump	6.0	176	130.0	0.00	0.000
P-1760a	Farmer St Pump	J-20	6.0	176	130.0	0.00	0.000
P-1770	J-1600	Hidden Valley Pump	6.0	57	130.0	0.00	0.000
P-1770a	Hidden Valley Pump	J-1610	6.0	57	130.0	0.00	0.000
P-1800	J-1550	J-1620	10.0	211	130.0	202.26	0.000
P-1810	J-1450	J-1620	10.0	859	130.0	-72.55	0.000
P-1820	J-1570	J-1620	4.0	212	130.0	-9.30	0.000
P-1830	J-1440	J-1630	4.0	1,009	130.0	2.82	0.000
P-1840	J-1630	J-1640	8.0	939	130.0	23.26	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-1860	J-1650	J-1660	4.0	437	130.0	6.20	0.000
P-1870	J-1660	J-1670	2.0	376	130.0	1.55	0.000
P-1880	J-1660	J-1680	2.0	150	130.0	2.32	0.000
P-1890	J-1650	J-1690	4.0	247	130.0	-0.83	0.000
P-1900	J-1690	J-1640	2.0	651	130.0	-1.23	0.000
P-1910	J-1690	J-1700	2.0	314	130.0	-0.38	0.000
P-1920	J-1700	J-1710	2.0	662	130.0	-1.15	0.000
P-1930	J-1710	J-1640	8.0	315	130.0	-12.01	0.000
P-1940	J-1710	J-1720	8.0	424	130.0	8.53	0.000
P-1960	J-1720	J-1740	4.0	561	130.0	4.65	0.000
P-1970	J-1620	J-1750	10.0	864	130.0	118.09	0.000
P-1980	J-1750	J-1760	8.0	208	130.0	82.32	0.000
P-1990	J-1760	J-1770	6.0	359	130.0	38.75	0.000
P-2000	J-1760	J-1780	4.0	379	130.0	23.13	0.000
P-2010	J-1780	J-1790	4.0	305	130.0	13.95	0.000
P-2020	J-1790	Hospital	4.0	377	130.0	11.62	0.000
P-2030	J-1740	J-1810	4.0	292	130.0	3.10	0.000
P-2040	J-1810	J-1820	4.0	235	130.0	1.55	0.000
P-2070	J-1830	J-1840	4.0	865	130.0	-4.65	0.000
P-2080	J-1840	J-1850	4.0	372	130.0	-6.20	0.000
P-2090	J-1850	J-1860	6.0	218	130.0	-9.30	0.000
P-2100	J-1860	J-1870	4.0	360	130.0	-10.08	0.000
P-2120	J-1780	J-1870	4.0	496	130.0	6.86	0.000
P-2130	J-1750	J-1590	6.0	591	130.0	7.75	0.000
P-2140	J-1550	J-1880	10.0	1,293	130.0	-206.14	0.000
P-2150	J-1870	J-1890	4.0	568	130.0	-3.99	0.000
P-2160	J-1890	J-1900	4.0	130	130.0	-10.97	0.000
P-2170	J-1900	J-1910	4.0	713	130.0	-17.94	0.000
P-2180	J-1900	J-1540	4.0	926	130.0	4.65	0.000
P-2190	J-1890	J-1920	4.0	989	130.0	6.97	0.000
P-2200	J-1920	J-1930	4.0	356	130.0	5.42	0.000
P-2210	J-1930	J-1940	2.0	321	130.0	3.10	0.000
P-2220	J-1940	J-1950	1.0	729	130.0	0.77	0.001
P-2230	J-1830	J-1960	4.0	348	130.0	3.10	0.000
P-2240	J-150	J-1970	4.0	130	130.0	-16.33	0.000
P-2250	J-1970	J-1980	4.0	615	130.0	19.19	0.000
P-2260	J-1980	J-1990	6.0	950	130.0	16.87	0.000
P-2270	J-1990	J-1490	4.0	1,270	130.0	14.54	0.000
P-2290	J-1520	J-2010	8.0	1,569	140.0	-10.08	0.000
P-2310	J-2010	Cedar Bluff Tank	8.0	990	130.0	-86.75	0.000
P-2330	J-2030	J-2040	8.0	1,048	140.0	0.00	0.000
P-2340	J-2040	J-2050	8.0	1,029	140.0	-1.55	0.000
P-2350	J-2050	Richlands HS Tank	6.0	533	130.0	-3.10	0.000
P-2360	J-40	J-2060	6.0	455	120.0	9.92	0.000
P-2410	J-60	J-20	6.0	403	130.0	0.00	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-2420	J-30	J-2100	6.0	336	120.0	6.82	0.000
P-2430	J-2100	J-120	6.0	49	130.0	6.05	0.000
P-2440	J-2000	Cedar Bluff PS	4.0	87	130.0	0.00	0.000
P-2440a	Cedar Bluff PS	J-1510	4.0	87	130.0	0.00	0.000
P-2480	J-2130	J-2140	6.0	3,280	130.0	5.66	0.000
P-2490	J-2140	J-2150	6.0	1,179	130.0	5.11	0.000
P-2500	J-2150	J-360	6.0	1,243	130.0	3.89	0.000
P-2590	J-2210	J-2220	2.0	217	130.0	0.00	0.000
P-2600	J-2200	J-2210	4.0	466	130.0	0.00	0.000
P-2610	J-830	J-2200	4.0	506	130.0	2.33	0.000
P-2620	J-2200	J-840	4.0	359	130.0	2.32	0.000
P-2630	J-280	J-300	6.0	1,328	130.0	-5.59	0.000
P-2650	J-180	J-2230	4.0	832	130.0	0.32	0.000
P-2680	J-390	J-2250	6.0	518	130.0	83.48	0.001
P-2690	J-2250	J-540	6.0	1,189	130.0	81.93	0.001
P-2700	J-330	J-2250	6.0	99	130.0	0.00	0.000
P-2710	J-2120	J-1100	6.0	120	130.0	-134.09	0.002

FlexTable: Tank Table

Current Time: 0.000 hours

Label	Zone	Elevation (Base) (ft)	Level (Initial) (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
Airport Tank	1	2,157.00	15.00	208.46	2,172.00
Birmingham Tank	Birm/Hidden Valley	2,337.54	16.00	142.35	2,353.54
CH WTP clearwell	Zone-1	2,058.00	8.00	0.00	2,066.00
Cedar Bluff Tank	1	2,220.00	11.00	86.75	2,231.00
College Tanks (2)	Claypool Hill	2,443.00	30.00	0.00	2,473.00
Downtown Tank	Downtown	2,163.75	10.00	-1,067.29	2,173.75
Farmer St Tank	1	2,232.50	14.00	41.08	2,246.50
Hidden Valley Tank	Birm/Hidden Valley	2,337.54	10.00	-77.38	2,347.54
Kent's Ridge Tank	Kent's Ridge	2,716.00	20.00	0.01	2,736.00
Richlands HS Tank	1	2,230.00	10.00	3.10	2,240.00

FlexTable: Pump Table

Current Time: 0.000 hours

Label	Elevation (ft)	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
BOOSTER PUMP	1,940.00	Off	2,179.42	2,171.13	0.00	0.00
Cedar Bluff PS	2,037.50	Off	2,186.33	2,230.80	0.00	0.00
Claypool Hill PS No. 3	2,100.00	Off	2,473.00	2,473.00	0.00	0.00
Farmer St Pump	1,932.50	Off	2,187.17	2,246.42	0.00	0.00
Hidden Valley Pump	1,940.00	Off	2,166.60	2,349.93	0.00	0.00
High Service Pump	1,932.50	On	1,903.73	2,209.91	1,769.63	306.18
Kent's Ridge PS 1	2,185.00	Off	2,473.00	2,736.00	0.00	0.00
Kent's Ridge PS 2	2,200.00	Off	2,350.68	2,736.00	0.00	0.00
Wardell HSP	2,065.00	Off	2,066.00	2,473.00	0.00	0.00

EPS with Recommended Operational Changes

Scenario Summary Report
Scenario: EPS with Recommended Operational Changes

Scenario Summary

ID	1160
Label	EPS with Recommended Operational Changes
Notes	
Active Topology	<I> Base-Active Topology
Physical	<I> Base-Physical
Demand	<I> Richlands Avg demand only
Initial Settings	<I> 24 hour EPS for 14478 Oct 2019
Operational	EPS Recommended Changes
Age	<I> Base-Age Alternative
Constituent	<I> Base-Constituent
Trace	<I> Base-Trace Alternative
Fire Flow	<I> Base-Fire Flow
Energy Cost	<I> Base-Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base-User Data
Steady State/EPS Solver Calculation Options	<I> 24 hour EPS 14478 Oct 2019
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	EPS	Simulation Start Date	10/1/2019
Friction Method	Hazen-Williams	Hydraulic Time Step	0.500 hours
Accuracy	0.001	Duration	24.000 hours
Trials	50	Calculation Type	Hydraulics Only

Pattern Detailed Report: Diurnal

Element Details			
ID	127	Notes	
Label	Diurnal		

<Pattern Summary>			
Start Time	12:00:00 AM	Pattern Category Type	Hydraulic
Starting Multiplier	0.130	Pattern Format	Stepwise

Pattern Curve

Time from Start (hours)	Multiplier
1.000	0.130
2.000	0.130
3.000	0.250
4.000	0.250
5.000	1.250
6.000	1.250
7.000	1.660
8.000	1.660
9.000	1.740
10.000	1.740
11.000	1.580
12.000	1.580
13.000	1.250
14.000	1.250
15.000	1.580
16.000	1.580
17.000	1.250
18.000	1.250
19.000	0.790
20.000	0.790
21.000	0.410
22.000	0.410
23.000	0.090
24.000	0.130

Pattern - Daily Multipliers

	Multiplier
Monday	1.000
Tuesday	1.000
Wednesday	1.000
Thursday	1.000
Friday	1.000
Saturday	1.000
Sunday	1.000

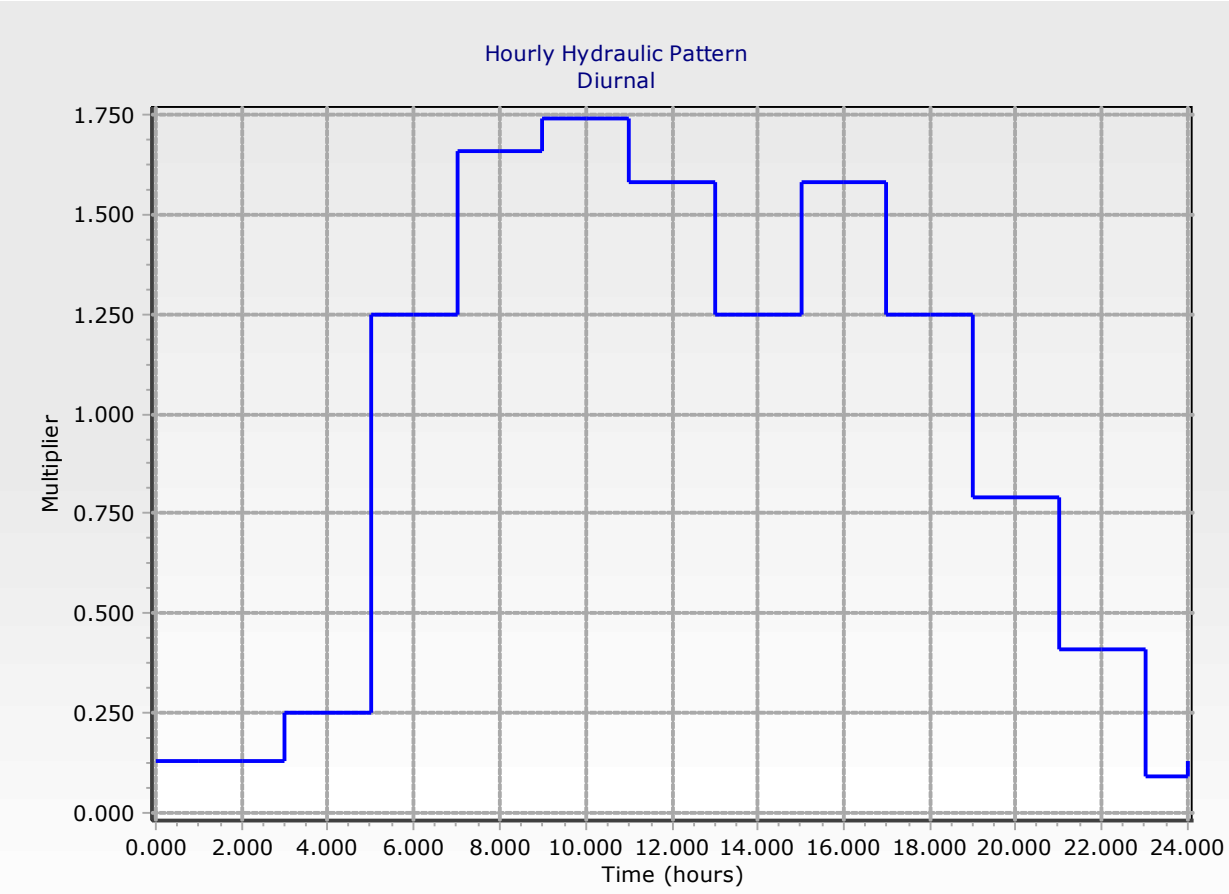
Pattern - Monthly Multipliers

	Multiplier

Pattern Detailed Report: Diurnal

Pattern - Monthly Multipliers

	Multiplier
January	1.000
February	1.000
March	1.000
April	1.000
May	1.000
June	1.000
July	1.000
August	1.000
September	1.000
October	1.000
November	1.000
December	1.000

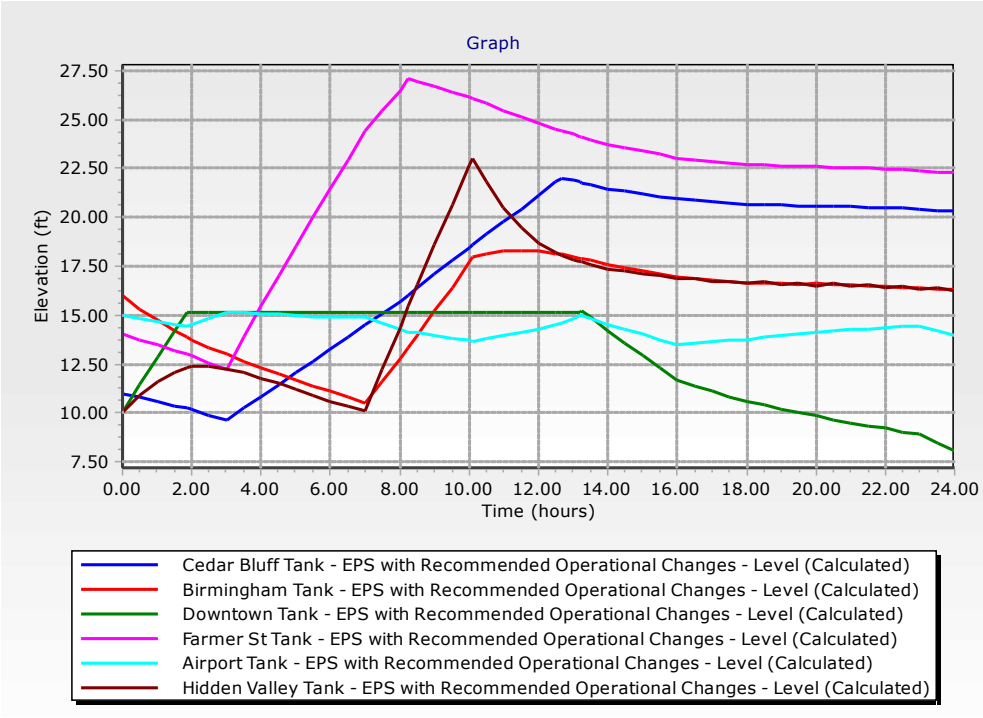


Tanks Level EPS Recommended

Time (hours)	Cedar Bluff Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Birmingham Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Downtown Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Farmer St Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Airport Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Hidden Valley Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)
0.00	11.00	16.00	10.00	14.00	15.00	10.00
0.50	10.79	15.31	11.44	13.73	14.82	10.90
1.00	10.58	14.71	12.85	13.46	14.66	11.59
1.50	10.37	14.18	14.19	13.20	14.52	12.10
1.85	10.23	13.87	15.12	13.01	14.42	12.33
2.00	10.16	13.75	15.12	12.93	14.54	12.39
2.50	9.88	13.34	15.12	12.57	14.84	12.37
3.00	9.61	12.98	15.12	12.22	15.14	12.24
3.50	10.22	12.64	15.12	13.86	15.11	12.03
4.00	10.84	12.33	15.12	15.47	15.07	11.79
4.50	11.44	12.02	15.12	17.02	15.02	11.49
5.00	12.04	11.71	15.12	18.53	14.98	11.19
5.50	12.64	11.40	15.12	20.02	14.93	10.88
6.00	13.24	11.09	15.12	21.47	14.89	10.57
6.50	13.87	10.79	15.12	22.95	14.89	10.32
7.00	14.49	10.51	15.12	24.40	14.89	10.06
7.50	15.10	11.61	15.12	25.45	14.57	12.25
8.00	15.70	12.75	15.12	26.48	14.26	14.38
8.25	16.03	13.35	15.12	27.08	14.14	15.46
8.50	16.38	13.95	15.12	26.95	14.08	16.52
9.00	17.08	15.18	15.12	26.68	13.95	18.62
9.50	17.78	16.43	15.12	26.41	13.83	20.67
10.00	18.47	17.70	15.12	26.15	13.70	22.66
10.10	18.60	17.95	15.12	26.08	13.66	23.03
10.50	19.13	18.13	15.12	25.81	13.79	21.83
11.00	19.78	18.28	15.12	25.47	13.95	20.52
11.50	20.44	18.32	15.12	25.13	14.11	19.47
12.00	21.09	18.25	15.12	24.79	14.27	18.69
12.50	21.81	18.15	15.12	24.53	14.50	18.18
12.65	22.03	18.10	15.12	24.45	14.57	18.07
13.00	21.88	17.98	15.12	24.26	14.85	17.84
13.20	21.80	17.90	15.12	24.15	15.00	17.73
13.25	21.77	17.88	15.25	24.12	14.99	17.70
13.50	21.67	17.78	14.89	23.99	14.84	17.57
14.00	21.46	17.57	14.16	23.72	14.52	17.32
14.50	21.33	17.40	13.53	23.55	14.27	17.26
15.00	21.20	17.25	12.91	23.38	14.02	17.13
15.50	21.06	17.11	12.29	23.22	13.76	16.99
16.00	20.93	16.97	11.68	23.05	13.50	16.85
16.50	20.86	16.86	11.39	22.96	13.57	16.86
17.00	20.79	16.81	11.11	22.87	13.64	16.75
17.50	20.73	16.73	10.84	22.78	13.70	16.70
18.00	20.66	16.66	10.57	22.70	13.75	16.62
18.50	20.64	16.61	10.38	22.68	13.85	16.68
19.00	20.63	16.64	10.19	22.66	13.94	16.54
19.50	20.60	16.57	10.01	22.63	14.02	16.64
20.00	20.58	16.60	9.83	22.60	14.10	16.50
20.50	20.56	16.52	9.66	22.57	14.17	16.60

Tanks Level EPS Recommended

Time (hours)	Cedar Bluff Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Birmingham Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Downtown Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Farmer St Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Airport Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)	Hidden Valley Tank - EPS with Recommended Operational Changes - Level (Calculated) (ft)
21.00	20.54	16.55	9.50	22.55	14.24	16.45
21.50	20.52	16.48	9.34	22.52	14.30	16.55
22.00	20.50	16.50	9.19	22.49	14.36	16.40
22.50	20.45	16.42	9.03	22.44	14.39	16.46
23.00	20.41	16.41	8.88	22.38	14.42	16.33
23.50	20.37	16.33	8.46	22.33	14.18	16.37
24.00	20.33	16.32	8.05	22.28	13.94	16.24



Tank Water Ages Recommended

Time (hours)	Cedar Bluff Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Birmingham Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Downtown Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Farmer St Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Airport Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Hidden Valley Tank - Water Age with Recommended Changes - Age (Calculated) (hours)
0.00	96.000	192.000	240.000	96.000	192.000	120.000
1.00	97.000	193.000	197.124	97.000	193.000	114.336
1.80	97.800	193.800	170.639	97.800	193.800	109.879
2.00	98.000	194.000	170.839	98.000	194.000	109.707
3.00	99.000	195.000	171.839	99.000	191.330	110.707
4.00	93.228	196.000	172.839	88.903	192.330	111.707
5.00	85.584	197.000	173.839	75.341	193.330	112.707
6.00	78.938	198.000	174.839	66.082	194.330	113.707
7.00	73.205	199.000	175.839	59.194	195.330	114.707
8.00	68.666	200.000	176.839	55.573	196.330	106.501
8.20	67.747	200.201	177.039	54.805	196.530	105.507
9.00	64.196	189.000	177.839	55.605	197.330	92.343
10.00	60.444	164.066	178.839	56.605	198.330	83.471
10.10	60.145	161.926	178.939	56.705	198.430	82.541
11.00	57.519	159.113	179.839	57.605	199.330	83.441
12.00	55.015	159.611	180.839	58.605	198.696	84.441
12.70	53.277	160.311	181.539	59.305	195.153	85.141
13.00	53.577	160.611	181.839	59.605	192.377	85.441
13.20	53.777	160.811	182.039	59.805	190.579	85.641
13.25	53.827	160.861	180.617	59.855	190.629	85.691
14.00	54.577	161.611	181.367	60.605	191.379	86.441
15.00	55.577	162.611	182.367	61.605	192.380	87.441
16.00	56.577	163.611	183.367	62.605	193.380	88.441
17.00	57.577	164.612	184.367	63.605	194.380	89.441
18.00	58.577	165.612	185.367	64.605	195.380	90.441
19.00	59.577	166.612	186.367	65.605	196.380	91.441
20.00	60.577	167.612	187.367	66.605	196.668	92.441
21.00	61.577	168.612	188.367	67.605	196.566	93.441
22.00	62.577	169.612	189.367	68.605	196.713	94.441
23.00	63.577	170.612	190.367	69.605	197.359	95.441
24.00	64.577	171.612	191.367	70.605	198.359	96.441
25.00	65.577	172.612	184.239	71.605	199.359	97.441
26.00	66.577	173.612	153.946	72.605	200.359	98.441
26.60	67.177	174.212	140.804	73.205	200.959	99.041
27.00	67.577	174.612	141.204	73.605	201.359	99.441
28.00	66.468	175.612	142.204	70.984	202.359	100.441
29.00	64.166	176.612	143.204	64.677	203.359	101.441
29.40	63.229	177.012	143.604	62.640	203.759	101.841
29.50	62.983	177.112	143.704	62.740	203.859	101.941
30.00	63.483	177.612	144.204	63.240	204.132	102.441
31.00	64.483	178.612	145.204	64.240	196.409	103.441
32.00	65.483	179.612	146.204	65.240	197.409	101.676
33.00	66.483	171.251	147.204	66.240	197.523	91.848
33.60	67.083	158.742	147.804	66.840	197.195	87.542
34.00	67.483	157.447	148.204	67.240	193.426	87.942

Tank Water Ages Recommended

Time (hours)	Cedar Bluff Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Birmingham Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Downtown Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Farmer St Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Airport Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Hidden Valley Tank - Water Age with Recommended Changes - Age (Calculated) (hours)
35.00	68.483	156.511	149.204	68.240	186.146	88.942
36.00	69.483	157.511	150.204	69.240	179.542	89.942
37.00	70.483	158.511	151.204	70.240	172.210	90.942
37.20	70.683	158.711	151.404	70.440	170.839	91.142
37.25	70.733	158.761	150.224	70.490	170.889	91.192
38.00	71.483	159.511	150.974	71.240	171.639	91.942
39.00	72.483	160.511	151.974	72.240	172.639	92.942
40.00	73.483	161.511	152.974	73.240	173.639	93.942
41.00	74.483	162.511	153.974	74.240	174.639	94.942
42.00	75.483	163.511	154.974	75.240	175.639	95.942
43.00	76.483	164.512	155.974	76.240	176.639	96.942
44.00	77.483	165.512	156.974	77.240	177.639	97.942
45.00	78.483	166.512	157.974	78.240	178.617	98.942
46.00	79.483	167.512	158.974	79.240	179.248	99.942
47.00	80.483	168.512	159.974	80.240	180.142	100.942
48.00	81.483	169.512	160.974	81.240	181.142	101.942
49.00	82.483	170.512	155.652	82.240	182.142	102.942
50.00	83.483	171.512	131.796	83.240	183.142	103.942
50.30	83.783	171.812	126.464	83.540	183.443	104.242
51.00	84.483	172.512	127.164	84.240	184.143	104.942
52.00	83.174	173.512	128.164	80.740	185.143	105.942
53.00	79.028	174.512	129.164	72.487	186.143	106.942
54.00	75.176	175.512	130.164	66.332	187.143	107.942
55.00	71.402	176.512	131.164	67.332	188.072	108.942
56.00	68.321	177.512	132.164	68.332	189.072	107.247
56.40	67.052	177.911	132.564	68.732	189.472	105.177
57.00	67.652	169.332	133.164	69.332	190.072	97.413
57.50	68.152	159.180	133.664	69.832	190.572	93.895
58.00	68.652	157.681	134.164	70.332	188.936	94.395
59.00	69.652	157.337	135.164	71.332	182.122	95.395
60.00	70.651	158.337	136.164	72.332	175.921	96.395
61.00	71.651	159.337	137.164	73.332	169.003	97.395
61.20	71.851	159.537	137.364	73.532	167.706	97.595
61.25	71.901	159.587	136.344	73.582	167.756	97.645
62.00	72.651	160.337	137.094	74.332	168.506	98.395
63.00	73.651	161.337	138.094	75.332	169.506	99.395
64.00	74.651	162.337	139.094	76.332	170.506	100.395
65.00	75.651	163.338	140.094	77.332	171.507	101.395
66.00	76.651	164.338	141.094	78.332	172.507	102.395
67.00	77.651	165.338	142.094	79.331	173.507	103.395
68.00	78.651	166.338	143.094	80.331	174.507	104.395
69.00	79.651	167.338	144.094	81.331	175.507	105.395
70.00	80.651	168.338	145.094	82.331	176.484	106.395
71.00	81.651	169.338	146.094	83.331	177.477	107.395
72.00	82.651	170.338	147.094	84.331	178.477	108.395

Tank Water Ages Recommended

Time (hours)	Cedar Bluff Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Birmingham Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Downtown Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Farmer St Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Airport Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Hidden Valley Tank - Water Age with Recommended Changes - Age (Calculated) (hours)
73.00	83.651	171.338	142.460	85.331	179.477	109.395
74.00	84.651	172.338	121.146	86.331	180.477	110.395
74.20	84.851	172.538	117.982	86.531	180.677	110.595
75.00	85.651	173.338	118.782	87.331	181.477	111.395
76.00	83.848	174.338	119.782	83.484	182.477	112.395
77.00	80.096	175.338	120.782	75.116	183.477	113.395
77.80	77.243	176.138	121.582	69.991	184.277	114.195
78.00	76.528	176.338	121.782	70.191	184.477	114.395
79.00	73.038	177.338	122.782	71.191	184.625	115.395
79.10	72.733	177.438	122.882	71.291	184.725	115.495
80.00	73.633	178.338	123.782	72.191	185.625	113.363
81.00	74.633	170.332	124.782	73.191	186.425	102.709
81.50	75.133	160.118	125.281	73.691	186.304	98.756
82.00	75.633	158.586	125.781	74.191	182.385	99.256
83.00	76.633	158.189	126.781	75.191	176.326	100.256
84.00	77.633	159.189	127.781	76.191	170.788	101.256
85.00	78.633	160.189	128.781	77.191	164.551	102.256
85.20	78.833	160.389	128.981	77.391	163.378	102.456
85.25	78.883	160.439	128.043	77.441	163.428	102.506
86.00	79.633	161.189	128.793	78.191	164.179	103.256
87.00	80.633	162.189	129.793	79.191	165.179	104.255
88.00	81.633	163.189	130.794	80.191	166.179	105.255
89.00	82.633	164.189	131.794	81.191	167.179	106.255
90.00	83.633	165.189	132.794	82.191	168.179	107.255
91.00	84.633	166.189	133.794	83.191	169.179	108.255
92.00	85.633	167.190	134.794	84.190	170.179	109.255
93.00	86.633	168.190	135.794	85.190	171.179	110.255
94.00	87.633	169.190	136.794	86.190	172.179	111.255
95.00	88.633	170.190	137.794	87.190	173.179	112.255
96.00	89.633	171.190	138.794	88.190	174.179	113.255
97.00	90.633	172.190	134.690	89.190	175.179	114.255
98.00	91.633	173.190	115.266	90.190	176.179	115.255
99.00	92.633	174.190	116.266	91.190	176.974	116.255
100.00	90.739	175.190	117.266	86.991	177.974	117.255
101.00	86.352	176.190	118.266	78.065	178.974	118.255
101.80	83.050	176.990	119.066	72.610	179.774	119.055
102.00	82.226	177.190	119.266	72.810	179.974	119.255
103.00	78.219	178.190	120.266	73.810	179.865	120.255
103.70	75.866	178.890	120.966	74.510	180.565	117.062
104.00	76.166	179.190	121.266	74.810	180.865	117.787
105.00	77.166	171.054	122.266	75.810	181.865	106.549
105.50	77.665	160.813	122.766	76.310	182.365	102.273
106.00	78.165	159.291	123.266	76.810	180.261	102.773
107.00	79.165	158.925	124.266	77.810	174.557	103.773
108.00	80.165	159.925	125.266	78.810	169.327	104.773

Tank Water Ages Recommended

Time (hours)	Cedar Bluff Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Birmingham Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Downtown Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Farmer St Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Airport Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Hidden Valley Tank - Water Age with Recommended Changes - Age (Calculated) (hours)
109.00	81.165	160.925	126.266	79.810	163.404	105.773
109.20	81.365	161.125	126.466	80.010	162.289	105.973
109.25	81.415	161.175	125.618	80.060	162.339	106.023
110.00	82.165	161.925	126.368	80.810	163.089	106.773
111.00	83.165	162.925	127.368	81.810	164.090	107.773
112.00	84.165	163.925	128.368	82.810	165.090	108.773
113.00	85.165	164.925	129.368	83.810	166.090	109.773
114.00	86.165	165.925	130.368	84.810	167.090	110.773
115.00	87.165	166.926	131.368	85.810	168.090	111.773
116.00	88.165	167.926	132.368	86.810	169.090	112.773
117.00	89.165	168.926	133.368	87.810	170.090	113.773
118.00	90.165	169.926	134.368	88.810	171.090	114.772
119.00	91.165	170.926	135.369	89.810	172.090	115.772
120.00	92.165	171.926	136.369	90.809	173.090	116.772
121.00	93.165	172.926	132.476	91.809	174.090	117.772
121.90	94.065	173.826	115.415	92.709	174.990	118.672
122.00	94.165	173.926	115.515	92.809	175.090	118.772
123.00	95.165	174.926	116.515	93.809	175.544	119.772
124.00	93.188	175.926	117.515	89.369	176.544	120.772
125.00	88.746	176.926	118.515	80.069	177.544	121.772
125.90	85.015	177.826	119.415	73.753	178.445	122.672
126.00	84.600	177.926	119.515	73.853	178.545	122.772
127.00	80.532	178.926	120.515	74.853	178.754	123.772
127.40	79.137	179.326	120.915	75.253	179.154	124.172
128.00	79.737	179.926	121.515	75.853	179.754	121.027
129.00	80.737	171.806	122.515	76.853	180.754	109.215
129.50	81.237	161.530	123.015	77.353	181.254	104.739
130.00	81.737	160.005	123.515	77.853	178.171	105.239
131.00	82.737	159.642	124.515	78.853	172.773	106.239
132.00	83.737	160.642	125.515	79.853	167.813	107.238
133.00	84.737	161.642	126.515	80.853	162.167	108.238
133.20	84.937	161.842	126.715	81.053	161.103	108.438
133.25	84.987	161.892	125.870	81.103	161.153	108.488
134.00	85.737	162.643	126.620	81.853	161.903	109.238
135.00	86.737	163.643	127.620	82.853	162.903	110.238
135.83	87.567	164.473	128.451	83.683	163.734	111.069
136.00	87.737	164.643	128.620	83.853	163.903	111.238
137.00	88.737	165.643	129.621	84.853	164.903	112.238
138.00	89.737	166.643	130.621	85.853	165.903	113.238
139.00	90.737	167.643	131.621	86.853	166.903	114.238
140.00	91.737	168.643	132.621	87.853	167.903	115.238
141.00	92.737	169.643	133.621	88.853	168.903	116.238
142.00	93.737	170.643	134.621	89.853	169.903	117.238
143.00	94.737	171.643	135.621	90.853	170.903	118.238
144.00	95.737	172.643	136.621	91.853	171.903	119.238

Tank Water Ages Recommended

Time (hours)	Cedar Bluff Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Birmingham Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Downtown Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Farmer St Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Airport Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Hidden Valley Tank - Water Age with Recommended Changes - Age (Calculated) (hours)
145.00	96.737	173.643	132.842	92.853	172.904	120.238
145.80	97.537	174.443	117.771	93.653	173.704	121.038
146.00	97.737	174.643	117.971	93.853	173.904	121.238
147.00	98.737	175.643	118.971	94.853	173.972	122.238
148.00	96.649	176.643	119.971	90.657	174.972	123.238
149.00	91.958	177.643	120.971	81.329	175.972	124.238
149.70	88.864	178.343	121.671	76.279	176.672	124.938
150.00	87.539	178.643	121.971	76.579	176.972	125.238
151.00	83.263	179.644	122.971	77.579	176.802	126.238
151.60	81.091	180.244	123.571	78.179	177.402	124.450
152.00	81.491	180.644	123.971	78.579	177.802	123.312
153.00	82.491	172.465	124.971	79.579	178.802	111.256
153.50	82.991	162.153	125.471	80.079	179.302	106.614
154.00	83.491	160.622	125.971	80.579	177.210	107.114
155.00	84.491	160.255	126.971	81.579	172.013	108.114
156.00	85.491	161.255	127.971	82.579	167.228	109.114
157.00	86.491	162.255	128.971	83.579	161.763	110.114
157.20	86.691	162.455	129.171	83.779	160.731	110.314
157.25	86.741	162.505	128.308	83.829	160.781	110.364
158.00	87.491	163.255	129.058	84.579	161.531	111.114
159.00	88.491	164.255	130.058	85.579	162.531	112.114
160.00	89.491	165.255	131.058	86.579	163.531	113.114
161.00	90.491	166.255	132.058	87.579	164.531	114.114
162.00	91.491	167.255	133.058	88.579	165.531	115.114
163.00	92.491	168.255	134.058	89.578	166.532	116.114
164.00	93.491	169.255	135.058	90.578	167.532	117.114
165.00	94.491	170.255	136.058	91.578	168.532	118.114
166.00	95.491	171.256	137.058	92.578	169.532	119.114
167.00	96.491	172.256	138.058	93.578	170.532	120.114
168.00	97.491	173.256	139.058	94.578	171.532	121.114
169.00	98.491	174.256	135.292	95.578	172.532	122.114
169.70	99.191	174.956	121.939	96.278	173.232	122.814
170.00	99.491	175.256	122.239	96.578	173.532	123.114
171.00	100.491	176.256	123.239	97.578	173.205	124.114
172.00	98.384	177.256	124.239	93.052	174.205	125.114
173.00	93.595	178.256	125.239	83.191	175.205	126.114
173.90	89.596	179.156	126.139	76.505	176.105	127.014
174.00	89.151	179.256	126.239	76.605	176.205	127.114
175.00	84.787	180.256	127.239	77.605	176.626	128.114
175.60	82.569	180.856	127.839	78.205	177.226	126.285
176.00	82.969	181.256	128.239	78.605	177.626	125.051
177.00	83.968	173.051	129.239	79.605	178.626	112.725
177.50	84.468	162.711	129.739	80.105	179.126	107.973
178.00	84.968	161.176	130.239	80.605	177.195	108.473
179.00	85.968	160.805	131.239	81.605	172.114	109.473

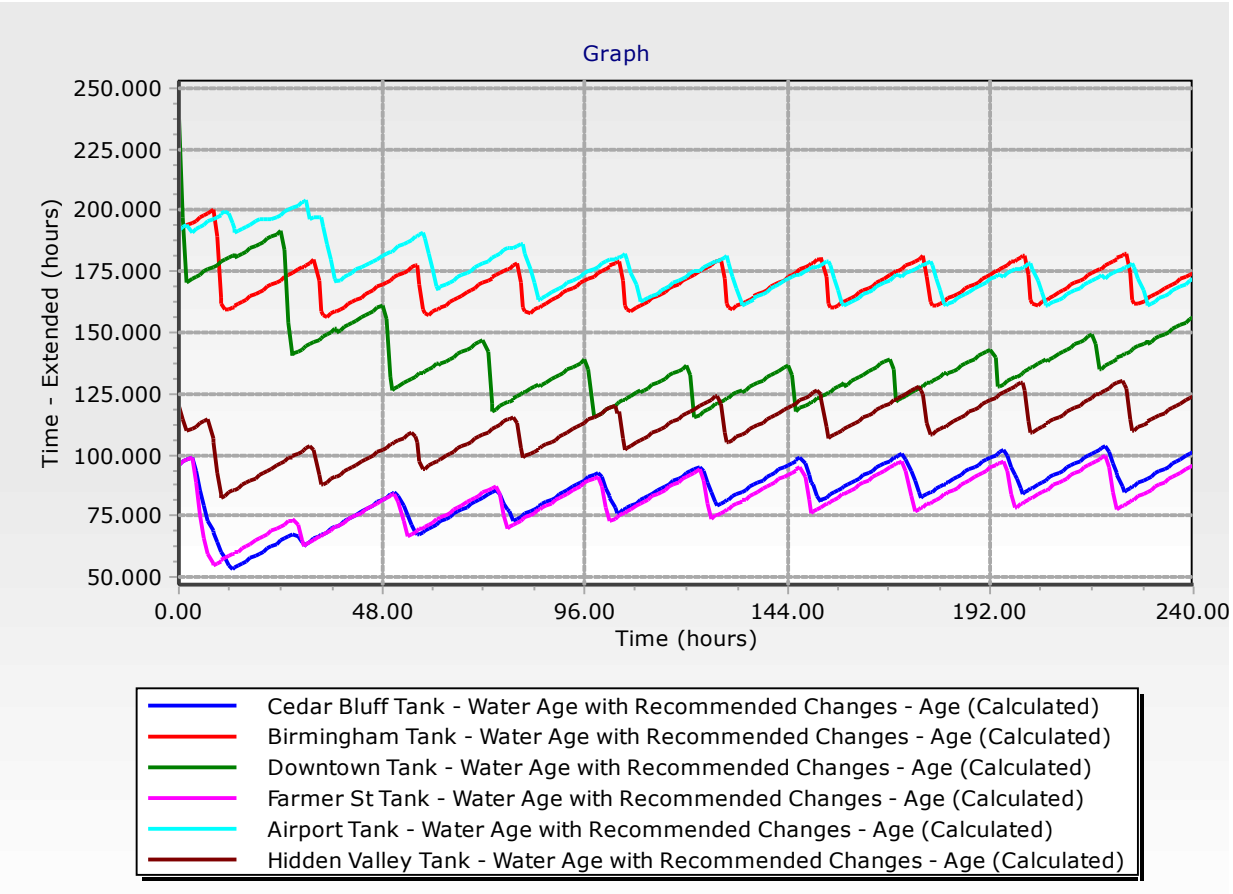
Tank Water Ages Recommended

Time (hours)	Cedar Bluff Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Birmingham Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Downtown Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Farmer St Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Airport Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Hidden Valley Tank - Water Age with Recommended Changes - Age (Calculated) (hours)
180.00	86.968	161.805	132.239	82.605	167.429	110.473
181.00	87.968	162.805	133.239	83.605	162.065	111.473
181.20	88.168	163.005	133.439	83.805	161.051	111.673
181.25	88.218	163.055	132.537	83.855	161.101	111.723
182.00	88.968	163.805	133.287	84.605	161.851	112.473
183.00	89.968	164.805	134.287	85.605	162.851	113.473
184.00	90.968	165.805	135.287	86.605	163.851	114.473
185.00	91.968	166.805	136.287	87.605	164.851	115.473
186.00	92.968	167.805	137.287	88.605	165.851	116.473
187.00	93.968	168.806	138.287	89.605	166.852	117.473
188.00	94.968	169.806	139.288	90.605	167.852	118.473
189.00	95.968	170.806	140.288	91.605	168.852	119.473
190.00	96.968	171.806	141.288	92.605	169.852	120.473
191.00	97.968	172.806	142.288	93.605	170.852	121.473
192.00	98.968	173.806	143.288	94.605	171.852	122.473
193.00	99.968	174.806	139.439	95.605	172.852	123.473
193.60	100.568	175.406	127.652	96.205	173.452	124.073
194.00	100.968	175.806	128.052	96.605	173.852	124.473
195.00	101.968	176.806	129.052	97.605	173.122	125.473
196.00	99.812	177.806	130.052	93.175	174.122	126.473
197.00	94.941	178.806	131.052	83.479	175.122	127.473
197.70	91.740	179.506	131.752	78.235	175.822	128.173
198.00	90.368	179.806	132.052	78.535	176.122	128.473
199.00	85.944	180.806	133.052	79.535	176.119	129.473
199.50	84.057	181.306	133.552	80.035	176.619	129.201
200.00	84.556	181.806	134.052	80.535	177.119	126.311
201.00	85.556	173.602	135.052	81.535	178.119	113.749
201.50	86.056	163.238	135.552	82.035	178.619	108.927
202.00	86.556	161.699	136.052	82.535	176.294	109.427
203.00	87.556	161.329	137.053	83.535	171.378	110.427
204.00	88.556	162.329	138.053	84.535	166.839	111.427
205.00	89.556	163.329	139.053	85.535	161.625	112.427
205.20	89.756	163.529	139.253	85.735	160.639	112.627
205.25	89.806	163.579	138.291	85.785	160.689	112.677
206.00	90.556	164.329	139.041	86.535	161.439	113.427
207.00	91.556	165.329	140.041	87.535	162.440	114.427
208.00	92.556	166.329	141.041	88.535	163.440	115.427
209.00	93.556	167.329	142.041	89.535	164.440	116.427
210.00	94.556	168.329	143.041	90.535	165.440	117.427
211.00	95.556	169.329	144.041	91.535	166.440	118.427
212.00	96.556	170.329	145.042	92.535	167.440	119.427
213.00	97.556	171.329	146.042	93.535	168.440	120.427
214.00	98.556	172.329	147.042	94.535	169.440	121.427
215.00	99.556	173.329	148.042	95.535	170.440	122.427
216.00	100.556	174.329	149.042	96.535	171.440	123.427

Tank Water Ages Recommended

Time (hours)	Cedar Bluff Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Birmingham Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Downtown Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Farmer St Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Airport Tank - Water Age with Recommended Changes - Age (Calculated) (hours)	Hidden Valley Tank - Water Age with Recommended Changes - Age (Calculated) (hours)
217.00	101.556	175.329	145.062	97.535	172.440	124.427
217.50	102.056	175.829	134.883	98.035	172.940	124.927
218.00	102.556	176.329	135.383	98.535	173.440	125.427
219.00	103.556	177.330	136.383	99.535	172.249	126.427
220.00	101.328	178.330	137.383	94.588	173.249	127.427
221.00	96.322	179.330	138.383	84.504	174.249	128.427
221.90	92.154	180.230	139.283	77.671	175.149	129.327
222.00	91.692	180.330	139.383	77.771	175.249	129.427
223.00	87.151	181.330	140.383	78.771	175.861	130.427
223.60	84.841	181.930	140.983	79.371	176.461	128.551
224.00	85.241	182.330	141.383	79.771	176.861	127.209
225.00	86.241	174.082	142.383	80.771	177.861	114.578
225.50	86.741	163.696	142.883	81.271	178.361	109.698
226.00	87.241	162.151	143.384	81.771	176.691	110.198
227.00	88.241	161.775	144.384	82.771	171.827	111.198
228.00	89.241	162.775	145.384	83.771	167.333	112.198
229.00	90.241	163.775	146.384	84.771	162.164	113.198
229.20	90.441	163.975	146.584	84.971	161.186	113.398
229.25	90.491	164.025	145.552	85.021	161.236	113.448
230.00	91.241	164.775	146.302	85.771	161.986	114.198
231.00	92.241	165.775	147.302	86.771	162.986	115.198
232.00	93.241	166.775	148.302	87.771	163.986	116.198
233.00	94.241	167.775	149.302	88.771	164.986	117.198
234.00	95.241	168.776	150.302	89.771	165.986	118.198
235.00	96.241	169.776	151.302	90.771	166.986	119.198
236.00	97.241	170.776	152.302	91.771	167.986	120.198
237.00	98.241	171.776	153.302	92.771	168.986	121.198
238.00	99.241	172.776	154.302	93.771	169.986	122.198
239.00	100.241	173.776	155.302	94.771	170.986	123.198
240.00	101.241	174.776	156.302	95.771	171.986	124.198

Tank Water Ages Recommended



FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
Big Ck Conn	1,945.00	Downtown	0.00	2,180.13	102
Hospital	1,955.00	Downtown	11.62	2,170.71	93
J-1	2,163.75	99	0.00	2,174.60	5
J-1	1,943.00	Downtown	0.00	2,170.98	99
J-2	2,075.00	Birm/Hidden Valley	0.00	2,352.23	120
J-2	1,986.00	Downtown	0.00	2,170.98	80
J-3	2,140.00	Birm/Hidden Valley	1.17	2,352.22	92
J-3	1,949.00	Downtown	0.00	2,170.98	96
J-4	2,040.00	Birm/Hidden Valley	0.00	2,352.22	135
J-4	1,958.00	Downtown	0.00	2,170.98	92
J-5	2,085.00	Birm/Hidden Valley	1.11	2,352.22	116
J-7	2,150.00	Birm/Hidden Valley	0.70	2,350.68	87
J-7	1,947.00	Downtown	0.00	2,170.98	97
J-8	1,991.00	Downtown	0.00	2,170.98	78
J-9	1,929.00	Downtown	0.00	2,170.97	105
J-10	1,925.00	99	0.00	1,926.46	1
J-10	1,930.00	Downtown	0.00	2,170.76	104
J-11	2,040.00	Birm/Hidden Valley	4.50	2,350.69	134
J-11	1,953.00	Downtown	0.00	2,170.96	94
J-12	2,080.00	Birm/Hidden Valley	0.87	2,350.68	117
J-12	2,058.00	Downtown	0.00	2,170.71	49
J-13	2,220.00	Birm/Hidden Valley	1.86	2,350.68	57
J-13	1,990.00	Downtown	0.00	2,054.49	28
J-14	2,080.00	Birm/Hidden Valley	0.37	2,350.68	117
J-14	1,926.00	Downtown	0.00	2,161.95	102
J-15	1,928.00	Downtown	0.00	2,161.95	101
J-16	2,061.00	3	0.00	2,246.42	80
J-17	2,075.00	Birm/Hidden Valley	0.39	2,352.22	120
J-17	2,067.00	3	0.00	2,246.39	78
J-18	2,000.00	Birm/Hidden Valley	0.17	2,350.65	152
J-18	2,062.00	Birm/Hidden Valley	0.00	2,349.47	124
J-19	1,980.00	Birm/Hidden Valley	0.50	2,350.65	160
J-19	2,183.00	Birm/Hidden Valley	0.00	2,349.47	72
J-20	1,930.00	3	0.00	2,246.42	137

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-20	2,166.00	Birm/Hidden Valley	0.00	2,349.21	79
J-21	2,071.00	Birm/Hidden Valley	0.00	2,349.21	120
J-22	2,080.00	Birm/Hidden Valley	0.00	2,352.23	118
J-22	2,100.00	Birm/Hidden Valley	0.00	2,349.21	108
J-23	2,030.00	Birm/Hidden Valley	0.00	2,350.99	139
J-23	2,025.00	Birm/Hidden Valley	0.00	2,350.35	141
J-24	2,400.00	Kent's Ridge	0.00	2,736.00	145
J-24	2,083.00	Birm/Hidden Valley	0.00	2,350.35	116
J-25	2,280.00	Kent's Ridge	0.00	2,736.00	197
J-25	2,063.00	Birm/Hidden Valley	0.00	2,352.23	125
J-26	2,180.00	Kent's Ridge	0.00	2,736.00	241
J-26	2,199.00	Kent's Ridge	0.00	2,736.00	232
J-27	2,185.00	Claypool Hill	0.00	2,473.00	125
J-27	2,185.00	Kent's Ridge	0.00	2,736.00	238
J-28	2,030.00	Claypool Hill	0.00	2,473.00	192
J-28	2,093.00	Birm/Hidden Valley	0.00	2,350.68	111
J-29	2,141.00	Birm/Hidden Valley	0.00	2,348.75	90
J-30	2,020.00	3	2.32	2,246.42	98
J-30	1,935.00	Downtown	0.00	2,170.74	102
J-31	2,260.00	Kent's Ridge	0.00	2,736.00	206
J-31	1,987.00	3	0.00	2,246.40	112
J-32	1,930.00	Downtown	0.00	2,186.16	111
J-33	1,978.00	Downtown	0.00	2,186.71	90
J-34	1,945.00	Downtown	0.00	2,180.06	102
J-35	1,940.00	Downtown	0.00	2,180.05	104
J-36	1,933.00	Downtown	0.00	2,184.98	109
J-37	1,940.00	Downtown	0.00	2,166.68	98
J-37	1,941.00	Downtown	0.00	2,185.34	106
J-39	2,080.00	Birm/Hidden Valley	0.00	2,350.68	117
J-39	1,947.00	Downtown	0.00	2,180.68	101
J-40	1,987.00	3	2.32	2,246.44	112
J-40	1,947.00	Downtown	0.00	2,184.34	103
J-41	2,220.00	Kent's Ridge	0.00	2,736.00	223
J-41	1,967.00	Downtown	0.00	2,181.19	93
J-42	1,945.00	Birm/Hidden Valley	0.00	2,349.93	175
J-42	1,951.00	Downtown	0.00	2,181.19	100

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-43	2,000.00	Birm/Hidden Valley	0.00	2,349.96	151
J-43	1,955.00	Downtown	0.00	2,181.69	98
J-44	2,060.00	Birm/Hidden Valley	0.00	2,349.93	125
J-44	1,951.00	Downtown	0.00	2,180.27	99
J-45	1,965.00	Birm/Hidden Valley	0.00	2,349.93	167
J-45	1,931.00	Downtown	0.00	2,180.21	108
J-46	2,050.00	Claypool Hill	0.00	2,473.00	183
J-46	1,939.00	Downtown	0.00	2,180.13	104
J-47	1,945.00	Downtown	0.00	2,180.13	102
J-48	1,980.00	Downtown	0.00	2,180.13	87
J-49	2,100.00	Birm/Hidden Valley	0.00	2,350.68	108
J-49	2,040.00	Downtown	0.00	2,180.13	61
J-50	2,150.00	3	2.32	2,246.46	42
J-50	2,076.00	Downtown	0.00	2,180.13	45
J-51	2,300.00	Kent's Ridge	0.00	2,736.00	189
J-51	2,082.00	Downtown	0.00	2,180.13	42
J-52	2,500.00	Kent's Ridge	0.00	2,736.00	102
J-52	2,011.00	Downtown	0.00	2,180.13	73
J-53	2,033.00	Birm/Hidden Valley	0.00	2,350.67	137
J-53	2,035.00	Downtown	0.00	2,180.13	63
J-54	1,946.00	Downtown	0.00	2,180.13	101
J-55	2,280.00	Kent's Ridge	0.00	2,736.00	197
J-55	1,952.00	Downtown	0.00	2,180.13	99
J-56	2,185.00	Kent's Ridge	0.00	2,736.00	238
J-56	2,012.00	Downtown	0.00	2,180.13	73
J-57	2,200.00	Birm/Hidden Valley	0.00	2,350.68	65
J-57	2,027.00	Downtown	0.00	2,180.13	66
J-58	1,940.00	3	0.00	2,166.60	98
J-58	1,999.00	Downtown	0.00	2,180.13	78
J-59	1,950.00	Birm/Hidden Valley	0.00	2,349.93	173
J-59	1,940.00	Downtown	0.00	2,180.13	104
J-60	1,935.00	Downtown	2.32	2,187.17	109
J-60	1,945.00	Downtown	0.00	2,180.13	102
J-61	1,975.00	Birm/Hidden Valley	0.00	2,349.93	162
J-61	2,005.00	Downtown	0.00	2,180.13	76
J-62	2,194.00	Claypool Hill	0.00	2,473.00	121
J-62	1,986.00	Downtown	0.00	2,180.13	84
J-63	2,165.00	Claypool Hill	0.00	2,473.00	133
J-63	2,008.00	Downtown	0.00	2,180.13	74
J-64	2,040.00	Claypool Hill	0.00	2,473.00	187

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-65	2,048.00	Claypool Hill	0.00	2,473.00	184
J-65	2,026.00	3	0.00	2,246.20	95
J-66	2,080.00	Claypool Hill	0.00	2,473.00	170
J-66	2,114.00	3	0.00	2,246.50	57
J-67	2,213.00	Claypool Hill	0.00	2,473.00	112
J-67	2,142.00	3	0.00	2,246.50	45
J-68	2,292.00	Claypool Hill	0.00	2,473.00	78
J-68	2,120.00	3	0.00	2,246.50	55
J-68A	2,164.00	Claypool Hill	0.00	2,473.00	134
J-69	2,232.00	99	0.00	2,246.50	6
J-70	1,940.00	Downtown	1.55	2,184.62	106
J-70	2,151.00	3	0.00	2,246.50	41
J-71	2,108.00	Claypool Hill	0.00	2,473.00	158
J-71	2,081.00	Downtown	0.00	2,186.70	46
J-72	2,295.00	Claypool Hill	0.00	2,473.00	77
J-72	1,968.00	Downtown	0.00	2,186.70	95
J-73	2,230.00	Claypool Hill	0.00	2,473.00	105
J-73	2,043.71	Cedar Bluff Tank	0.00	2,230.80	81
J-74	2,100.00	Claypool Hill	0.00	2,473.00	161
J-74	2,055.00	Cedar Bluff Tank	0.00	2,230.80	76
J-75	2,100.00	Claypool Hill	0.00	2,473.00	161
J-75	2,085.00	Cedar Bluff Tank	0.00	2,240.00	67
J-76	2,430.00	99	0.00	2,473.00	19
J-76	2,071.00	Cedar Bluff Tank	0.00	2,240.00	73
J-77	2,370.00	Claypool Hill	0.00	2,473.00	45
J-77	1,936.00	Downtown	0.00	2,180.23	106
J-78	2,213.00	Claypool Hill	0.00	2,473.00	112
J-79	2,336.00	Claypool Hill	0.00	2,473.00	59
J-80	1,940.00	Downtown	2.32	2,184.93	106
J-81	2,332.00	Claypool Hill	0.00	2,473.00	61
J-82	2,320.00	Claypool Hill	0.00	2,473.00	66
J-83	2,330.00	Claypool Hill	0.00	2,473.00	62
J-84	2,278.00	Claypool Hill	0.00	2,473.00	84
J-85	1,975.00	Birm/Hidden Valley	0.00	2,349.93	162
J-86	2,040.00	Birm/Hidden Valley	0.20	2,352.22	135
J-87	2,020.00	Birm/Hidden Valley	0.20	2,352.22	144
J-88	2,040.00	Birm/Hidden Valley	0.20	2,352.22	135
J-90	1,935.00	Downtown	0.00	2,187.14	109
J-100	1,945.00	Downtown	1.55	2,187.06	105
J-110	1,945.00	Downtown	1.55	2,187.01	105
J-120	2,015.00	3	1.55	2,246.42	100
J-130	2,000.00	3	2.32	2,246.40	107
J-140	2,035.00	3	2.32	2,246.39	91
J-150	1,945.00	Downtown	2.32	2,186.82	105

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-160	1,960.00	Downtown	2.32	2,186.76	98
J-170	1,975.00	Downtown	2.32	2,186.71	92
J-180	2,000.00	Downtown	2.32	2,186.70	81
J-190	2,000.00	Downtown	2.32	2,186.70	81
J-200	2,000.00	Downtown	2.32	2,186.70	81
J-210	2,005.00	Downtown	2.32	2,186.71	79
J-220	1,985.00	Downtown	2.32	2,186.78	87
J-230	2,020.00	Downtown	2.32	2,185.50	72
J-240	2,020.00	Downtown	2.32	2,185.50	72
J-250	2,025.00	Downtown	2.32	2,183.40	69
J-260	1,985.00	3	2.32	2,246.34	113
J-270	1,975.00	3	2.32	2,246.25	117
J-280	1,965.00	3	2.32	2,246.25	122
J-290	2,080.00	3	2.32	2,246.26	72
J-300	2,100.00	3	2.32	2,246.26	63
J-310	2,095.00	3	2.32	2,246.27	65
J-320	1,960.00	3	2.32	2,246.24	124
J-330	1,955.00	3	0.77	2,246.24	126
J-340	1,950.00	3	2.32	2,246.21	128
J-350	1,975.00	3	2.32	2,246.20	117
J-360	2,025.00	Birm/Hidden Valley	3.88	2,350.65	141
J-370	1,955.00	3	2.32	2,246.21	126
J-380	1,970.00	3	2.32	2,246.16	119
J-390	1,955.00	3	3.88	2,167.59	92
J-400	1,945.00	Downtown	2.32	2,168.12	97
J-410	1,940.00	Downtown	2.32	2,168.57	99
J-420	1,950.00	Downtown	3.88	2,168.90	95
J-430	1,950.00	Downtown	3.88	2,169.28	95
J-440	1,950.00	Downtown	2.32	2,168.11	94
J-450	1,955.00	Downtown	2.32	2,168.03	92
J-460	1,945.00	Downtown	2.32	2,168.57	97
J-470	1,930.00	Downtown	3.88	2,167.95	103
J-480	1,929.00	Downtown	3.88	2,167.56	103
J-490	1,925.00	Downtown	2.32	2,161.95	103
J-500	2,005.00	3	2.32	2,157.05	66
J-510	1,927.00	3	2.32	2,096.39	73
J-520	1,921.00	Downtown	2.32	2,161.95	104
J-530	2,040.00	3	2.32	2,156.99	51
J-540	1,940.00	3	2.32	2,166.34	98
J-550	1,965.00	Birm/Hidden Valley	2.77	2,349.93	167
J-560	1,975.00	Birm/Hidden Valley	1.66	2,349.90	162
J-570	2,094.00	Birm/Hidden Valley	4.44	2,349.56	111
J-580	2,110.00	Birm/Hidden Valley	2.22	2,349.43	104

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-590	2,160.00	Birm/Hidden Valley	2.22	2,349.21	82
J-600	2,170.00	Birm/Hidden Valley	2.22	2,348.86	77
J-610	2,265.00	Birm/Hidden Valley	2.22	2,348.86	36
J-620	1,937.00	3	2.32	2,151.46	93
J-630	1,945.00	3	2.32	2,109.40	71
J-640	1,950.00	3	2.32	2,151.36	87
J-650	1,990.00	Downtown	2.32	2,171.75	79
J-670	1,960.00	Downtown	6.20	2,180.29	95
J-680	1,965.00	Downtown	3.88	2,180.27	93
J-690	1,965.00	Downtown	4.65	2,180.13	93
J-700	1,955.00	Downtown	3.88	2,180.13	97
J-710	1,935.00	Downtown	2.32	2,180.13	106
J-720	1,925.00	Downtown	3.88	2,180.13	110
J-730	1,930.00	Downtown	3.88	2,180.13	108
J-740	1,927.00	Downtown	2.32	2,180.13	110
J-750	1,955.00	Downtown	2.32	2,178.21	97
J-760	1,925.00	Downtown	2.32	2,180.21	110
J-770	1,930.00	Downtown	3.88	2,180.22	108
J-780	1,935.00	Downtown	2.32	2,180.23	106
J-790	1,940.00	Downtown	3.88	2,180.24	104
J-800	1,950.00	Downtown	2.32	2,180.27	100
J-810	1,990.00	Downtown	3.88	2,181.69	83
J-820	2,045.00	Downtown	2.32	2,180.06	58
J-830	1,975.00	Downtown	2.32	2,180.10	89
J-840	2,025.00	Downtown	2.32	2,180.09	67
J-850	1,965.00	Downtown	2.32	2,180.11	93
J-860	1,950.00	Downtown	3.88	2,180.12	100
J-870	1,980.00	Downtown	2.32	2,180.04	87
J-880	1,970.00	Downtown	3.88	2,180.99	91
J-890	1,955.00	Downtown	2.32	2,180.93	98
J-900	1,970.00	Downtown	2.32	2,181.23	91
J-910	1,930.00	Downtown	2.32	2,184.98	110
J-920	1,920.00	Downtown	2.32	2,185.30	115
J-930	1,930.00	Downtown	2.32	2,184.98	110
J-940	1,930.00	Downtown	2.32	2,187.17	111
J-950	1,930.00	Downtown	2.32	2,186.32	111
J-960	2,025.00	Downtown	2.32	2,181.75	68
J-970	2,010.00	Downtown	2.32	2,186.71	76
J-980	2,165.00	Birm/Hidden Valley	1.66	2,349.44	80
J-990	2,190.00	Birm/Hidden Valley	1.66	2,349.40	69
J-1000	2,095.00	Birm/Hidden Valley	2.22	2,349.43	110

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1010	2,180.00	Birm/Hidden Valley	2.22	2,348.77	73
J-1020	2,115.00	Birm/Hidden Valley	2.22	2,348.68	101
J-1030	2,120.00	Birm/Hidden Valley	2.22	2,348.65	99
J-1040	2,105.00	Birm/Hidden Valley	2.22	2,349.13	106
J-1050	2,112.00	Birm/Hidden Valley	1.66	2,349.28	103
J-1060	2,125.00	Birm/Hidden Valley	1.66	2,348.77	97
J-1070	2,105.00	Birm/Hidden Valley	1.66	2,348.69	105
J-1080	2,105.00	Birm/Hidden Valley	2.77	2,348.68	105
J-1090	2,170.00	Birm/Hidden Valley	1.66	2,349.13	78
J-1100	2,050.00	Birm/Hidden Valley	1.66	2,350.91	130
J-1120	2,075.00	Birm/Hidden Valley	1.66	2,350.90	119
J-1130	2,075.00	Birm/Hidden Valley	1.66	2,352.22	120
J-1280	1,945.00	Downtown	3.88	2,179.46	101
J-1290	1,953.00	Downtown	3.88	2,179.44	98
J-1300	1,955.00	Downtown	3.88	2,179.42	97
J-1310	1,950.00	Downtown	3.88	2,171.13	96
J-1320	1,947.00	Downtown	3.88	2,171.36	97
J-1330	1,940.00	Downtown	3.88	2,171.56	100
J-1340	1,945.00	Downtown	2.32	2,178.85	101
J-1350	1,930.00	Downtown	2.32	2,176.09	106
J-1360	1,930.00	Downtown	2.32	2,174.95	106
J-1370	1,935.00	Downtown	2.32	2,175.36	104
J-1380	1,930.00	Downtown	2.32	2,175.36	106
J-1390	1,933.00	Downtown	2.32	2,174.08	104
J-1400	1,925.00	Downtown	2.32	2,174.08	108
J-1410	1,934.00	Downtown	2.32	2,172.66	103
J-1420	1,931.00	Downtown	2.32	2,172.65	105
J-1430	1,937.00	Downtown	3.88	2,171.03	101
J-1440	1,930.00	Downtown	3.88	2,171.01	104
J-1450	1,925.00	Downtown	3.88	2,171.11	106
J-1460	1,950.00	Downtown	2.32	2,171.11	96
J-1470	1,955.00	Downtown	2.32	2,171.11	94
J-1480	1,945.00	Downtown	2.32	2,186.33	104
J-1490	1,945.00	Downtown	2.32	2,186.33	104
J-1500	1,990.00	Downtown	2.32	2,186.33	85
J-1510	2,035.00	Cedar Bluff Tank	3.88	2,230.80	85
J-1520	2,070.00	Cedar Bluff Tank	6.20	2,230.80	70

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1530	1,920.00	Downtown	3.88	2,170.78	109
J-1540	1,913.00	Downtown	0.77	2,170.80	112
J-1550	1,925.00	Downtown	3.88	2,171.22	107
J-1560	1,920.00	Downtown	3.10	2,171.12	109
J-1570	1,925.00	Downtown	6.20	2,171.13	106
J-1580	1,920.00	Downtown	3.88	2,171.04	109
J-1590	1,920.00	Downtown	3.88	2,171.04	109
J-1600	1,940.00	3	0.00	2,166.60	98
J-1610	1,940.00	Birm/Hidden Valley	0.00	2,349.93	177
J-1620	1,930.00	Downtown	2.32	2,171.15	104
J-1630	1,930.00	Downtown	0.00	2,171.00	104
J-1640	1,932.00	Downtown	2.32	2,170.98	103
J-1650	1,985.00	Downtown	2.32	2,170.94	80
J-1660	2,040.00	Downtown	2.32	2,170.92	57
J-1670	2,075.00	Downtown	1.55	2,170.89	41
J-1680	2,040.00	Downtown	2.32	2,170.89	57
J-1690	1,970.00	Downtown	0.77	2,170.94	87
J-1700	1,970.00	Downtown	0.77	2,170.95	87
J-1710	1,936.00	Downtown	2.32	2,170.98	102
J-1720	1,937.00	Downtown	2.32	2,170.98	101
J-1730	1,938.00	Downtown	1.55	2,170.98	101
J-1740	1,933.00	Downtown	1.55	2,170.97	103
J-1750	1,930.00	Downtown	7.75	2,171.05	104
J-1760	1,923.00	Downtown	0.00	2,171.01	107
J-1770	1,960.00	Downtown	38.75	2,170.95	91
J-1780	1,922.00	Downtown	2.32	2,170.82	108
J-1790	1,923.00	Downtown	2.32	2,170.76	107
J-1810	1,940.00	Downtown	1.55	2,170.96	100
J-1820	1,945.00	Downtown	1.55	2,170.96	98
J-1830	1,950.00	Downtown	1.55	2,170.72	95
J-1840	1,925.00	Downtown	1.55	2,170.74	106
J-1850	1,918.00	Downtown	3.10	2,170.76	109
J-1860	1,922.00	Downtown	0.77	2,170.76	108
J-1870	1,920.00	Downtown	0.77	2,170.80	109
J-1880	1,915.00	Downtown	0.00	2,171.65	111
J-1890	1,925.00	Downtown	0.00	2,170.81	106
J-1900	1,925.00	Downtown	2.32	2,170.82	106
J-1910	1,923.00	Downtown	2.32	2,171.05	107
J-1920	1,948.00	Downtown	1.55	2,170.75	96
J-1930	1,969.00	Downtown	2.32	2,170.74	87
J-1940	2,010.00	Downtown	2.32	2,170.63	69
J-1950	2,040.00	Downtown	0.77	2,170.05	56
J-1960	1,965.00	Downtown	3.10	2,170.71	89
J-1970	1,934.00	Downtown	0.77	2,186.85	109
J-1980	1,970.00	Downtown	2.32	2,186.64	94
J-1990	1,970.00	Downtown	2.32	2,186.60	94

FlexTable: Junction Table

Current Time: 0.000 hours

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2000	2,040.00	Downtown	0.00	2,186.33	63
J-2010	2,040.00	Cedar Bluff Tank	76.67	2,230.80	83
J-2030	2,083.00	Cedar Bluff Tank	0.00	2,240.00	68
J-2040	2,085.00	Cedar Bluff Tank	1.55	2,240.00	67
J-2050	2,082.00	Cedar Bluff Tank	1.55	2,240.00	68
J-2060	2,000.00	1	0.77	2,246.43	107
J-2100	2,005.00	3	0.77	2,246.42	104
J-2120	2,033.00	Birm/Hidden Valley	0.56	2,350.69	137
J-2130	2,020.00	Birm/Hidden Valley	0.56	2,350.67	143
J-2140	2,188.00	Birm/Hidden Valley	0.56	2,350.66	70
J-2150	2,151.00	Birm/Hidden Valley	0.56	2,350.65	86
J-2200	1,980.00	Downtown	0.00	2,180.09	87
J-2210	2,035.00	Downtown	0.00	2,180.09	63
J-2220	2,085.00	Downtown	0.00	2,180.09	41
J-2230	2,055.00	Downtown	0.00	2,186.70	57
J-2250	1,955.00	3	1.55	2,167.20	92
Raven Connection	2,005.00	Downtown	518.63	2,041.56	16

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-1	Downtown Tank	J-1	10.0	122	130.0	-1,067.29	0.007
P-1	J-1720	J-1	6.0	124	130.0	1.55	0.000
P-2	J-1	J-820	10.0	786	130.0	-1,067.29	0.007
P-2	J-1	J-1730	6.0	336	130.0	1.55	0.000
P-3	J-950	J-1490	6.0	1,613	130.0	-7.57	0.000
P-3	J-1	J-2	6.0	671	130.0	0.00	0.000
P-4	J-810	J-820	10.0	508	130.0	702.00	0.003
P-4	J-2	H-1	6.0	71	130.0	0.00	0.000
P-5	J-1720	J-3	2.0	335	120.0	0.00	0.000
P-6	J-1640	J-4	8.0	258	130.0	7.70	0.000
P-7	J-4	J-1650	4.0	629	130.0	7.70	0.000
P-8	J-4	J-7	2.0	465	130.0	0.00	0.000
P-9	J-4	J-8	6.0	2,339	130.0	0.00	0.000
P-10	Clearwell	J-10	12.0	64	120.0	1,769.63	0.008
P-10	J-1630	J-1760	8.0	838	130.0	-20.43	0.000
P-11	J-1740	J-9	2.0	414	120.0	0.00	0.000
P-12	J-1130	J-3	6.0	1,070	120.0	3.26	0.000
P-13	J-3	J-4	6.0	4,500	120.0	2.10	0.000
P-13	J-10	J-1790	1.0	163	130.0	0.00	0.000
P-14	J-4	J-5	6.0	3,558	120.0	1.11	0.000
P-14	J-1820	J-11	2.0	319	130.0	0.00	0.000
P-16	J-1960	J-12	4.0	2,455	130.0	0.00	0.000
P-17	Raven Connection	J-13	6.0	588	130.0	-518.63	0.022
P-18	J-13	J-510	6.0	1,906	130.0	-518.63	0.022
P-19	J-11	J-2130	6.0	1,946	130.0	6.22	0.000
P-19	J-13	J-650	6.0	68	130.0	0.00	0.000
P-20	J-520	J-14	1.0	219	130.0	0.00	0.000
P-21	J-520	J-15	1.0	313	130.0	0.00	0.000
P-22	J-30	J-16	2.0	466	120.0	0.00	0.000
P-23	J-11	J-14	6.0	1,300	120.0	3.80	0.000
P-23	J-140	J-17	4.0	719	130.0	0.00	0.000
P-24	J-14	J-12	6.0	600	120.0	0.87	0.000
P-24	J-43	J-18	6.0	1,097	130.0	63.12	0.000
P-25	J-18	J-1050	6.0	421	130.0	63.12	0.000
P-26	J-18	J-19	2.0	829	150.0	0.00	0.000
P-27	J-4	J-17	6.0	579	120.0	0.99	0.000
P-27	J-1040	J-20	6.0	198	130.0	-61.46	0.000
P-28	J-20	J-1050	6.0	168	130.0	-61.46	0.000
P-29	J-2150	J-19	6.0	400	120.0	0.67	0.000
P-30	J-20	J-2100	6.0	2,142	120.0	0.00	0.000
P-30	J-20	J-22	4.0	521	130.0	0.00	0.000
P-31	J-19	J-18	2.0	1,000	120.0	0.17	0.000
P-31	J-22	J-21	2.0	662	130.0	0.00	0.000
P-32	J-43	J-23	8.0	1,092	130.0	-119.01	0.000
P-33	J-7	J-13	4.0	966	120.0	-0.70	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-33	J-23	J-53	8.0	908	130.0	-119.01	0.000
P-34	J-23	J-24	2.0	402	130.0	0.00	0.000
P-35	J-22	Birmingham Tank	8.0	2,285	120.0	-142.35	0.001
P-35	J-1100	J-1120	6.0	2,374	130.0	1.66	0.000
P-36	J-1100	J-23	8.0	175	130.0	-137.42	0.000
P-36	J-2	J-25	6.0	100	130.0	0.00	0.000
P-38	J-22	J-23	8.0	2,320	120.0	137.42	0.001
P-38	J-41	J-26	8.0	277	130.0	0.00	0.000
P-39	J-26	J-31	8.0	1,523	130.0	-0.01	0.000
P-40	J-30	J-2060	6.0	594	120.0	-9.15	0.000
P-40	J-26	J-27	6.0	1,835	130.0	0.00	0.000
P-41	J-24	J-25	8.0	2,815	130.0	0.01	0.000
P-42	J-25	J-26	8.0	1,434	130.0	0.01	0.000
P-43	J-39	J-28	1.0	813	130.0	0.00	0.000
P-44	J-1010	J-29	4.0	455	130.0	6.78	0.000
P-45	J-29	J-1070	4.0	709	130.0	8.56	0.000
P-46	J-29	J-1060	2.0	150	130.0	-1.78	0.000
P-47	J-1840	J-30	6.0	651	130.0	0.00	0.000
P-48	J-31	J-24	8.0	2,566	130.0	-0.01	0.000
P-48	J-40	J-31	4.0	62	130.0	26.50	0.001
P-49	J-31	J-260	4.0	82	130.0	26.35	0.001
P-50	J-40	J-50	8.0	476	120.0	-38.75	0.000
P-50	J-130	J-31	4.0	656	130.0	-0.15	0.000
P-51	J-60	J-32	12.0	293	130.0	1,183.04	0.003
P-53	J-950	J-32	6.0	1,078	130.0	34.86	0.000
P-54	J-970	J-33	2.0	644	130.0	0.00	0.000
P-56	J-36	J-930	6.0	993	130.0	0.00	0.000
P-57	J-32	J-37	12.0	225	130.0	1,217.91	0.004
P-58	J-37	J-80	12.0	119	130.0	1,172.42	0.003
P-59	J-920	J-37	6.0	132	130.0	-45.49	0.000
P-60	J-50	Farmer St Tank	8.0	694	120.0	-41.08	0.000
P-60	J-800	J-39	4.0	316	130.0	-38.52	0.001
P-62	J-39	J-49	8.0	627	130.0	2.55	0.000
P-62	J-39	J-40	2.0	112	140.0	-38.52	0.033
P-63	J-40	J-910	4.0	493	130.0	-38.52	0.001
P-65	J-41	J-880	6.0	309	130.0	77.24	0.001
P-66	J-900	J-41	6.0	68	130.0	77.24	0.001
P-68	J-1290	J-1300	10.0	338	130.0	79.36	0.000
P-68	J-42	J-41	2.0	257	130.0	0.00	0.000
P-69	J-810	J-43	2.0	383	130.0	0.00	0.000
P-70	J-10	High Service Pump	6.0	107	130.0	1,769.63	0.213
P-70a	High Service Pump	J-60	6.0	107	130.0	1,769.63	0.213
P-71	J-680	J-44	4.0	557	130.0	0.00	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-72	J-760	J-45	6.0	437	130.0	0.00	0.000
P-73	J-720	J-46	4.0	303	130.0	0.00	0.000
P-74	J-1280	J-35	10.0	280	130.0	-562.83	0.002
P-74	Big Ck Conn	J-47	6.0	407	130.0	0.00	0.000
P-75	J-34	J-35	10.0	181	130.0	63.80	0.000
P-75	J-47	J-48	6.0	215	130.0	0.00	0.000
P-76	J-790	J-34	6.0	405	130.0	63.80	0.000
P-77	J-60	PSV-1	10.0	459	130.0	499.03	0.002
P-77	J-48	J-50	4.0	274	130.0	0.00	0.000
P-78	PSV-1	J-35	10.0	3,730	130.0	499.03	0.002
P-78	J-50	J-49	4.0	761	130.0	0.00	0.000
P-79	J-1300	BOOSTER PUMP	10.0	132	130.0	0.00	0.000
P-79	J-50	J-51	2.0	477	130.0	0.00	0.000
P-80	J-60	J-940	10.0	253	130.0	31.95	0.000
P-80	J-51	J-52	4.0	198	130.0	0.00	0.000
P-81	BOOSTER PUMP	J-1310	10.0	112	130.0	0.00	0.000
P-81	J-52	J-48	4.0	420	130.0	0.00	0.000
P-82	J-52	J-53	6.0	421	130.0	0.00	0.000
P-83	J-1280	J-37	8.0	4,090	130.0	385.37	0.003
P-83	Big Ck Conn	J-54	6.0	182	130.0	0.00	0.000
P-84	J-54	J-55	8.0	518	130.0	0.00	0.000
P-85	J-55	J-56	8.0	1,150	130.0	0.00	0.000
P-86	J-57	J-58	1.0	249	130.0	0.00	0.000
P-87	J-710	J-59	6.0	849	130.0	0.01	0.000
P-88	J-59	Big Ck Conn	6.0	164	130.0	0.01	0.000
P-89	J-58	J-59	4.0	1,645	130.0	0.00	0.000
P-90	Big Ck Conn	J-60	6.0	163	130.0	0.01	0.000
P-92	J-60	J-62	4.0	2,934	130.0	0.00	0.000
P-93	J-62	J-61	4.0	1,096	130.0	0.00	0.000
P-94	J-62	J-63	2.0	831	130.0	0.00	0.000
P-95	J-350	J-65	6.0	1,732	130.0	0.00	0.000
P-96	J-65	J-360	6.0	357	130.0	0.00	0.000
P-97	J-65	J-66	6.0	894	130.0	0.00	0.000
P-98	J-66	J-67	6.0	240	130.0	0.00	0.000
P-99	J-67	J-68	6.0	1,060	130.0	0.00	0.000
P-100	J-60	J-90	6.0	93	130.0	53.29	0.000
P-100	J-68	J-50	6.0	148	130.0	0.00	0.000
P-102	J-67	J-69	6.0	1,490	130.0	0.00	0.000
P-103	J-42	J-45	8.0	930	130.0	0.00	0.000
P-103	J-69	Farmer St Tank	8.0	337	130.0	0.00	0.000
P-104	J-66	J-70	6.0	292	130.0	0.00	0.000
P-105	J-550	J-45	6.0	93	130.0	-2.77	0.000
P-105	J-2230	J-71	4.0	348	130.0	0.32	0.000
P-106	J-27	J-46	8.0	2,336	130.0	0.00	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-106	J-71	J-72	4.0	1,137	130.0	0.00	0.000
P-107	J-46	J-28	8.0	516	130.0	0.00	0.000
P-107	J-71	J-190	2.0	973	120.0	0.32	0.000
P-108	J-1510	J-73	6.0	281	130.0	-3.88	0.000
P-109	J-58	J-1610	4.0	57	130.0	0.00	0.000
P-109	J-73	J-1520	6.0	849	130.0	-3.88	0.000
P-110	J-90	J-100	4.0	284	130.0	17.00	0.000
P-110	J-73	J-74	6.0	511	130.0	0.00	0.000
P-111	J-1600	J-58	4.0	57	130.0	0.00	0.000
P-111	J-1520	J-75	8.0	98	140.0	0.00	0.000
P-112	J-75	J-2030	8.0	303	140.0	0.00	0.000
P-113	J-24	Kent's Ridge Tank	8.0	3,900	130.0	-0.01	0.000
P-113	J-75	J-76	2.0	551	150.0	0.00	0.000
P-114	J-780	J-77	2.0	297	135.0	0.00	0.000
P-115	Kent's Ridge PS 1	J-27	8.0	85	130.0	0.00	0.000
P-115	J-1750	J-1910	10.0	836	150.0	20.27	0.000
P-117	Kent's Ridge PS 2	J-41	8.0	99	130.0	0.00	0.000
P-118	J-26	J-51	8.0	1,554	130.0	0.01	0.000
P-120	J-100	J-110	4.0	246	130.0	14.93	0.000
P-121	J-52	J-51	6.0	3,840	130.0	0.00	0.000
P-122	J-2120	J-53	8.0	61	130.0	119.01	0.000
P-127	J-26	J-55	6.0	3,030	130.0	0.00	0.000
P-128	J-51	J-56	8.0	1,512	130.0	0.00	0.000
P-129	J-56	Kent's Ridge PS 1	8.0	82	130.0	0.00	0.000
P-130	J-110	J-120	4.0	1,706	130.0	0.00	0.000
P-131	J-56	PRV-1	6.0	82	130.0	0.00	0.000
P-133	J-27	J-56	4.0	167	130.0	0.00	0.000
P-134	J-49	J-57	8.0	1,700	130.0	2.55	0.000
P-135	J-57	Kent's Ridge PS 2	8.0	104	130.0	0.00	0.000
P-136	J-41	PRV-2	6.0	99	130.0	0.00	0.000
P-138	J-57	J-41	4.0	203	130.0	0.00	0.000
P-140	J-120	J-130	4.0	864	130.0	4.50	0.000
P-141	PRV-3	J-1610	6.0	57	130.0	0.00	0.000
P-142	J-1610	J-59	8.0	217	130.0	0.00	0.000
P-143	J-59	J-42	8.0	159	130.0	0.00	0.000
P-144	J-59	J-44	6.0	831	130.0	0.00	0.000
P-146	J-2120	J-11	6.0	147	130.0	14.52	0.000
P-147	J-37	J-1600	8.0	720	130.0	64.80	0.000
P-148	J-45	J-61	8.0	852	130.0	-2.78	0.000
P-149	J-61	J-43	8.0	380	130.0	-55.89	0.000
P-150	J-130	J-140	4.0	533	130.0	2.33	0.000
P-151	J-560	J-61	6.0	86	130.0	-53.11	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-152	J-540	J-37	8.0	151	130.0	-320.57	0.002
P-153	J-64	J-65	8.0	4,295	120.0	0.00	0.000
P-154	CH WTP clearwell	Wardell HSP	8.0	10	130.0	0.00	0.000
P-155	Wardell HSP	J-65	8.0	1,200	120.0	0.00	0.000
P-156	J-65	J-66	6.0	2,364	120.0	0.00	0.000
P-157	J-66	J-74	6.0	3,104	120.0	0.00	0.000
P-158	J-74	Claypool Hill PS No. 3	6.0	120	130.0	0.00	0.000
P-159	Claypool Hill PS No. 3	J-75	6.0	30	120.0	0.00	0.000
P-160	J-90	J-1970	4.0	250	130.0	36.29	0.001
P-161	J-75	J-74	6.0	60	130.0	0.00	0.000
P-162	J-75	J-71	6.0	950	120.0	0.00	0.000
P-163	J-71	J-63	6.0	1,399	120.0	2.26	0.000
P-164	J-63	J-62	6.0	746	120.0	2.26	0.000
P-165	J-62	J-67	6.0	532	120.0	2.26	0.000
P-166	J-67	J-68A	6.0	1,547	120.0	2.26	0.000
P-167	J-68A	J-78	6.0	3,057	120.0	0.00	0.000
P-168	J-78	J-84	6.0	796	120.0	0.00	0.000
P-169	J-84	J-82	6.0	571	120.0	0.00	0.000
P-170	J-150	J-160	4.0	294	130.0	14.52	0.000
P-173	J-83	J-81	6.0	575	120.0	0.00	0.000
P-174	J-81	J-79	6.0	370	120.0	0.00	0.000
P-175	J-83	J-84	2.0	800	120.0	0.00	0.000
P-176	J-71	J-73	12.0	1,536	120.0	-2.26	0.000
P-177	J-73	J-72	12.0	1,257	120.0	-2.26	0.000
P-179	J-72	J-76	12.0	1,129	120.0	0.00	0.000
P-180	J-160	J-170	4.0	438	130.0	9.87	0.000
P-181	J-76	College Tanks (2)	12.0	725	120.0	0.00	0.000
P-182	J-82	J-83	6.0	841	120.0	0.00	0.000
P-183	J-72	J-77	6.0	954	130.0	0.00	0.000
P-184	J-28	J-64	8.0	547	130.0	0.00	0.000
P-185	J-72	J-68	6.0	488	120.0	-2.26	0.000
P-186	J-68	J-68A	6.0	386	120.0	-2.26	0.000
P-187	J-57	J-13	4.0	300	130.0	2.56	0.000
P-188	J-22	J-2	6.0	361	130.0	4.93	0.000
P-190	J-170	J-180	4.0	373	130.0	5.22	0.000
P-191	J-2	J-1130	6.0	1,340	130.0	4.93	0.000
P-192	J-42	J-85	4.0	900	130.0	0.00	0.000
P-193	PRV-1	FCV-1	6.0	51	130.0	0.00	0.000
P-194	FCV-1	J-27	6.0	34	130.0	0.00	0.000
P-195	PRV-2	FCV-2	6.0	44	130.0	0.00	0.000
P-196	FCV-2	J-57	6.0	60	130.0	0.00	0.000
P-197	J-1600	FCV-3	6.0	29	130.0	0.00	0.000
P-198	FCV-3	PRV-3	6.0	28	130.0	0.00	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-199	J-14	J-39	6.0	148	130.0	2.56	0.000
P-200	J-180	J-190	4.0	699	130.0	2.58	0.000
P-201	J-17	J-86	6.0	1,019	130.0	0.60	0.000
P-202	J-86	J-87	4.0	418	130.0	0.20	0.000
P-203	J-86	J-88	6.0	343	130.0	0.20	0.000
P-210	J-190	J-200	4.0	172	130.0	0.57	0.000
P-220	J-200	J-210	4.0	706	130.0	-4.08	0.000
P-230	J-210	J-220	4.0	884	130.0	-8.72	0.000
P-240	J-220	J-110	4.0	1,242	130.0	-13.38	0.000
P-250	J-100	J-150	1.0	646	130.0	0.52	0.000
P-260	J-210	J-230	1.0	201	130.0	2.31	0.006
P-270	J-230	J-240	1.0	706	130.0	-0.01	0.000
P-280	J-240	J-220	1.0	208	130.0	-2.34	0.006
P-290	J-200	J-250	1.0	543	130.0	2.32	0.006
P-310	J-260	J-270	4.0	666	130.0	11.46	0.000
P-320	J-270	J-280	6.0	258	130.0	9.13	0.000
P-340	J-290	J-300	6.0	653	130.0	7.92	0.000
P-350	J-260	J-310	4.0	466	130.0	12.57	0.000
P-360	J-310	J-290	6.0	375	130.0	10.24	0.000
P-370	J-280	J-320	6.0	268	130.0	12.40	0.000
P-380	J-320	J-330	6.0	544	130.0	10.07	0.000
P-390	J-330	J-340	4.0	278	130.0	9.30	0.000
P-400	J-340	J-350	4.0	1,002	130.0	2.32	0.000
P-420	J-340	J-370	6.0	332	130.0	4.65	0.000
P-430	J-370	J-380	2.0	218	130.0	2.32	0.000
P-450	J-390	J-320	4.0	322	130.0	0.00	0.000
P-460	J-390	J-400	6.0	651	130.0	-87.36	0.001
P-470	J-400	J-410	6.0	487	130.0	-94.33	0.001
P-480	J-410	J-420	6.0	324	130.0	-98.98	0.001
P-490	J-420	J-430	6.0	201	130.0	-137.58	0.002
P-500	J-400	J-440	4.0	267	130.0	4.65	0.000
P-510	J-440	J-450	2.0	380	130.0	2.32	0.000
P-520	J-410	J-460	4.0	302	130.0	2.32	0.000
P-530	J-430	J-470	4.0	771	130.0	45.27	0.002
P-540	J-470	J-480	4.0	86	130.0	76.12	0.005
P-550	J-480	J-490	4.0	1,361	130.0	72.25	0.004
P-560	J-490	J-500	4.0	1,348	130.0	67.59	0.004
P-570	J-500	J-510	2.0	650	130.0	62.94	0.093
P-580	J-490	J-520	4.0	301	130.0	2.33	0.000
P-590	J-500	J-530	2.0	276	130.0	2.32	0.000
P-600	J-470	J-420	4.0	903	130.0	-34.73	0.001
P-620	J-540	J-1600	6.0	541	130.0	-64.80	0.000
P-640	J-560	J-570	6.0	1,100	130.0	51.44	0.000
P-650	J-570	J-580	6.0	779	130.0	38.01	0.000
P-660	J-580	J-590	6.0	1,178	130.0	39.23	0.000
P-670	J-590	J-600	4.0	352	130.0	33.57	0.001

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-680	J-600	J-610	6.0	688	130.0	2.22	0.000
P-690	J-540	J-620	4.0	115	130.0	464.98	0.129
P-700	J-620	J-630	4.0	331	130.0	460.33	0.127
P-710	J-620	J-640	2.0	459	130.0	2.32	0.000
P-720	J-630	J-510	6.0	745	130.0	458.01	0.017
P-750	J-70	J-670	6.0	1,379	130.0	181.42	0.003
P-760	J-670	J-680	12.0	354	130.0	125.14	0.000
P-770	J-680	J-690	12.0	1,144	130.0	192.30	0.000
P-780	J-690	J-700	10.0	551	130.0	17.07	0.000
P-790	J-700	J-710	10.0	452	130.0	4.67	0.000
P-800	J-710	J-720	10.0	556	130.0	2.33	0.000
P-810	J-720	J-730	10.0	451	130.0	-1.55	0.000
P-820	J-730	J-740	4.0	465	130.0	2.32	0.000
P-830	J-730	J-750	1.0	316	130.0	2.32	0.006
P-840	J-730	J-760	4.0	758	130.0	-10.07	0.000
P-850	J-760	J-770	6.0	458	130.0	-12.40	0.000
P-860	J-770	J-780	6.0	313	130.0	-16.27	0.000
P-870	J-780	J-790	6.0	204	130.0	-18.60	0.000
P-880	J-790	J-800	10.0	514	130.0	-86.27	0.000
P-890	J-800	J-670	10.0	505	130.0	-50.08	0.000
P-900	J-70	J-810	10.0	488	130.0	987.13	0.006
P-910	J-810	J-820	6.0	425	130.0	201.69	0.004
P-920	J-820	J-830	12.0	415	130.0	-165.93	0.000
P-930	J-830	J-690	12.0	340	130.0	-170.58	0.000
P-950	J-700	J-860	4.0	170	130.0	8.52	0.000
P-960	J-850	J-860	4.0	166	130.0	-2.32	0.000
P-970	J-860	J-870	2.0	378	130.0	2.32	0.000
P-990	J-880	J-680	4.0	180	130.0	71.04	0.004
P-1000	J-880	J-890	2.0	279	130.0	2.32	0.000
P-1010	J-810	J-900	6.0	668	130.0	79.57	0.001
P-1030	J-910	J-920	6.0	1,486	130.0	-43.17	0.000
P-1040	J-910	J-930	6.0	247	130.0	2.33	0.000
P-1050	J-70	J-940	8.0	331	130.0	0.00	0.000
P-1060	J-940	J-950	4.0	1,079	130.0	29.62	0.001
P-1070	J-160	J-960	1.0	825	130.0	2.32	0.006
P-1080	J-170	J-970	4.0	877	130.0	2.32	0.000
P-1090	J-570	J-980	4.0	1,402	130.0	8.99	0.000
P-1100	J-980	J-990	2.0	361	130.0	1.66	0.000
P-1110	J-980	J-580	4.0	372	130.0	5.66	0.000
P-1120	J-580	J-1000	4.0	173	130.0	2.22	0.000
P-1130	J-600	J-1010	6.0	842	130.0	29.13	0.000
P-1140	J-1010	J-1020	6.0	1,626	130.0	20.13	0.000
P-1150	J-1020	J-1030	6.0	472	130.0	22.03	0.000
P-1160	J-1030	J-1040	6.0	1,267	130.0	-57.57	0.000
P-1180	J-590	J-1060	2.0	1,035	130.0	3.44	0.000
P-1200	J-1020	J-1070	4.0	365	130.0	-4.12	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-1210	J-1070	J-1080	4.0	960	130.0	2.77	0.000
P-1220	J-1040	J-1090	6.0	1,898	130.0	1.66	0.000
P-1420	J-1280	J-1290	10.0	173	130.0	108.33	0.000
P-1450	J-1310	J-1320	6.0	123	130.0	-137.15	0.002
P-1460	J-1320	J-1330	6.0	328	130.0	-74.84	0.001
P-1470	J-1280	J-1340	6.0	1,277	130.0	65.25	0.000
P-1480	J-1340	J-1290	4.0	1,010	130.0	-25.09	0.001
P-1490	J-1340	J-1350	4.0	466	130.0	88.02	0.006
P-1500	J-1350	J-1360	6.0	1,448	130.0	85.69	0.001
P-1510	J-1330	J-1410	4.0	227	130.0	-78.72	0.005
P-1520	J-1300	J-1370	4.0	909	130.0	75.48	0.004
P-1530	J-1370	J-1380	6.0	394	130.0	2.32	0.000
P-1540	J-1320	J-1390	4.0	777	130.0	-66.18	0.003
P-1550	J-1390	J-1400	4.0	393	130.0	2.32	0.000
P-1560	J-1390	J-1370	4.0	323	130.0	-70.83	0.004
P-1570	J-1360	J-1410	4.0	428	130.0	83.37	0.005
P-1580	J-1410	J-1420	4.0	466	130.0	2.32	0.000
P-1590	J-430	J-1430	6.0	526	130.0	-186.73	0.003
P-1600	J-1430	J-1440	6.0	2,010	130.0	6.70	0.000
P-1610	J-1430	J-1450	10.0	1,971	130.0	-68.68	0.000
P-1620	J-1430	J-1460	10.0	613	130.0	-128.63	0.000
P-1630	J-1460	J-1470	6.0	238	130.0	2.32	0.000
P-1640	J-1460	J-1310	10.0	136	130.0	-133.28	0.000
P-1650	J-1480	J-1490	4.0	532	130.0	-2.32	0.000
P-1660	J-1490	J-1500	4.0	415	130.0	2.32	0.000
P-1670	J-1500	J-2000	6.0	518	130.0	0.00	0.000
P-1690	J-1530	J-1540	4.0	949	130.0	-3.88	0.000
P-1700	J-650	Airport Tank	10.0	741	130.0	-208.46	0.000
P-1710	J-650	J-1880	10.0	313	130.0	206.14	0.000
P-1720	J-1560	J-1570	4.0	1,111	130.0	-3.10	0.000
P-1730	J-1580	J-1590	6.0	705	130.0	-3.88	0.000
P-1740	J-1030	Hidden Valley Tank	6.0	1,717	130.0	77.38	0.001
P-1750	J-80	J-70	12.0	92	130.0	1,170.09	0.003
P-1760	J-60	Farmer St Pump	6.0	176	130.0	0.00	0.000
P-1760a	Farmer St Pump	J-20	6.0	176	130.0	0.00	0.000
P-1770	J-1600	Hidden Valley Pump	6.0	57	130.0	0.00	0.000
P-1770a	Hidden Valley Pump	J-1610	6.0	57	130.0	0.00	0.000
P-1800	J-1550	J-1620	10.0	211	130.0	202.26	0.000
P-1810	J-1450	J-1620	10.0	859	130.0	-72.55	0.000
P-1820	J-1570	J-1620	4.0	212	130.0	-9.30	0.000
P-1830	J-1440	J-1630	4.0	1,009	130.0	2.82	0.000
P-1840	J-1630	J-1640	8.0	939	130.0	23.26	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-1860	J-1650	J-1660	4.0	437	130.0	6.20	0.000
P-1870	J-1660	J-1670	2.0	376	130.0	1.55	0.000
P-1880	J-1660	J-1680	2.0	150	130.0	2.32	0.000
P-1890	J-1650	J-1690	4.0	247	130.0	-0.83	0.000
P-1900	J-1690	J-1640	2.0	651	130.0	-1.23	0.000
P-1910	J-1690	J-1700	2.0	314	130.0	-0.38	0.000
P-1920	J-1700	J-1710	2.0	662	130.0	-1.15	0.000
P-1930	J-1710	J-1640	8.0	315	130.0	-12.01	0.000
P-1940	J-1710	J-1720	8.0	424	130.0	8.53	0.000
P-1960	J-1720	J-1740	4.0	561	130.0	4.65	0.000
P-1970	J-1620	J-1750	10.0	864	130.0	118.09	0.000
P-1980	J-1750	J-1760	8.0	208	130.0	82.32	0.000
P-1990	J-1760	J-1770	6.0	359	130.0	38.75	0.000
P-2000	J-1760	J-1780	4.0	379	130.0	23.13	0.000
P-2010	J-1780	J-1790	4.0	305	130.0	13.95	0.000
P-2020	J-1790	Hospital	4.0	377	130.0	11.62	0.000
P-2030	J-1740	J-1810	4.0	292	130.0	3.10	0.000
P-2040	J-1810	J-1820	4.0	235	130.0	1.55	0.000
P-2070	J-1830	J-1840	4.0	865	130.0	-4.65	0.000
P-2080	J-1840	J-1850	4.0	372	130.0	-6.20	0.000
P-2090	J-1850	J-1860	6.0	218	130.0	-9.30	0.000
P-2100	J-1860	J-1870	4.0	360	130.0	-10.08	0.000
P-2120	J-1780	J-1870	4.0	496	130.0	6.86	0.000
P-2130	J-1750	J-1590	6.0	591	130.0	7.75	0.000
P-2140	J-1550	J-1880	10.0	1,293	130.0	-206.14	0.000
P-2150	J-1870	J-1890	4.0	568	130.0	-3.99	0.000
P-2160	J-1890	J-1900	4.0	130	130.0	-10.97	0.000
P-2170	J-1900	J-1910	4.0	713	130.0	-17.94	0.000
P-2180	J-1900	J-1540	4.0	926	130.0	4.65	0.000
P-2190	J-1890	J-1920	4.0	989	130.0	6.97	0.000
P-2200	J-1920	J-1930	4.0	356	130.0	5.42	0.000
P-2210	J-1930	J-1940	2.0	321	130.0	3.10	0.000
P-2220	J-1940	J-1950	1.0	729	130.0	0.77	0.001
P-2230	J-1830	J-1960	4.0	348	130.0	3.10	0.000
P-2240	J-150	J-1970	4.0	130	130.0	-16.33	0.000
P-2250	J-1970	J-1980	4.0	615	130.0	19.19	0.000
P-2260	J-1980	J-1990	6.0	950	130.0	16.87	0.000
P-2270	J-1990	J-1490	4.0	1,270	130.0	14.54	0.000
P-2290	J-1520	J-2010	8.0	1,569	140.0	-10.08	0.000
P-2310	J-2010	Cedar Bluff Tank	8.0	990	130.0	-86.75	0.000
P-2330	J-2030	J-2040	8.0	1,048	140.0	0.00	0.000
P-2340	J-2040	J-2050	8.0	1,029	140.0	-1.55	0.000
P-2350	J-2050	Richlands HS Tank	6.0	533	130.0	-3.10	0.000
P-2360	J-40	J-2060	6.0	455	120.0	9.92	0.000
P-2410	J-60	J-20	6.0	403	130.0	0.00	0.000

FlexTable: Pipe Table

Current Time: 0.000 hours

Label	Start Node	Stop Node	Diameter (in)	Length (ft)	Hazen-Williams C	Flow (gpm)	Headloss Gradient (ft/ft)
P-2420	J-30	J-2100	6.0	336	120.0	6.82	0.000
P-2430	J-2100	J-120	6.0	49	130.0	6.05	0.000
P-2440	J-2000	Cedar Bluff PS	4.0	87	130.0	0.00	0.000
P-2440a	Cedar Bluff PS	J-1510	4.0	87	130.0	0.00	0.000
P-2480	J-2130	J-2140	6.0	3,280	130.0	5.66	0.000
P-2490	J-2140	J-2150	6.0	1,179	130.0	5.11	0.000
P-2500	J-2150	J-360	6.0	1,243	130.0	3.89	0.000
P-2590	J-2210	J-2220	2.0	217	130.0	0.00	0.000
P-2600	J-2200	J-2210	4.0	466	130.0	0.00	0.000
P-2610	J-830	J-2200	4.0	506	130.0	2.33	0.000
P-2620	J-2200	J-840	4.0	359	130.0	2.32	0.000
P-2630	J-280	J-300	6.0	1,328	130.0	-5.59	0.000
P-2650	J-180	J-2230	4.0	832	130.0	0.32	0.000
P-2680	J-390	J-2250	6.0	518	130.0	83.48	0.001
P-2690	J-2250	J-540	6.0	1,189	130.0	81.93	0.001
P-2700	J-330	J-2250	6.0	99	130.0	0.00	0.000
P-2710	J-2120	J-1100	6.0	120	130.0	-134.09	0.002

FlexTable: Tank Table

Current Time: 0.000 hours

Label	Zone	Elevation (Base) (ft)	Level (Initial) (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
Airport Tank	1	2,157.00	15.00	208.46	2,172.00
Birmingham Tank	Birm/Hidden Valley	2,337.54	16.00	142.35	2,353.54
CH WTP clearwell	Zone-1	2,058.00	8.00	0.00	2,066.00
Cedar Bluff Tank	1	2,220.00	11.00	86.75	2,231.00
College Tanks (2)	Claypool Hill	2,443.00	30.00	0.00	2,473.00
Downtown Tank	Downtown	2,163.75	10.00	-1,067.29	2,173.75
Farmer St Tank	1	2,232.50	14.00	41.08	2,246.50
Hidden Valley Tank	Birm/Hidden Valley	2,337.54	10.00	-77.38	2,347.54
Kent's Ridge Tank	Kent's Ridge	2,716.00	20.00	0.01	2,736.00
Richlands HS Tank	1	2,230.00	10.00	3.10	2,240.00

FlexTable: Pump Table

Current Time: 0.000 hours

Label	Elevation (ft)	Status (Initial)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
BOOSTER PUMP	1,940.00	Off	2,179.42	2,171.13	0.00	0.00
Cedar Bluff PS	2,037.50	Off	2,186.33	2,230.80	0.00	0.00
Claypool Hill PS No. 3	2,100.00	Off	2,473.00	2,473.00	0.00	0.00
Farmer St Pump	1,932.50	Off	2,187.17	2,246.42	0.00	0.00
Hidden Valley Pump	1,940.00	Off	2,166.60	2,349.93	0.00	0.00
High Service Pump	1,932.50	On	1,903.73	2,209.91	1,769.63	306.18
Kent's Ridge PS 1	2,185.00	Off	2,473.00	2,736.00	0.00	0.00
Kent's Ridge PS 2	2,200.00	Off	2,350.68	2,736.00	0.00	0.00
Wardell HSP	2,065.00	Off	2,066.00	2,473.00	0.00	0.00

Richlands Fire Flow

Scenario Summary Report
Scenario: Richlands Fire Flow

Scenario Summary	
ID	1083
Label	Richlands Fire Flow
Notes	
Active Topology	Base-Active Topology
Physical	Base-Physical
Demand	Demands-MAX
Initial Settings	Initial Settings - Pumps Off
Operational	Base-Operational
Age	Base-Age Alternative
Constituent	Base-Constituent
Trace	Base-Trace Alternative
Fire Flow	Base-Fire Flow
Energy Cost	Base-Energy Cost
Transient	Base Transient
Pressure Dependent Demand	Base Pressure Dependent Demand
Failure History	Base Failure History
SCADA	Base SCADA
User Data Extensions	Base-User Data
Steady State/EPS Solver Calculation Options	Base
Transient Solver Calculation Options	Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	False
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Fire Flow

Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
Big Ck Conn	Downtown	590.61	20	79	20	J-51	J-1
H-1	Downtown	746.17	20	39	20	J-1670	J-1
Hospital	Downtown	523.53	20	20	24	J-51	J-1
J-1	Downtown	745.55	20	72	20	J-1670	J-1
J-2	Birm/Hidden Valley	832.61	20	90	20	J-610	J-1
J-2	Downtown	746.17	20	40	20	J-1670	J-1
J-3	Birm/Hidden Valley	719.59	20	20	22	J-610	J-1
J-4	Birm/Hidden Valley	518.64	20	40	20	J-5	J-1
J-4	Downtown	719.26	20	71	20	J-1670	J-1
J-5	Birm/Hidden Valley	424.74	20	20	25	J-610	J-1
J-7	Birm/Hidden Valley	323.19	20	20	22	J-13	J-1
J-11	Birm/Hidden Valley	563.02	20	111	20	J-610	J-1
J-12	Birm/Hidden Valley	506.66	20	74	20	J-13	J-1
J-13	Birm/Hidden Valley	339.47	20	20	24	J-610	J-1
J-13	Downtown	3,004.88	20	39	20	J-1670	J-1
J-14	Birm/Hidden Valley	504.97	20	81	20	J-13	J-1
J-17	Birm/Hidden Valley	513.15	20	20	22	J-5	J-1
J-17	3	354.13	20	20	36	J-50	J-1
J-18	Birm/Hidden Valley	474.70	20	104	20	J-610	J-1
J-19	Birm/Hidden Valley	504.35	20	98	20	J-2140	J-1
J-20	3	968.12	20	20	32	J-50	J-1
J-20	Birm/Hidden Valley	471.28	20	59	20	J-610	J-1
J-22	Birm/Hidden Valley	832.61	20	96	20	J-610	J-1
J-22	Birm/Hidden Valley	470.86	20	58	20	J-610	J-1
J-23	Birm/Hidden Valley	572.04	20	118	20	J-610	J-1
J-23	Birm/Hidden Valley	510.54	20	121	20	J-610	J-1
J-24	Kent's Ridge	1,633.24	20	63	20	J-52	J-1
J-25	Kent's Ridge	1,216.73	20	115	20	J-52	J-1
J-25	Birm/Hidden Valley	832.62	20	93	20	J-610	J-1
J-26	Kent's Ridge	1,096.97	20	159	20	J-52	J-1
J-26	Kent's Ridge	1,625.74	20	71	20	J-52	J-1

Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
J-27	Kent's Ridge	1,349.00	20	20	43	J-52	J-1
J-29	Birm/Hidden Valley	347.47	20	68	20	J-610	J-1
J-30	3	1,314.56	20	38	20	J-16	J-1
J-31	Kent's Ridge	1,625.63	20	74	20	J-52	J-1
J-31	3	1,659.53	20	65	20	J-300	J-1
J-32	Downtown	825.37	20	94	20	J-51	J-1
J-34	Downtown	1,181.33	20	80	20	J-51	J-1
J-35	Downtown	1,190.11	20	82	20	J-51	J-1
J-36	Downtown	814.00	20	40	20	J-51	J-1
J-37	Downtown	1,548.99	20	60	20	J-51	J-1
J-37	Downtown	825.39	20	89	20	J-51	J-1
J-39	Birm/Hidden Valley	488.24	20	81	20	J-13	J-1
J-39	Downtown	753.08	20	59	20	J-51	J-1
J-40	3	1,838.79	20	80	20	J-50	J-1
J-40	Downtown	802.90	20	31	20	J-51	J-1
J-41	Kent's Ridge	1,626.25	20	56	20	J-52	J-1
J-41	Downtown	807.29	20	72	20	J-51	J-1
J-42	Birm/Hidden Valley	473.65	20	152	20	J-610	J-1
J-43	Birm/Hidden Valley	484.25	20	132	20	J-610	J-1
J-44	Birm/Hidden Valley	473.42	20	95	20	J-610	J-1
J-44	Downtown	695.83	20	20	20	J-51	J-1
J-45	Birm/Hidden Valley	473.78	20	145	20	J-610	J-1
J-45	Downtown	657.52	20	80	20	J-51	J-1
J-46	Downtown	515.21	20	69	20	J-51	J-1
J-49	Birm/Hidden Valley	473.29	20	72	20	J-13	J-1
J-50	3	1,813.88	20	20	36	J-70	J-1
J-51	Kent's Ridge	992.75	20	107	20	J-52	J-1
J-52	Kent's Ridge	595.60	20	20	129	J-24	J-1
J-53	Birm/Hidden Valley	536.23	20	117	20	J-610	J-1
J-55	Kent's Ridge	1,029.96	20	20	28	J-52	J-1
J-57	Birm/Hidden Valley	439.79	20	29	20	J-13	J-1
J-58	3	1,602.60	20	20	35	J-530	J-1
J-59	Birm/Hidden Valley	473.59	20	150	20	J-610	J-1
J-59	Downtown	126.14	20	83	20	J-51	J-1
J-60	Downtown	831.35	20	91	20	J-51	J-1
J-61	Birm/Hidden Valley	473.89	20	143	20	J-610	J-1
J-65	3	924.67	20	20	35	J-50	J-2140

Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
J-66	3	493.57	20	36	20	J-70	J-69
J-67	3	532.91	20	24	20	J-70	J-69
J-68	3	532.91	20	23	20	J-70	J-69
J-70	Downtown	829.59	20	90	20	J-51	J-1
J-70	3	455.34	20	20	28	J-67	J-69
J-73	Cedar Bluff Tank	1,021.56	20	25	20	J-74	J-1
J-74	Cedar Bluff Tank	870.96	20	20	38	J-73	J-1
J-75	Cedar Bluff Tank	1,363.61	20	20	20	J-2040	J-1
J-80	Downtown	831.50	20	90	20	J-51	J-1
J-85	Birm/Hidden Valley	473.38	20	87	20	J-610	J-1
J-86	Birm/Hidden Valley	512.73	20	26	20	J-17	J-1
J-87	Birm/Hidden Valley	481.58	20	20	25	J-610	J-1
J-88	Birm/Hidden Valley	512.49	20	23	20	J-17	J-1
J-90	Downtown	824.76	20	89	20	J-51	J-1
J-100	Downtown	601.69	20	68	20	J-71	J-1
J-110	Downtown	493.96	20	66	20	J-71	J-1
J-120	3	1,356.25	20	26	20	J-16	J-1
J-130	3	899.61	20	49	20	J-17	J-1
J-140	3	503.91	20	34	20	J-17	J-1
J-150	Downtown	427.16	20	78	20	J-71	J-1
J-160	Downtown	319.52	20	72	20	J-71	J-1
J-260	3	1,244.43	20	67	20	J-300	J-1
J-270	3	958.24	20	67	20	J-300	J-1
J-280	3	942.25	20	74	20	J-300	J-1
J-290	3	871.12	20	24	20	J-310	J-1
J-300	3	832.36	20	20	27	J-310	J-1
J-310	3	847.61	20	20	24	J-300	J-1
J-320	3	952.10	20	72	20	J-300	J-1
J-330	3	967.59	20	67	20	J-300	J-1
J-340	3	1,045.92	20	41	20	J-300	J-1
J-350	3	1,011.15	20	21	20	J-65	J-2140
J-360	Birm/Hidden Valley	571.97	20	74	20	J-2140	J-1
J-370	3	1,045.87	20	27	20	J-300	J-1
J-390	3	1,710.37	20	20	22	J-530	J-1
J-400	Downtown	1,754.25	20	25	20	J-450	J-1
J-410	Downtown	1,834.02	20	30	20	J-51	J-1
J-420	Downtown	1,912.24	20	31	20	J-51	J-1
J-430	Downtown	1,911.39	20	37	20	J-1670	J-1
J-440	Downtown	865.62	20	22	20	J-450	J-1
J-460	Downtown	872.93	20	20	23	J-51	J-1
J-470	Downtown	1,122.86	20	20	21	J-480	J-530
J-480	Downtown	996.10	20	20	22	J-51	J-530

Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
J-500	3	237.92	20	35	20	J-530	J-1
J-510	3	1,844.49	20	20	24	J-630	J-1
J-540	3	2,393.45	20	20	20	J-530	J-1
J-550	Birm/Hidden Valley	483.88	20	145	20	J-610	J-1
J-560	Birm/Hidden Valley	471.02	20	143	20	J-610	J-1
J-570	Birm/Hidden Valley	414.59	20	90	20	J-610	J-1
J-580	Birm/Hidden Valley	386.90	20	83	20	J-610	J-1
J-590	Birm/Hidden Valley	354.28	20	63	20	J-610	J-1
J-600	Birm/Hidden Valley	301.71	20	61	20	J-610	J-1
J-610	Birm/Hidden Valley	257.24	20	20	44	J-13	J-1
J-620	3	1,767.52	20	26	20	J-640	J-1
J-630	3	1,618.94	20	20	31	J-530	J-1
J-650	Downtown	3,005.73	20	58	20	J-1670	J-1
J-670	Downtown	764.40	20	81	20	J-51	J-1
J-680	Downtown	759.64	20	79	20	J-51	J-1
J-690	Downtown	757.63	20	80	20	J-51	J-1
J-700	Downtown	601.02	20	84	20	J-51	J-1
J-710	Downtown	518.56	20	92	20	J-51	J-1
J-720	Downtown	525.17	20	96	20	J-51	J-1
J-730	Downtown	527.07	20	94	20	J-51	J-1
J-740	Downtown	522.83	20	63	20	J-51	J-1
J-760	Downtown	663.01	20	89	20	J-51	J-1
J-770	Downtown	686.71	20	89	20	J-51	J-1
J-780	Downtown	703.38	20	89	20	J-51	J-1
J-790	Downtown	730.68	20	89	20	J-51	J-1
J-800	Downtown	736.30	20	85	20	J-51	J-1
J-810	Downtown	844.89	20	69	20	J-51	J-1
J-820	Downtown	870.13	20	45	20	J-51	J-1
J-830	Downtown	798.09	20	76	20	J-51	J-1
J-840	Downtown	282.64	20	38	20	J-2220	J-1
J-850	Downtown	596.48	20	49	20	J-51	J-1
J-860	Downtown	601.04	20	70	20	J-51	J-1
J-880	Downtown	809.36	20	71	20	J-51	J-1
J-900	Downtown	815.06	20	71	20	J-51	J-1
J-910	Downtown	819.99	20	69	20	J-51	J-1
J-920	Downtown	829.65	20	95	20	J-51	J-1
J-930	Downtown	819.59	20	64	20	J-51	J-1
J-940	Downtown	831.39	20	93	20	J-51	J-1
J-950	Downtown	830.97	20	82	20	J-51	J-1
J-980	Birm/Hidden Valley	393.17	20	52	20	J-610	J-1

Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
J-1000	Birm/Hidden Valley	386.46	20	83	20	J-610	J-1
J-1010	Birm/Hidden Valley	330.99	20	57	20	J-610	J-1
J-1020	Birm/Hidden Valley	391.46	20	85	20	J-610	J-1
J-1030	Birm/Hidden Valley	467.10	20	83	20	J-610	J-1
J-1040	Birm/Hidden Valley	477.76	20	86	20	J-610	J-1
J-1050	Birm/Hidden Valley	477.43	20	83	20	J-610	J-1
J-1060	Birm/Hidden Valley	295.74	20	20	22	J-610	J-1
J-1070	Birm/Hidden Valley	377.02	20	83	20	J-610	J-1
J-1080	Birm/Hidden Valley	381.02	20	46	20	J-610	J-1
J-1090	Birm/Hidden Valley	475.69	20	42	20	J-610	J-1
J-1100	Birm/Hidden Valley	568.21	20	109	20	J-610	J-1
J-1130	Birm/Hidden Valley	838.60	20	58	20	J-610	J-1
J-1280	Downtown	1,213.78	20	79	20	J-51	J-1
J-1290	Downtown	1,216.94	20	75	20	J-51	J-1
J-1300	Downtown	1,221.22	20	73	20	J-51	J-1
J-1310	Downtown	1,750.85	20	63	20	J-1670	J-1
J-1320	Downtown	1,802.72	20	57	20	J-1670	J-1
J-1330	Downtown	1,871.29	20	37	20	J-1670	J-1
J-1340	Downtown	1,304.82	20	55	20	J-51	J-1
J-1350	Downtown	1,245.57	20	20	21	J-51	J-1
J-1360	Downtown	1,218.43	20	20	21	J-51	J-1
J-1370	Downtown	1,026.04	20	20	22	J-51	J-1
J-1380	Downtown	954.08	20	20	22	J-51	J-1
J-1390	Downtown	1,047.28	20	20	22	J-51	J-1
J-1400	Downtown	684.10	20	20	23	J-51	J-1
J-1410	Downtown	1,419.43	20	20	21	J-51	J-1
J-1420	Downtown	704.48	20	20	23	J-51	J-1
J-1430	Downtown	1,720.58	20	72	20	J-1670	J-1
J-1440	Downtown	1,415.10	20	26	20	J-1670	J-1
J-1450	Downtown	1,641.94	20	83	20	J-1670	J-1
J-1460	Downtown	1,741.61	20	64	20	J-1670	J-1
J-1470	Downtown	1,741.90	20	40	20	J-1670	J-1
J-1480	Downtown	618.90	20	20	21	J-51	J-1
J-1490	Downtown	760.26	20	61	20	J-2000	J-1
J-1500	Downtown	427.41	20	42	20	J-2000	J-1
J-1510	Cedar Bluff Tank	1,023.08	20	20	21	J-74	J-1

Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
J-1520	Cedar Bluff Tank	1,405.02	20	27	20	J-2040	J-1
J-1550	Downtown	1,683.83	20	86	20	J-1670	J-1
J-1560	Downtown	486.44	20	20	24	J-51	J-1
J-1570	Downtown	1,216.07	20	20	22	J-1560	J-1
J-1580	Downtown	1,294.89	20	20	20	J-1670	J-1
J-1590	Downtown	1,305.89	20	56	20	J-1670	J-1
J-1600	3	2,192.80	20	20	20	J-58	J-1
J-1610	Birm/Hidden Valley	473.89	20	154	20	J-610	J-1
J-1620	Downtown	1,610.59	20	83	20	J-1670	J-1
J-1630	Downtown	945.48	20	83	20	J-1670	J-1
J-1640	Downtown	755.27	20	82	20	J-1670	J-1
J-1650	Downtown	317.21	20	59	20	J-1670	J-1
J-1690	Downtown	323.78	20	62	20	J-1670	J-1
J-1710	Downtown	751.79	20	79	20	J-1670	J-1
J-1720	Downtown	751.45	20	77	20	J-1670	J-1
J-1730	Downtown	749.35	20	68	20	J-1670	J-1
J-1740	Downtown	620.36	20	29	20	J-11	J-1
J-1750	Downtown	1,315.87	20	83	20	J-1670	J-1
J-1760	Downtown	1,177.34	20	86	20	J-1670	J-1
J-1770	Downtown	1,277.36	20	52	20	J-1670	J-1
J-1780	Downtown	604.09	20	75	20	J-12	J-1
J-1790	Downtown	604.43	20	44	20	J-12	J-1
J-1810	Downtown	513.22	20	26	20	J-11	J-1
J-1820	Downtown	457.63	20	24	20	J-11	J-1
J-1850	Downtown	305.63	20	81	20	J-12	J-1
J-1860	Downtown	306.42	20	79	20	J-12	J-1
J-1870	Downtown	446.31	20	80	20	J-12	J-1
J-1880	Downtown	2,498.94	20	90	20	J-1670	J-1
J-1910	Downtown	1,300.53	20	83	20	J-1670	J-1
J-1970	Downtown	535.38	20	83	20	J-71	J-1
J-1980	Downtown	655.05	20	42	20	J-71	J-1
J-1990	Downtown	677.88	20	38	20	J-71	J-1
J-2000	Downtown	397.88	20	20	23	J-51	J-1
J-2030	Cedar Bluff Tank	1,293.35	20	21	20	J-2040	J-1
J-2040	Cedar Bluff Tank	1,116.13	20	20	21	J-2050	J-1
J-2050	Cedar Bluff Tank	1,014.22	20	20	26	J-2040	J-1
J-2060	1	2,050.07	20	20	20	J-2060	J-16
J-2100	3	1,349.62	20	32	20	J-16	J-1
J-2120	Birm/Hidden Valley	540.11	20	117	20	J-610	J-1
J-2130	Birm/Hidden Valley	614.40	20	93	20	J-2140	J-1
J-2140	Birm/Hidden Valley	392.34	20	20	26	J-610	J-1
J-2150	Birm/Hidden Valley	504.45	20	28	20	J-2140	J-1

Fire Flow Node FlexTable: Fire Flow Report

Label	Zone	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Junction w/ Minimum Pressure (System)
J-2200	Downtown	276.39	20	66	20	J-2220	J-1
J-2250	3	1,738.92	20	20	24	J-530	J-1

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
Big Ck Conn	1,945.00	Downtown	480.00	2,139.10	84
Hospital	1,955.00	Downtown	30.00	2,159.49	89
J-1	2,163.75	99	0.00	2,164.21	0
J-1	1,943.00	Downtown	0.00	2,161.03	95
J-2	2,075.00	Birm/Hidden Valley	0.00	2,334.61	113
J-2	1,986.00	Downtown	0.00	2,161.03	76
J-3	2,140.00	Birm/Hidden Valley	4.30	2,334.53	84
J-3	1,949.00	Downtown	0.00	2,161.04	92
J-4	2,040.00	Birm/Hidden Valley	0.00	2,334.48	128
J-4	1,958.00	Downtown	0.00	2,161.05	88
J-5	2,085.00	Birm/Hidden Valley	4.00	2,334.47	108
J-7	2,150.00	Birm/Hidden Valley	1.90	2,329.34	78
J-7	1,947.00	Downtown	0.00	2,161.05	93
J-8	1,991.00	Downtown	0.00	2,161.05	74
J-9	1,929.00	Downtown	0.00	2,160.95	101
J-10	1,925.00	99	0.00	1,927.00	1
J-10	1,930.00	Downtown	0.00	2,159.79	100
J-11	2,040.00	Birm/Hidden Valley	16.20	2,329.39	125
J-11	1,953.00	Downtown	0.00	2,160.93	90
J-12	2,080.00	Birm/Hidden Valley	3.14	2,329.36	108
J-12	2,058.00	Downtown	0.00	2,159.50	44
J-13	2,220.00	Birm/Hidden Valley	4.80	2,329.34	47
J-13	1,990.00	Downtown	0.00	2,163.91	75
J-14	2,080.00	Birm/Hidden Valley	1.34	2,329.36	108
J-14	1,926.00	Downtown	0.00	2,160.22	102
J-15	1,928.00	Downtown	0.00	2,160.22	101
J-16	2,061.00	Farmer Street	0.00	2,233.96	75
J-17	2,075.00	Birm/Hidden Valley	1.30	2,334.48	112
J-17	2,067.00	Farmer Street	0.00	2,234.15	72
J-18	2,000.00	Birm/Hidden Valley	0.60	2,295.71	128
J-18	2,062.00	Birm/Hidden Valley	0.00	2,331.01	117
J-19	1,980.00	Birm/Hidden Valley	1.90	2,295.73	137
J-19	2,183.00	Birm/Hidden Valley	0.00	2,331.01	64
J-20	1,930.00	99	0.00	2,233.96	132
J-20	2,166.00	Birm/Hidden Valley	0.00	2,331.32	72
J-21	2,071.00	Birm/Hidden Valley	0.00	2,331.32	113
J-22	2,080.00	Birm/Hidden Valley	0.00	2,334.63	110
J-22	2,100.00	Birm/Hidden Valley	0.00	2,331.32	100
J-23	2,030.00	Birm/Hidden Valley	0.00	2,331.14	131
J-23	2,025.00	Birm/Hidden Valley	0.00	2,330.40	132
J-24	2,400.00	Kent's Ridge	7.00	2,725.94	141
J-24	2,083.00	Birm/Hidden Valley	0.00	2,330.40	107
J-25	2,280.00	Kent's Ridge	7.00	2,725.91	193
J-25	2,063.00	Birm/Hidden Valley	0.00	2,334.61	118
J-26	2,180.00	Kent's Ridge	7.00	2,725.91	237
J-26	2,199.00	Kent's Ridge	0.00	2,725.94	228
J-27	2,185.00	Claypool Hill	7.00	2,443.75	112
J-27	2,185.00	Kent's Ridge	0.00	2,725.94	235

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-28	2,030.00	Claypool Hill	7.00	2,443.75	179
J-28	2,093.00	Birm/Hidden Valley	0.00	2,329.36	102
J-29	2,141.00	Birm/Hidden Valley	0.00	2,331.45	83
J-30	2,020.00	Farmer Street	6.00	2,233.96	93
J-30	1,935.00	Downtown	0.00	2,159.65	97
J-31	2,260.00	Kent's Ridge	0.00	2,725.94	202
J-31	1,987.00	Farmer Street	0.00	2,234.64	107
J-32	1,930.00	Downtown	0.00	2,160.31	100
J-33	1,978.00	Downtown	0.00	2,158.61	78
J-34	1,945.00	Downtown	0.00	2,160.60	93
J-35	1,940.00	Downtown	0.00	2,160.60	96
J-36	1,933.00	Downtown	0.00	2,160.24	99
J-37	1,940.00	Downtown	0.00	2,160.71	96
J-37	1,941.00	Downtown	0.00	2,160.33	95
J-39	2,080.00	Birm/Hidden Valley	0.00	2,329.36	108
J-39	1,947.00	Downtown	0.00	2,160.05	92
J-40	1,987.00	Farmer Street	6.00	2,233.95	107
J-40	1,947.00	Downtown	0.00	2,160.22	92
J-41	2,220.00	Kent's Ridge	0.00	2,725.94	219
J-41	1,967.00	Downtown	0.00	2,160.29	84
J-42	1,945.00	Birm/Hidden Valley	0.00	2,330.45	167
J-42	1,951.00	Downtown	0.00	2,160.29	91
J-43	2,000.00	Birm/Hidden Valley	0.00	2,330.46	143
J-43	1,955.00	Downtown	0.00	2,160.52	89
J-44	2,060.00	Birm/Hidden Valley	0.00	2,330.45	117
J-44	1,951.00	Downtown	0.00	2,160.06	91
J-45	1,965.00	Birm/Hidden Valley	0.00	2,330.45	158
J-45	1,931.00	Downtown	0.00	2,159.65	99
J-46	2,050.00	Claypool Hill	0.00	2,443.75	171
J-46	1,939.00	Downtown	0.00	2,158.40	95
J-47	1,945.00	Downtown	0.00	2,139.10	84
J-48	1,980.00	Downtown	0.00	2,139.10	69
J-49	2,100.00	Birm/Hidden Valley	0.00	2,329.36	99
J-49	2,040.00	Downtown	0.00	2,139.10	43
J-50	2,150.00	Farmer Street	6.00	2,233.76	36
J-50	2,076.00	Downtown	0.00	2,139.10	27
J-51	2,300.00	Kent's Ridge	0.00	2,725.91	185
J-51	2,082.00	Downtown	0.00	2,139.10	25
J-52	2,500.00	Kent's Ridge	1.50	2,725.91	98
J-52	2,011.00	Downtown	0.00	2,139.10	56
J-53	2,033.00	Birm/Hidden Valley	0.00	2,330.35	129
J-53	2,035.00	Downtown	0.00	2,139.10	45
J-54	1,946.00	Downtown	0.00	2,139.10	84
J-55	2,280.00	Kent's Ridge	0.00	2,725.91	193
J-55	1,952.00	Downtown	0.00	2,139.10	81
J-56	2,185.00	Kent's Ridge	0.00	2,725.91	234
J-56	2,012.00	Downtown	0.00	2,139.10	55
J-57	2,200.00	Birm/Hidden Valley	0.00	2,329.36	56

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-57	2,027.00	Downtown	0.00	2,142.23	50
J-58	1,940.00	Farmer Street	0.00	2,160.71	96
J-58	1,999.00	Downtown	0.00	2,142.23	62
J-59	1,950.00	Birm/Hidden Valley	0.00	2,330.45	165
J-59	1,940.00	Downtown	0.00	2,142.23	88
J-60	1,935.00	Downtown	6.00	2,160.30	98
J-60	1,945.00	Downtown	0.00	2,139.10	84
J-61	1,975.00	Birm/Hidden Valley	0.00	2,330.45	154
J-61	2,005.00	Downtown	0.00	2,139.10	58
J-62	2,194.00	Claypool Hill	0.00	2,444.00	108
J-62	1,986.00	Downtown	0.00	2,139.10	66
J-63	2,165.00	Claypool Hill	0.00	2,444.00	121
J-63	2,008.00	Downtown	0.00	2,139.10	57
J-64	2,040.00	Claypool Hill	0.00	2,443.76	175
J-65	2,048.00	Claypool Hill	0.00	2,443.79	172
J-65	2,026.00	Farmer Street	0.00	2,287.95	114
J-66	2,080.00	Claypool Hill	0.00	2,443.87	158
J-66	2,114.00	Farmer Street	0.00	2,233.50	52
J-67	2,213.00	Claypool Hill	0.00	2,444.00	100
J-67	2,142.00	Farmer Street	0.00	2,233.50	40
J-68	2,292.00	Claypool Hill	0.00	2,444.00	66
J-68	2,120.00	Farmer Street	0.00	2,233.50	49
J-68A	2,164.00	Claypool Hill	0.00	2,444.00	121
J-69	2,232.00	99	0.00	2,233.50	1
J-70	1,940.00	Downtown	4.00	2,160.35	96
J-70	2,151.00	Farmer Street	0.00	2,233.50	36
J-71	2,108.00	Claypool Hill	0.00	2,444.00	146
J-71	2,081.00	Downtown	0.00	2,158.52	34
J-72	2,295.00	Claypool Hill	0.00	2,444.00	65
J-72	1,968.00	Downtown	0.00	2,158.52	83
J-73	2,230.00	Claypool Hill	0.00	2,444.00	93
J-73	2,043.71	Cedar Bluff Tank	0.00	2,220.15	76
J-74	2,100.00	Claypool Hill	0.00	2,443.96	149
J-74	2,055.00	Cedar Bluff Tank	0.00	2,220.15	72
J-75	2,100.00	Claypool Hill	0.00	2,443.97	149
J-75	2,085.00	Cedar Bluff Tank	0.00	2,220.17	59
J-76	2,430.00	99	0.00	2,444.00	6
J-76	2,071.00	Cedar Bluff Tank	0.00	2,220.17	65
J-77	2,370.00	Claypool Hill	0.00	2,444.00	32
J-77	1,936.00	Downtown	0.00	2,159.90	97
J-78	2,213.00	Claypool Hill	0.00	2,444.00	100
J-79	2,336.00	Claypool Hill	0.00	2,444.00	47
J-80	1,940.00	Downtown	6.00	2,160.34	96
J-81	2,332.00	Claypool Hill	0.00	2,444.00	49
J-82	2,320.00	Claypool Hill	0.00	2,444.00	54
J-83	2,330.00	Claypool Hill	0.00	2,444.00	49
J-84	2,278.00	Claypool Hill	0.00	2,444.00	72
J-85	1,975.00	Birm/Hidden Valley	0.00	2,330.45	154

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-86	2,040.00	Birm/Hidden Valley	0.72	2,334.48	128
J-87	2,020.00	Birm/Hidden Valley	0.72	2,334.48	136
J-88	2,040.00	Birm/Hidden Valley	0.72	2,334.48	128
J-90	1,935.00	Downtown	0.00	2,160.23	98
J-100	1,945.00	Downtown	4.00	2,159.88	93
J-110	1,945.00	Downtown	4.00	2,159.64	93
J-120	2,015.00	Farmer Street	4.00	2,233.96	95
J-130	2,000.00	Farmer Street	6.00	2,234.18	102
J-140	2,035.00	Farmer Street	6.00	2,234.15	86
J-150	1,945.00	Downtown	6.00	2,159.49	93
J-160	1,960.00	Downtown	6.00	2,159.03	86
J-170	1,975.00	Downtown	6.00	2,158.65	80
J-180	2,000.00	Downtown	6.00	2,158.52	69
J-190	2,000.00	Downtown	6.00	2,158.43	69
J-200	2,000.00	Downtown	6.00	2,158.42	69
J-210	2,005.00	Downtown	6.00	2,158.44	67
J-220	1,985.00	Downtown	6.00	2,158.69	75
J-230	2,020.00	Downtown	6.00	2,151.38	57
J-240	2,020.00	Downtown	6.00	2,151.38	57
J-250	2,025.00	Downtown	6.00	2,139.34	50
J-260	1,985.00	Farmer Street	6.00	2,235.95	109
J-270	1,975.00	Farmer Street	6.00	2,239.58	115
J-280	1,965.00	Farmer Street	6.00	2,239.80	119
J-290	2,080.00	Farmer Street	6.00	2,238.14	69
J-300	2,100.00	Farmer Street	6.00	2,238.64	60
J-310	2,095.00	Farmer Street	6.00	2,237.89	62
J-320	1,960.00	Farmer Street	6.00	2,240.69	122
J-330	1,955.00	Farmer Street	2.00	2,242.60	125
J-340	1,950.00	Farmer Street	6.00	2,249.78	130
J-350	1,975.00	Farmer Street	6.00	2,280.25	132
J-360	2,025.00	Birm/Hidden Valley	14.00	2,289.53	115
J-370	1,955.00	Farmer Street	6.00	2,249.77	128
J-380	1,970.00	Farmer Street	6.00	2,249.51	121
J-390	1,955.00	Farmer Street	10.00	2,160.67	89
J-400	1,945.00	Downtown	6.00	2,160.67	93
J-410	1,940.00	Downtown	6.00	2,160.69	96
J-420	1,950.00	Downtown	10.00	2,160.72	91
J-430	1,950.00	Downtown	10.00	2,160.79	91
J-440	1,950.00	Downtown	6.00	2,160.63	91
J-450	1,955.00	Downtown	6.00	2,160.17	89
J-460	1,945.00	Downtown	6.00	2,160.68	94
J-470	1,930.00	Downtown	10.00	2,160.53	100
J-480	1,929.00	Downtown	10.00	2,160.48	100
J-490	1,925.00	Downtown	6.00	2,160.23	102
J-500	2,005.00	Farmer Street	6.00	2,160.23	67
J-510	1,927.00	Farmer Street	6.00	2,162.42	102
J-520	1,921.00	Downtown	6.00	2,160.22	104
J-530	2,040.00	Farmer Street	6.00	2,159.90	52

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-540	1,940.00	Farmer Street	6.00	2,160.72	96
J-550	1,965.00	Birm/Hidden Valley	10.00	2,330.45	158
J-560	1,975.00	Birm/Hidden Valley	6.00	2,330.45	154
J-570	2,094.00	Birm/Hidden Valley	16.00	2,330.44	102
J-580	2,110.00	Birm/Hidden Valley	8.00	2,330.45	96
J-590	2,160.00	Birm/Hidden Valley	8.00	2,330.63	74
J-600	2,170.00	Birm/Hidden Valley	8.00	2,331.12	70
J-610	2,265.00	Birm/Hidden Valley	8.00	2,331.11	29
J-620	1,937.00	Farmer Street	6.00	2,160.97	97
J-630	1,945.00	Farmer Street	6.00	2,162.02	94
J-640	1,950.00	Farmer Street	6.00	2,160.41	91
J-650	1,990.00	Downtown	6.00	2,165.89	76
J-670	1,960.00	Downtown	16.00	2,160.06	87
J-680	1,965.00	Downtown	10.00	2,160.06	85
J-690	1,965.00	Downtown	12.00	2,160.06	85
J-700	1,955.00	Downtown	10.00	2,159.10	88
J-710	1,935.00	Downtown	6.00	2,158.40	97
J-720	1,925.00	Downtown	10.00	2,158.40	101
J-730	1,930.00	Downtown	10.00	2,158.41	99
J-740	1,927.00	Downtown	6.00	2,158.39	100
J-750	1,955.00	Downtown	6.00	2,147.30	83
J-760	1,925.00	Downtown	6.00	2,159.65	102
J-770	1,930.00	Downtown	10.00	2,159.78	100
J-780	1,935.00	Downtown	6.00	2,159.90	98
J-790	1,940.00	Downtown	10.00	2,160.00	95
J-800	1,950.00	Downtown	6.00	2,160.03	91
J-810	1,990.00	Downtown	10.00	2,160.52	74
J-820	2,045.00	Downtown	6.00	2,160.70	50
J-830	1,975.00	Downtown	6.00	2,160.34	80
J-840	2,025.00	Downtown	6.00	2,160.31	59
J-850	1,965.00	Downtown	6.00	2,159.02	84
J-860	1,950.00	Downtown	10.00	2,159.02	91
J-870	1,980.00	Downtown	6.00	2,158.57	77
J-880	1,970.00	Downtown	10.00	2,160.21	82
J-890	1,955.00	Downtown	6.00	2,159.88	89
J-900	1,970.00	Downtown	6.00	2,160.31	83
J-910	1,930.00	Downtown	6.00	2,160.24	100
J-920	1,920.00	Downtown	6.00	2,160.32	104
J-930	1,930.00	Downtown	6.00	2,160.24	100
J-940	1,930.00	Downtown	6.00	2,160.30	100
J-950	1,930.00	Downtown	6.00	2,160.20	100
J-960	2,025.00	Downtown	6.00	2,130.04	46
J-970	2,010.00	Downtown	6.00	2,158.61	64
J-980	2,165.00	Birm/Hidden Valley	6.00	2,330.42	72
J-990	2,190.00	Birm/Hidden Valley	6.00	2,329.98	61
J-1000	2,095.00	Birm/Hidden Valley	8.00	2,330.44	102
J-1010	2,180.00	Birm/Hidden Valley	8.00	2,331.42	66
J-1020	2,115.00	Birm/Hidden Valley	8.00	2,332.01	94

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1030	2,120.00	Birm/Hidden Valley	8.00	2,332.48	92
J-1040	2,105.00	Birm/Hidden Valley	8.00	2,331.44	98
J-1050	2,112.00	Birm/Hidden Valley	6.00	2,331.23	95
J-1060	2,125.00	Birm/Hidden Valley	6.00	2,331.04	89
J-1070	2,105.00	Birm/Hidden Valley	6.00	2,331.65	98
J-1080	2,105.00	Birm/Hidden Valley	10.00	2,331.55	98
J-1090	2,170.00	Birm/Hidden Valley	6.00	2,331.43	70
J-1100	2,050.00	Birm/Hidden Valley	6.00	2,330.92	122
J-1120	2,075.00	Birm/Hidden Valley	6.00	2,330.91	111
J-1130	2,075.00	Birm/Hidden Valley	6.00	2,334.55	113
J-1280	1,945.00	Downtown	10.00	2,160.60	93
J-1290	1,953.00	Downtown	10.00	2,160.60	90
J-1300	1,955.00	Downtown	10.00	2,160.60	89
J-1310	1,950.00	Downtown	10.00	2,161.12	92
J-1320	1,947.00	Downtown	10.00	2,161.04	93
J-1330	1,940.00	Downtown	10.00	2,160.98	96
J-1340	1,945.00	Downtown	6.00	2,160.60	93
J-1350	1,930.00	Downtown	6.00	2,160.62	100
J-1360	1,930.00	Downtown	6.00	2,160.65	100
J-1370	1,935.00	Downtown	6.00	2,160.60	98
J-1380	1,930.00	Downtown	6.00	2,160.60	100
J-1390	1,933.00	Downtown	6.00	2,160.64	99
J-1400	1,925.00	Downtown	6.00	2,160.63	102
J-1410	1,934.00	Downtown	6.00	2,160.79	98
J-1420	1,931.00	Downtown	6.00	2,160.77	100
J-1430	1,937.00	Downtown	10.00	2,161.17	97
J-1440	1,930.00	Downtown	10.00	2,161.14	100
J-1450	1,925.00	Downtown	10.00	2,161.78	103
J-1460	1,950.00	Downtown	6.00	2,161.13	92
J-1470	1,955.00	Downtown	6.00	2,161.12	89
J-1480	1,945.00	Downtown	6.00	2,159.98	93
J-1490	1,945.00	Downtown	6.00	2,160.00	93
J-1500	1,990.00	Downtown	6.00	2,159.98	74
J-1510	2,035.00	Cedar Bluff Tank	10.00	2,220.15	80
J-1520	2,070.00	Cedar Bluff Tank	16.00	2,220.17	65
J-1530	1,920.00	Downtown	10.00	2,159.91	104
J-1540	1,913.00	Downtown	2.00	2,160.01	107
J-1550	1,925.00	Downtown	10.00	2,162.50	103
J-1560	1,920.00	Downtown	8.00	2,161.88	105
J-1570	1,925.00	Downtown	16.00	2,161.96	103
J-1580	1,920.00	Downtown	10.00	2,161.42	105
J-1590	1,920.00	Downtown	10.00	2,161.43	105
J-1600	1,940.00	Farmer Street	0.00	2,160.71	96
J-1610	1,940.00	Birm/Hidden Valley	0.00	2,330.45	169
J-1620	1,930.00	Downtown	6.00	2,162.07	101
J-1630	1,930.00	Downtown	0.00	2,161.14	100
J-1640	1,932.00	Downtown	6.00	2,161.05	99
J-1650	1,985.00	Downtown	6.00	2,160.81	76

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1660	2,040.00	Downtown	6.00	2,160.70	52
J-1670	2,075.00	Downtown	4.00	2,160.49	37
J-1680	2,040.00	Downtown	6.00	2,160.52	52
J-1690	1,970.00	Downtown	2.00	2,160.81	83
J-1700	1,970.00	Downtown	2.00	2,160.83	83
J-1710	1,936.00	Downtown	6.00	2,161.04	98
J-1720	1,937.00	Downtown	6.00	2,161.04	97
J-1730	1,938.00	Downtown	4.00	2,161.03	97
J-1740	1,933.00	Downtown	4.00	2,160.95	99
J-1750	1,930.00	Downtown	20.00	2,161.46	100
J-1760	1,923.00	Downtown	0.00	2,161.23	103
J-1770	1,960.00	Downtown	100.00	2,160.85	87
J-1780	1,922.00	Downtown	6.00	2,160.14	103
J-1790	1,923.00	Downtown	6.00	2,159.79	103
J-1810	1,940.00	Downtown	4.00	2,160.93	96
J-1820	1,945.00	Downtown	4.00	2,160.93	94
J-1830	1,950.00	Downtown	4.00	2,159.53	91
J-1840	1,925.00	Downtown	4.00	2,159.65	102
J-1850	1,918.00	Downtown	8.00	2,159.75	105
J-1860	1,922.00	Downtown	2.00	2,159.76	103
J-1870	1,920.00	Downtown	2.00	2,159.99	104
J-1880	1,915.00	Downtown	0.00	2,165.23	108
J-1890	1,925.00	Downtown	0.00	2,160.05	102
J-1900	1,925.00	Downtown	6.00	2,160.15	102
J-1910	1,923.00	Downtown	6.00	2,161.44	103
J-1920	1,948.00	Downtown	4.00	2,159.74	92
J-1930	1,969.00	Downtown	6.00	2,159.67	83
J-1940	2,010.00	Downtown	6.00	2,159.01	65
J-1950	2,040.00	Downtown	2.00	2,155.67	50
J-1960	1,965.00	Downtown	8.00	2,159.50	84
J-1970	1,934.00	Downtown	2.00	2,159.74	98
J-1980	1,970.00	Downtown	6.00	2,159.74	82
J-1990	1,970.00	Downtown	6.00	2,159.75	82
J-2000	2,040.00	Downtown	0.00	2,159.98	52
J-2010	2,040.00	Cedar Bluff Tank	150.00	2,220.21	78
J-2030	2,083.00	Cedar Bluff Tank	0.00	2,220.17	59
J-2040	2,085.00	Cedar Bluff Tank	4.00	2,220.16	59
J-2050	2,082.00	Cedar Bluff Tank	4.00	2,220.16	60
J-2060	2,000.00	Farmer Street	2.00	2,233.95	101
J-2100	2,005.00	Farmer Street	2.00	2,233.96	99
J-2120	2,033.00	Birm/Hidden Valley	2.00	2,330.35	129
J-2130	2,020.00	Birm/Hidden Valley	2.00	2,319.02	130
J-2140	2,188.00	Birm/Hidden Valley	2.00	2,301.82	49
J-2150	2,151.00	Birm/Hidden Valley	2.00	2,295.73	63
J-2200	1,980.00	Downtown	0.00	2,160.32	78
J-2210	2,035.00	Downtown	0.00	2,160.32	54
J-2220	2,085.00	Downtown	0.00	2,160.32	33
J-2230	2,055.00	Downtown	0.00	2,158.52	45

FlexTable: Junction Table

Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-2250	1,955.00	Farmer Street	4.00	2,160.68	89
Raven Connection	2,005.00	Downtown	518.63	2,150.98	63

FlexTable: Tank Table

Label	Zone	Elevation (Base) (ft)	Level (Initial) (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
Airport Tank	1	2,157.00	15.00	1,170.64	2,172.00
Birmingham Tank	Birm/Hidden Valley	2,337.54	1.00	257.17	2,338.54
CH WTP clearwell	Zone-1	2,058.00	10.00	0.00	2,068.00
Cedar Bluff Tank	1	2,220.00	1.00	184.00	2,221.00
College Tanks (2)	Claypool Hill	2,443.00	1.00	14.00	2,444.00
Downtown Tank	Downtown	2,163.75	1.00	840.01	2,164.75
Farmer St Tank	1	2,232.50	1.00	-112.72	2,233.50
Hidden Valley Tank	Birm/Hidden Valley	2,337.54	1.00	193.19	2,338.54
Kent's Ridge Tank	Kent's Ridge	2,716.00	10.00	22.51	2,726.00
Richlands HS Tank	1	2,230.00	10.00	0.00	2,240.00

APPENDIX C

WATER PLANT FILTER EQUIPMENT

WESTECH QUOTATION

WESTECH	48 MAIN STREET, STE. 11 STURBRIDGE, MA 01566	Phone: 515-268-8400 Fax: 774-241-0413	Quotation No. Q30591-133980

Thank you for the opportunity to quote you with your equipment needs.

Please review the following and contact us to place an order or ask any question.

Date:	8/27/2019	Proj Manager:	JOSEPH MONETTE	Ship Via:	NOT APPLICABLE
RFQ No.:	Q30591-133980	Prime Job No:	GFN94-148	Freight:	NO FREIGHT REQUIRED
Quoted by:	JOSEPH MONETTE	Prime Name:	RICHLANDS, VA		
Phone:	774-241-3401 or 515-268-8400	Equipment:	GRAVITY FILTER PARTS	Lead Time:	2-3 WEEKS AFTER RECEIVED
Email:	JMONETTE@WESTECH-INC.COM	Tax Exemption No.:		Quote Valid:	15 days
For Group:	15	Payment Terms:	NET 30 DAYS		

Bill To:
JENNIFER DAWSON
THOMPSON & LITTON
P O BOX 1307
000
WISE, VA 24293
UNITED STATES OF AMERICA

Tel/Fax: 276-328-2161
JDAWSON@T-L.COM

Ship To:
THOMPSON & LITTON
JENNIFER DAWSON
P O BOX 1307
103 E MAIN ST
WISE, VA 24293
UNITED STATES OF AMERICA

Tel/Fax: 276-328-2161

Doc	No.	Part/Dwg Number	Description	Qty	Units	Unit Price	Net Price
57390	001		FILTER MEDIA CORE SAMPLE ANALYSIS - ANTHRACITE PER CORE SAMPLE	1	EA	[redacted]	
58442	002		FILTER MEDIA CORE SAMPLE ANALYSIS -SAND PER CORE SAMPLE	1	EA		

No sales, GST, PST, use, or other taxes have been included in our pricing. No discounts accepted.

Quoted in US Dollars Gran[redacted]

-Please see the attached General Terms and Conditions. All purchase orders for Aftermarket parts need to be in US dollars.

-Minimum Order amount is US$250. A small order fee of US$25 will be applied to orders between US$100 and US$250. All orders must be at least US$100.

-All information provided with and including this proposal is considered proprietary and is not for distribution without express written consent of WesTech Engineering, Inc.

-WesTech accepts Credit Card payments up to $10,000. This is to include freight and taxes. Any order over this amount will be invoiced at terms. A processing fee of up to 4 percent on Credit Cards will be added where allowed by law.

This Quotation is subject to all specifications above as well as all attachments included with this document.

Thank you again for your quote request!

Best Regards, Joe Monette

WESTECH QUOTATION

WESTECH®	48 MAIN STREET, STE. 11 STURBRIDGE, MA 01566	Phone: 515-268-8400 Fax: 774-241-0413	Quotation No. Q30592-133979

Thank you for the opportunity to quote you with your equipment needs.

Please review the following and contact us to place an order or ask any question.

Date:	8/27/2019	Proj Manager:	JOSEPH MONETTE	Ship Via:	NOT APPLICABLE
RFQ No.:	Q30592-133979	Prime Job No:	GFN94-148	Freight:	NO FREIGHT REQUIRED
Quoted by:	JOSEPH MONETTE	Prime Name:	RICHLANDS, VA		
Phone:	774-241-3401 or 515-268-8400	Equipment:	GRAVITY FILTER PARTS	Lead Time:	4-6 WEEKS NOTICED REQUIRED
Email:	JMONETTE@WESTECH-INC.COM	Tax Exemption No.:		Quote Valid:	30 DAYS
For Group:	15	Payment Terms:	NET 30 DAYS		

Bill To:
JENNIFER DAWSON
THOMPSON & LITTON
P O BOX 1307
000
WISE, VA 24293
UNITED STATES OF AMERICA

Tel/Fax: 276-328-2161
JDAWSON@T-L.COM

Ship To:
THOMPSON & LITTON
JENNIFER DAWSON
P O BOX 1307
103 E MAIN ST
WISE, VA 24293
UNITED STATES OF AMERICA

Tel/Fax: 276-328-2161

Doc	No.	Part/Dwg Number	Description	Qty	Units	Unit Price	Net Price
58376	001		ON SITE FIELD SERVICE\RICHLANDS,VA	1	TRI	[redacted]	
58376	002		SCOPE: EQUIPMENT EVALUATION				
58376	003		EQUIPMENT -GRAVITY FILTER PROJECT GFN94-148				
58376	004		FIELD SERVICE DATES;TO BE DETERMINED				
58376	005		TECHNICIAN: TO BE DETERMINED				
58376	006		TRIP INCLUDES THE FOLLOWING: ONE(1) TRIP ,TO INCLUDE(1) SITE DAY & (2) TRAVEL DAYS				
58376	007		RATE INCLUDES (1) SITE DAY & (2) TRAVEL DAYS				
58376	008		TRAVEL AND LIVING EXPENSES				
58376	009		ADDITIONAL DAYS BILLED $1,235.00/DAY				

No sales, GST, PST, use, or other taxes have been included in our pricing. No discounts accepted.

Quoted in US Dollars Grand Total [redacted]

-Please see the attached General Terms and Conditions. All purchase orders for Aftermarket parts need to be in US dollars.

-Minimum Order amount is US$250. A small order fee of US$25 will be applied to orders between US$100 and US$250. All orders must be at least US$100.

-All information provided with and including this proposal is considered proprietary and is not for distribution without express written consent of WesTech Engineering, Inc.

-WesTech accepts Credit Card payments up to $10,000. This is to include freight and taxes. Any order over this amount will be invoiced at terms. A processing fee of up to 4 percent on Credit Cards will be added where allowed by law.

This Quotation is subject to all specifications above as well as all attachments included with this document.

Thank you again for your quote request!

Best Regards, Joe Monette

Item C – MULTICRETE™ II Underdrain and Media Replacement

Design Criteria	
Design Flow	1,728 gpm
Number of Filter Cells	3
Filter Cell Size	12 ft x 12 ft
Filter Area	432 ft^2
Hydraulic Load	4 gpm/ft^2
Backwash Method	Air followed by water
Backwash Water Loading Rate	15 gpm/ft^2*
Backwash Airwash Loading Rate	2 $scfm/ft^2$

* The design backwash rate listed is based on a temperature of 25 °C. The actual backwash water rate must be adjusted 2% up or down for each degree Celsius difference above or below from design temperature; i.e., above 25 °C increase by 2%, below 25 °C decrease by 2%.

MULTICRETE™ II Underdrain Features and Benefits

The MULTICRETE II filter underdrain system is a highly flexible concrete false bottom filter design. The integral system of piers, pans, and inserts assures the proper location of all nozzles. PVC pier forms are furnished cut to length to interlock the pan forms. The HDPE plastic pan forms have properly located recesses for accurate placement of the nozzle inserts. The rebar system furnished by the installer is anchored into the filter floor and walls providing a structurally sound false bottom underdrain. MULTICRETE II underdrains use sturdy time-proven ABS plastic nozzles with horizontal slot openings sized for the required media. Because of the open plenum design, the MULTICRETE II underdrain has minimal headloss, provides even backwash distribution, and allows inspection access to the area below the underdrain.

- Pan and pier forms can be cut to fit any cell configuration
- Media-retaining ABS nozzles are available for almost any media size and type
- Floors and piers are made in one monolithic concrete pour, reducing installation costs
- Virtually unlimited range of backwash rates can be used
- MULTIWASH® backwash process can be implemented into any MULTICRETE II application to keep filter media in peak working condition

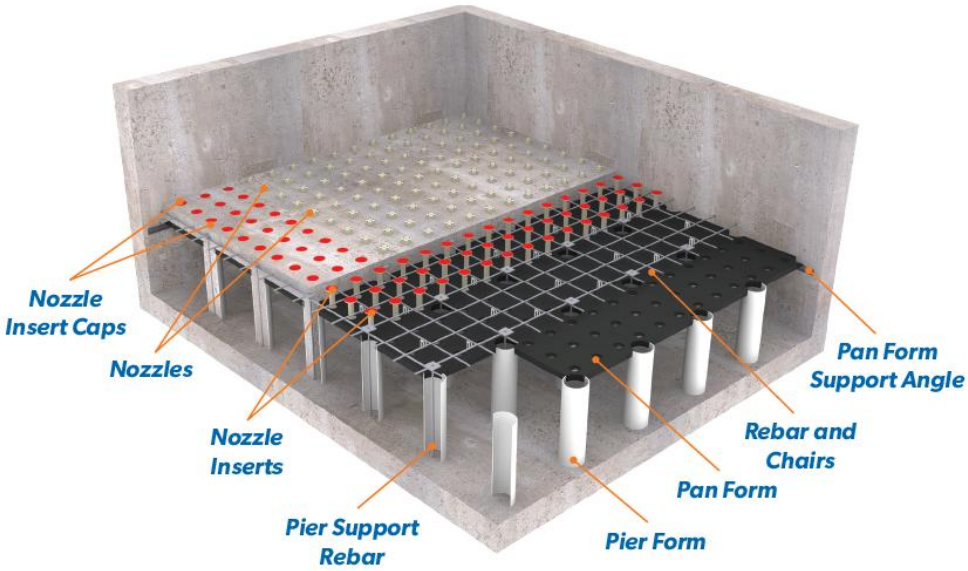


Figure 1 – Standard MULTICRETE II system components depicted. May not entirely reflect system quoted.

MULTICRETE™ II Underdrain Scope of Supply				
Filter Cell Quantity			Cell Size	
3			12' x 12'	
Item	Qty/Cell	Size	Material	Notes
Pan Forms	35	24 in square	HDPE	Pans along cell edges may require field cut to fit
Manway Pan Forms	1	24 in square	HDPE	Manway is 18 in square type 304 stainless steel
Pier Forms	25	6 in diameter	Sch 40 PVC	Factory cut to length
Nozzle Inserts	324	Standard	ABS	NSF 61 Approved
Nozzles	324	Standard	ABS	NSF 61 Approved
Rebar Chairs	72	Standard	Plastic	Included
Rebar Retention Plates	25	2 in square	Steel	Per ACI 318 requirements

Notes

- Horizontal and vertical reinforcing rods on 8 inch centers both ways are not included.
- Concrete for underdrains and support piers is not included.
- Before pouring of the underdrain concrete and installation of the filter media, the contractor shall vacuum clean the underdrain area, all cell effluent and backwash supply piping, and all surfaces that come into contact with backwash supply water. This cleaning must be approved by WesTech prior to the concrete pouring and media placement.
- In order to prevent damage to the underdrain, a method of pressure relief is recommended. This may be in the form of a pressure relief riser in the backwash supply line or double redundant pressure switches in the backwash supply line to shut off the pump upon increasing pressure. These devices are NOT by WesTech.

Media Scope of Supply					
Type	Quantity	Depth	Effective Size	U. C.	Packaging
Anthracite*	756 ft^3	20 in	0.8-1.0 mm	$\leq$1.6	1-ft^3 Bags on Pallets
Sand*	378 ft^3	10 in	0.45-0.55 mm	$\leq$1.6	1-ft^3 Bags on Pallets
Gravel	432 ft^3	12 in	3/16” x 3/32” (Top 3”) 1/2” x 3/16” (Next 3”) 3/4” x 1/2” (Next 3”) 1 1/2" x 3/4” (Bottom 3”)		1-ft^3 Bags on Pallets

*Media quantities will include sufficient volume for skimming, typically 5% extra.

WesTech Trips to the Site		
Total Trips	Total Days	Includes
2	6	Installation inspection, startup, instruction of plant personnel, and training

Note: Any Item Not Listed Above to Be Furnished by Others.

Items Not Furnished by WesTech

1. Unloading of equipment from delivering carrier, protected storage of equipment, installation, supervision of installation
2. All underground and interconnecting piping, filter face piping and fittings, pipe supports, wall inserts or sleeves, Dresser or flexible couplings, hangers, filter function valves, pneumatic tubing from air compressor to filter batteries, air release piping and valves, sampling lines and sinks, surface wash backflow preventer, field work of piping (i.e., drilling and tapping for instrumentation) and flow meters
3. Walkways, handrails, stairways and ladders
4. All chemical feeders, feed lines, chemicals, labor and procedures for the disinfection of equipment, laboratory test equipment
5. Structural design, supply and installation of concrete basin, foundations, rebar, anchors, concrete, grout, sealant, sumps and concrete fill for filter underdrains
6. Motor control center, motor starters, disconnects, electrical wiring and conduit, telemetering equipment, level controls, turbidity monitoring equipment, supports for controls
7. All pumps, air compressors, dryers, operating and start-up lubricants

This proposal has been reviewed and is approved for issue by Sarah Willett on September 16, 2019.

Budget Pricing

Proposal Name: Richlands
Proposal Number: 1930408
Monday, September 16, 2019

1. Bidder's Contact Information

Company Name	WesTech Engineering, Inc.
Contact Name	Mitch Matthews
Phone	801.265.1000
Email	mmatthews@westech-inc.com
Address: Number/Street	3665 S West Temple
Address: City, State, Zip	Salt Lake City, UT 84115

2. Pricing

Currency		US Dollars
Scope of Supply		
A	Full Gravity Filter Parts Replacement, Model GFPD20A	[redacted]
B	Media Replacement	[redacted]
C	MULTICRETE II Underdrain and Media Replacement	[redacted]
	Taxes (sales, use, VAT, IVA, IGV, duties, import fees, etc.)	Not Included

Prices are for a period not to exceed 30 days from date of proposal.

Field Service	
Daily Rate	[redacted]

Prices do not include field service unless noted, but it is available at the daily rate plus expenses. The customer will be charged for a minimum of three days for time at the jobsite. Travel will be billed at the daily rate. Any canceled charges due to the customer's request will be added to the invoice. The greater of visa procurement time or a two week notice is required prior to trip departure date.

3. Payment Terms

Submittals Approved	15%
Release for Fabrication	35%
Net 30 days from Shipment	50%

All payments are net 30 days. Partial shipments are allowed. Other terms per WesTech proforma invoice.

4. Schedule

Submittals, after PO receipt	6 to 8 Weeks
Customer Review Period	2 weeks
Ready to Ship, after Submittal Approval	18 to 20 weeks
Total Weeks from PO to Shipment	26 to 30 weeks

APPENDIX D

TOWN ASSET MANAGEMENT PLAN (WATER)

Asset Management/ Capital Improvements Plan

Prepared for
Town of Richlands, Virginia

T&L Project No. 13558
May 30, 2018

THOMPSON & LITTON EST. 1956

Asset Management/Capital Improvements Plan

Prepared for
Town of Richlands, Virginia

This document and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Thompson & Litton and is not to be used in whole or in part for any other project without the written authorization of Thompson & Litton.

THOMPSON & LITTON

726 Auburn Avenue
Radford, Virginia 24141

T&L Project No. 13558 **May 30, 2018**

TABLE OF CONTENTS

PAGE

Methodology - Asset Management/CIP for Existing Water Assets 1

Overall System Inventory

Table I: Asset Management/CIP (Water System) 3
Table II: Assets and Current Value 5
Table III: Miscellaneous Water Information 5

Evaluation (Per EPA Guidelines) and Prioritization by Town 6

Table IV: Projected Revenues, Expenses, and Changes in Net Position (per EPA Guidelines).....7

Table V: Projected Revenues, Expenses, and Changes in Net Position (per Town Prioritization) 8

LIST OF ATTACHMENTS

Attachment A - Water System Inventory
Attachment B - Existing Water Facilities Map

Methodology-Asset Management/CIP for Existing Water Assets

- The steps involved in developing the CIP for the existing water and sewer assets were:
    - Inventory,
    - Age,
    - Determine the useful life,
    - Determine the remaining useful life,
    - Determine the present cost,
    - Determine the replacement cost,
    - Determine the current value, and
    - Calculate the annual debt payment based on a 20-year loan at 3% interest.

- Inventory - The first step was to inventory the existing water assets.

- Age - The age of each asset was determined based on a review of previous drawings and information provided by the Town. The asset age is included on the inventory sheets.

- Useful Life - The useful life for each asset was determined based on information obtained from databases established by the EPA. The useful life of the various water assets is included on the inventory sheets and is summarized as follow:

    - Water Lines - 38 Years
    - Pump Stations - 15 Years;
    - Gate Valves - 40 Years
    - Water Storage Tanks - 60 Years
    - Water Treatment Plant (WTP) - 30 Years

- Remaining Useful Life - The remaining useful life is the difference between the asset age and useful life.

- Present Cost - The present cost represents the cost estimate for a contractor to replace the asset today. The present cost was determined for each asset and is included on the inventory sheets. Please note that present costs do not include the site work for pressure reducing valves, water storage tanks, pump stations, and WTPs.

- Current Value - The current value represents the depreciation of the asset based on its age and present cost. The current value is included on the inventory sheets. Please note that current values include the site work for water storage tanks, pump stations, and WTPs.

Information in this plan is presented as follows:

- Table I presents construction cost information by fiscal year.

- Table II presents an overall summary of the existing assets, current values, and replacement costs.

- Table III presents miscellaneous information in regard to the water system.

- Table IV presents projected revenues, expenses, and changes in net position. The projected revenue and expenses were based on information provided by the Town. Please note that inflation for the past twenty (20) years has averaged approximately 2.5 percent; therefore, projections account for 2.5 percent inflation.

- Table V presents projected revenues, expenses, and changes in net position per the Town's prioritization.

- Attachment A includes the inventory for the assets.

- Attachment B presents the Existing Water Facilities Map (Exhibit I).

TABLE I: TOWN OF RICHLANDS – ASSET MANAGEMENT / CAPITAL IMPROVEMENTS PLAN (WATER SYSTEM) MAY 30, 2018							
Year	Project	Construction Cost	Total Construction Cost	Contingency (10%)	Related Cost (30%)	Total Probable Project Cost	Annual Debt Service Payment *(3% for 20 yrs)*
Fiscal Year 2019	Liquid Chlorine Conversion WTP	[redacted]					
	Install Chlorine Analyzer						
	New Chemical Feed Pump						
	New Work Truck						
	Rehabilitate Airport Tank						
Fiscal Year 2020	Upgrade WTP Filter Controls						
	Upgrade SCADA						
	Rebuild Raw Water Pump						
	Purchase Maintenance Software						
	Purchase New Computers						
	New Work Truck						
	New Meter Reader Truck						
	1,000 L.F. 2-inch Water Line						
Fiscal Year 2021	Replace One High Service Pump						
	Inspect/Clean Birmingham Tank						
	Upgrade WTP Filter Controls						
	Upgrade SCADA						
	Replace Chemical Feed Pump						
	Replace Roof Hidden Valley PS						
	Replace Farmer Street Pumps						
	Replace Waste Basin Pumps						
	3,700 L.F. 6-inch Water Line						
Revised							

Notes:

1. The Town intends to perform all of the work utilizing Town personnel with the exception of the 3,700 L.F. of 6-inch water line referenced in Fiscal Year 2021; therefore, related costs were only applied to the installation of 3,700 L.F. of 6-inch water line.

2. A loan payment generated for each year based on a 3% loan over 20 years; however, the Town may utilize revenue to pay for some or all of the projects listed. Therefore, the Town may choose to take out smaller loans or no loans at all.

3. The next three (3) fiscal years are the only years presented in Table 1 due to the possibility of future projects changing after the three-year period.

ASSET MANAGEMENT/CAPITAL IMPROVEMENT PLAN
FOR THE TOWN OF RICHLANDS
T&L PROJECT NO. 13558 MAY 30, 2018

OVERALL SYSTEM INVENTORY

TABLE II				
Assets and Current Value				
Item	Totals	Unit of Measurement	Current Value	Present Cost to Replace
Water Line Owned by Town (inches)				
2	21,398	L.F.	[redacted]	
4	45,542	L.F.		
6	95,922	L.F.		
8	24,699	L.F.		
10	16,492	L.F.		
12	12,628	L.F.		
Total Water Line	216,682	41 miles		
Water Line Not Owned by Town (inches)				
6	8,613	L.F.	[redacted]	
8	18,579	L.F.		
12	419	L.F.		
Total Water Line	27,611	5.2 miles		
Pump Stations	4	EA.	[redacted]	
Tanks	4	EA.		
Water Plant	1	EA.		
TOTAL				

TABLE III	
Miscellaneous Water Information	
Water	TOTALS
Customers	2,564
Asset - Earliest Age	15
Asset - Average Age	41

Present Worth of Water System =
Total Present Cost to Replace System =

Present Worth of Water System (Not Owned) =
Total Present Cost to Replace System (Not Owned) =

[redacted]

Evaluation (Per EPA Guidelines) and Prioritization by Town

As stated in the "Methodology-Asset Management/CIP for Existing Water Assets" section of this plan, the useful life of assets was determined utilizing guidelines established by the EPA. As illustrated in Attachment A, the remaining useful life of a considerable amount of the Town's Water System has been exceeded. Therefore, Table IV includes the replacement of the aforementioned assets beginning in fiscal year 2021.

The Town's staff responsible for operating and maintaining the existing water assets has demonstrated their capability to maintain existing assets in a condition that allows a large portion of the assets to exceed the useful life established by the EPA. The Town's staff should be commended for their dedication to providing safe and reliable potable water to the Town's industrial, commercial, residential, and bulk (Cedar Bluff and the Tazewell County Public Service Authority) customers.

In addition to the Town's ability to utilize assets beyond their useful lives, the Town is not in a financial position to begin replacing all of the assets identified as exceeding their useful lives at once. Therefore, T&L worked with the Town to generate a list of projects to be completed between fiscal years 2018 and 2027. Consequently, Table IV has been updated to replace the costs associated with capital improvements projects associated with the EPA guidelines to include the costs associated with the projects identified by the Town as being needed to continue to effectively operate the water system for the next ten years. The updated table is included as Table V.

ASSET MANAGEMENT/CAPITAL IMPROVEMENTS PLAN FOR THE TOWN OF RICHLANDS

T&L PROJECT NO. 13558 MAY 30, 2018

PROJECTED REVENUES, EXPENSES, AND CHANGES IN NET POSITION (PER EPA GUIDELINES)

TABLE IV								
Year	Projected Revenue	Projected O&M Cost	Debt Payments	Capital Improvements Projects	Total Projected Expenses	Projected Revenue Less Project O&M Cost and Debt Payments	Projected Revenue Less Projected Total Expenses Financial Position Including Capital Improvements	Projected Shortfall Per Customer (Year/Month)
July 2017 - June 2018	[redacted]							
July 2018 - June 2019								
July 2019 - June 2020								
July 2020 - June 2021								
July 2021 - June 2022								
July 2022 - June 2023								
July 2023 - June 2024								
July 2024 - June 2025								
July 2025 - June 2026								
July 2026 - June 2027								

Notes:

1. Projected Revenue includes the Town's water collection from its residential, commercial, and industrial customers and revenue collected from the Tazewell County Public Service Authority and Cedar Bluff per agreements between the entities.
2. Projected O&M Cost includes salaries, wages, and benefits; operation and maintenance expenses; and general / administration expenses.
3. The Capital Improvement Expenses Projected assumes a loan at 3% interest for a 20 year term to replace assets that have exceeded their useful lives beginning in fiscal year 2021. In fiscal year 2025, the Town would need to take out another loan to include assets that exceeded their useful lives in fiscal year 2025.

ASSET MANAGEMENT/CAPITAL IMPROVEMENTS PLAN FOR THE TOWN OF RICHLANDS

T&L PROJECT NO. 13558 MAY 30, 2018

PROJECTED REVENUES, EXPENSES, AND CHANGES IN NET POSITION (PER TOWN PRIORITIZATION)

TABLE V									
Year	Projected Revenue	Projected O&M Cost	Debt Payments	Water Distribution Capital Improvements Projects	Water Treatment Plant Capital Improvements Projects	Total Projected Expenses	Projected Revenue Less Projected O&M Cost & Debt Payments	Projected Revenue Less Projected Total Expenses Financial Position Including Capital Improvements	Projected Shortfall Per Customer (Year/Month)
July 2018 - June 2019	[redacted]								
July 2019 - June 2020									
July 2020 - June 2021									
July 2021 - June 2022									
July 2022 - June 2023									
July 2023 - June 2024									
July 2024 - June 2025									
July 2025 - June 2026									
July 2026 - June 2027									

Notes:

1. Projected Revenue includes the Town's water collection from its residential, commercial, and industrial customers and revenue collected from the Tazewell County Public Service Authority and Cedar Bluff per agreements between the entities.
2. Projected O&M Cost includes salaries, wages, and benefits; operation and maintenance expenses; and general / administration expenses.

ATTACHMENT A:

WATER SYSTEM INVENTORY

ASSET MANAGEMENT/CAPITAL IMPROVEMENT PLAN

FOR THE TOWN OF RICHLANDS

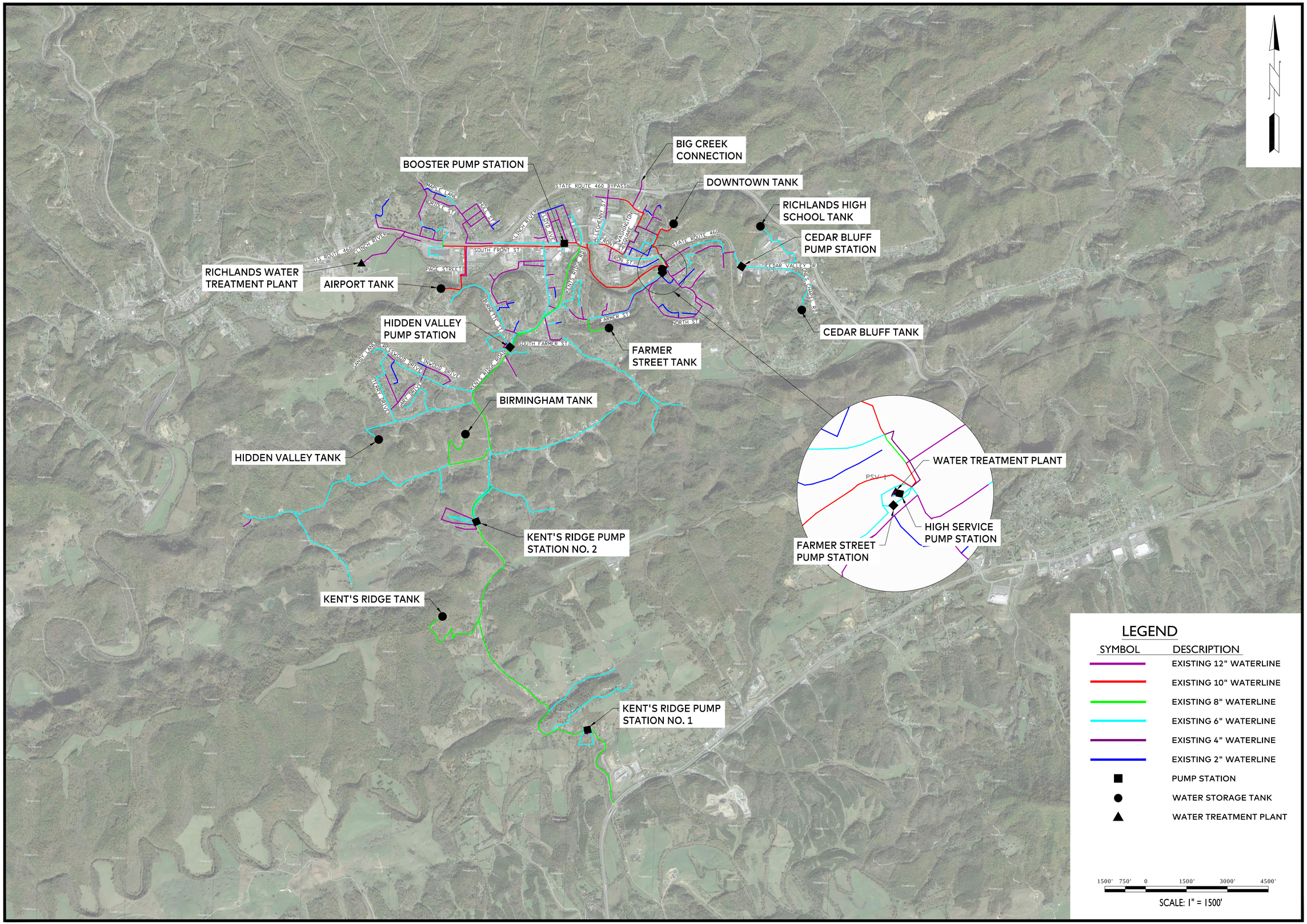
T&L PROJECT NO. 13558 **MAY 30, 2018**

WATER SYSTEM INVENTORY

Town of Richlands Existing Water												
Water Line (inches)	**Totals**		**Expected Useful Life (Years)**	**Year Installed**	**Current Year**	**Age**	**Remaining Useful Life (years)**	**Present Unit Cost**	**Present Total Cost**	**Year for Replacement**	**Cost for Replacement (3% Compound Annually)**	**Current Value**
15 + Years Old								[redacted]				
4	290.49	L.F.	38	2002	2017	15	23					
6	13530.59	L.F.	38	2002	2017	15	23					
8	5808.23	L.F.	38	2002	2017	15	23					
10	5757.84	L.F.	38	2002	2017	15	23					
20 + Years Old												
2	150.82	L.F.	38	1997	2017	20	18					
6	2097.58	L.F.	38	1997	2017	20	18					
8	4369.74	L.F.	38	1997	2017	20	18					
25 + Years Old												
4	1006.39	L.F.	38	1992	2017	25	13					
6	811.67	L.F.	38	1992	2017	25	13					
10	1781.79	L.F.	38	1992	2017	25	13					
30 + Years Old												
2	489.47	L.F.	38	1987	2017	30	8					
4	1436.61	L.F.	38	1987	2017	30	8					
6	2549.76	L.F.	38	1987	2017	30	8					
40 + Years Old												
4	219.76	L.F.	38	1977	2017	40	-2					
6	8257	L.F.	38	1977	2017	40	-2					
50 + Years Old												
2	1830.06	L.F.	38	1967	2017	50	-12					
4	16635.34	L.F.	38	1967	2017	50	-12					
6	26063.16	L.F.	38	1967	2017	50	-12					
8	2342.6	L.F.	38	1967	2017	50	-12					
10	6403.14	L.F.	38	1967	2017	50	-12					
12	6593.42	L.F.	38	1967	2017	50	-12					
Unknown (Assumed to Replace)												
2	18928.06	L.F.	38	1979	2017	38	0					
4	25953.49	L.F.	38	1979	2017	38	0					
6	42612.66	L.F.	38	1979	2017	38	0					
8	12178.57	L.F.	38	1979	2017	38	0					
10	2549.36	L.F.	38	1979	2017	38	0					
12	6034.49	L.F.	38	1979	2017	38	0					
Not Owned by Town (Kents Ridge)												
6	*8613.11*	*L.F.*	*38*	*1979*	*2017*	*38*	*0*					
8	*18578.53*	*L.F.*	*38*	*1979*	*2017*	*38*	*0*					
12	*419.28*	*L.F.*	*38*	*1979*	*2017*	*38*	*0*					
Pump Stations	**Totals**		**Expected Useful Life (Years)**	**Year Installed**	**Current Year**	**Age**	**Remaining Useful Life (years)**					
Kents Ridge 1	1	EA	15	1979	2017	38	-23					
Hidden Valley	1	EA	15	1979	2017	38	-23					
Booster	1	EA	15	1917	2017	100	-85					
Cedar Bluff	1	EA	15	1947	2017	70	-55					
Tanks	**Totals**		**Expected Useful Life (Years)**	**Year Installed**	**Current Year**	**Age**	**Remaining Useful Life (years)**					
Hidden Valley (75K)	1	EA	60	1947	2017	70	-10					
Birmingham (161K)	1	EA	60	1957	2017	60	0					
Airport (1M)	1	EA	60	1957	2017	60	0					
Farmer Street (150K)	1	EA	60	1957	2017	60	0					
Water Plant	**Totals**		**Expected Useful Life (Years)**	**Year Installed**	**Current Year**	**Age**	**Remaining Useful Life (years)**					
Richlands Water Plant	1	EA	30	1995	2017	22	8					

ATTACHMENT B:

EXISTING WATER FACILITIES MAP (EXHIBIT I)



ASSET MANAGEMENT/CAPITAL IMPROVEMENT PLAN
RICHLANDS, VIRGINIA

EXISTING WATER FACILITIES MAP

No.	Date	Purpose of Document Issue

Designed	
Drawn	
Checked	
Date	MAY 2018

Project No.
13558

THOMPSON & LITTON

Sheet No.
EXHIBIT I

APPENDIX E

TOWN'S MOST RECENT AUDIT

FINANCIAL STATEMENTS

TOWN OF RICHLANDS, VIRGINIA

FISCAL YEAR ENDED
JUNE 30, 2019

TOWN OF RICHLANDS, VIRGINIA

FINANCIAL REPORT

FOR THE FISCAL YEAR ENDED JUNE 30, 2019

TOWN OF RICHLANDS, VIRGINIA
FINANCIAL REPORT
FOR THE YEAR ENDED JUNE 30, 2019

TABLE OF CONTENTS

INTRODUCTORY SECTION

		Page
List of Elected and Appointed Officials		1

FINANCIAL SECTION

Independent Auditors' Report		2-4
Managements' Discussion and Analysis		5-17
Basic Financial Statements:	**Exhibit**	**Page**
Government-Wide Financial Statements:		
Statement of Net Position	1	18
Statement of Activities	2	19
Fund Financial Statements:		
Balance Sheet – Governmental Fund	3	20
Reconciliation of the Balance Sheet of Governmental Fund to the Statement of Net Position	4	21
Statement of Revenues, Expenditures, and Changes in Fund Balances – Governmental Fund	5	22
Reconciliation of the Statement of Revenues, Expenditures, and Changes in Fund Balances of Governmental Fund to the Statement of Activities	6	23
Statement of Net Position – Proprietary Funds	7	24
Statement of Revenues, Expenses, and Changes in Net Position – Proprietary Funds	8	25
Statement of Cash Flows – Proprietary Funds	9	26
Notes to Financial Statements		27-64
Required Supplementary Information:		
Schedule of Revenues, Expenditures, and Changes in Fund Balances – Budget and Actual: General Fund	10	65
Pension Plan:		
Schedule of Changes in Net Pension Liability and Related Ratios	11	66
Schedule of Employer Contributions	12	67
Notes to Required Supplementary Information	13	68
Other Postemployment Benefits – Line of Duty Act (LODA) Program		
Schedule of Employer's Share of Net LODA OPEB Liability	14	69
Schedule of Employer Contributions	15	70
Notes to Required Supplementary Information	16	71
Other Supplementary Information:		
Supporting Schedules:	**Schedule**	**Page**
Schedule of Revenues – Budget and Actual - Governmental Fund	1	72-73
Schedule of Expenditures – Budget and Actual - Governmental Fund	2	74-75

TABLE OF CONTENTS (CONTINUED)

Statistical Information:	**Table**	**Page**
Government-Wide Information:		
Government-Wide Expenses by Function	1	76
Government-Wide Revenues	2	77
Fund Information:		
General Governmental Expenditures by Function	3	78
General Governmental Revenues by Source	4	79
Property Tax Levies and Collections	5	80
Assessed Value of Taxable Property	6	81
Property Tax Rates	7	82
Ratio of Net General Bonded Debt to Assessed Value and Net Bonded Debt Per Capita	8	83
Computation of Legal Debt Margin	9	84

COMPLIANCE SECTION

Compliance:	**Page**
Independent Auditors' Report on Internal Control over Financial Reporting and on Compliance and Other Matters Based on an Audit of Financial Statements Performed in Accordance with *Government Auditing Standards*	85-86

INTRODUCTORY SECTION

TOWN OF RICHLANDS, VIRGINIA

TOWN COUNCIL

Paul Crawford, Mayor

Rod Cury, Vice Mayor

Richard Brown

Vickie England

Doug Ratliff

Mary Ann Strong

Rick Wood

Connie Allen, Town Clerk

OTHER OFFICIALS

Timothy Taylor ..... Town Manager
Adrienne Cordle ..... Office Manager/Accountant

FINANCIAL SECTION

Independent Auditors' Report

To the Honorable Members of the Town Council
Town of Richlands, Virginia
Richlands, Virginia

Report on the Financial Statements

We have audited the accompanying financial statements of the governmental activities, the business-type activities, and each major fund of the Town of Richlands, Virginia, as of and for the year ended June 30, 2019, and the related notes to the financial statements, which collectively comprise the Town's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and the *Specifications for Audits of Counties, Cities, and Towns*, issued by the Auditor of Public Accounts of the Commonwealth of Virginia. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinions

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the governmental activities, the business-type activities, and each major fund of the Town of Richlands, Virginia, as of June 30, 2019, and the respective changes in financial position, and, where applicable, cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Change in Accounting Principles

As described in Note 19 to the financial statements, in 2019, the Town adopted new accounting guidance, GASB Statement No. 88, *Certain Disclosures Related to Debt, Including Direct Borrowings and Direct Placements*. Our opinion is not modified with respect to this matter.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, budgetary comparison information, and schedules related to pension and OPEB funding on pages 5-17, 65, and 66-71 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance. The budgetary comparison information has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

Supplementary and Other Information

Our audit was conducted for the purpose of forming opinions on the financial statements that collectively comprise the Town of Richlands, Virginia's basic financial statements. The introductory section, supporting schedules, and statistical information, are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The supporting schedules are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the supporting schedules are fairly stated in all material respects in relation to the basic financial statements as a whole.

The introductory section and statistical information have not been subjected to the auditing procedures applied in the audit of the basic financial statements and, accordingly, we do not express an opinion or provide any assurance on them.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated November 7, 2019, on our consideration of the Town of Richlands, Virginia's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the Town of Richlands, Virginia's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Town of Richlands, Virginia's internal control over financial reporting and compliance.

Robinson, Farmer, Cox Associates

Blacksburg, Virginia
November 7, 2019

MANAGEMENT'S DISCUSSION AND ANALYSIS

The Management Discussion and Analysis (MD&A) offers the readers of the Town of Richlands, Virginia (the Town) financial statements a narrative overview and analysis of the financial activities of the Town for the fiscal year ended June 30, 2019.

Financial Highlights for fiscal year 2019

- The assets and deferred outflows of resources of the Town exceeded its liabilities and deferred inflows of resources at the close of the most recent fiscal year by $18,053,084 (net position). Of this amount, $(1,082,108) (unrestricted net position) may be used to meet the government's ongoing obligations to citizens and creditors.

- The Town's total net position decreased by $23,698. The decrease is attributable to an increase in governmental liabilities as offset by a decrease in business-type liabilities.

- The Town's total liabilities and deferred inflows of resources at the close of the current fiscal year were $13,157,773, including $10,227,643 in long-term obligations.

- Long-term obligations primarily represent amounts due on the Town's general obligation bonds and net pension liability.

- As of the close of the current fiscal year, the Town's general fund reported an ending fund balance of $177,852, a decrease of $275,671 from the prior year fund balance.

- At the end of the current fiscal year, unassigned fund balance for the general fund was $(191,414), or -3.4% of total general fund expenditures. Such amount would be available for spending at the government's discretion.

- At the end of the fiscal year June 30, 2019, the Town incurred expenses of $132,914 for building and land improvements at the Town's Historical Railroad Foreman Section House property. The expenses incurred for this portion of the project, was the Town's matching contribution for a grant that was awarded by VDOT, in the amount of $438,000, for the restoration project.

- During the current fiscal year, the Town made capital improvements to its recreational facility weight room totaling approximately $34,921. The improvements consist of purchasing weight and fitness equipment/machines. The Town also purchased new vehicles for the public works and public safety departments as well as public safety equipment totaling $259,035 and computer / IT equipment for approximately $15,600.

- The Town had one revenue bond at the end of the current fiscal year with a total balance of $560,546.

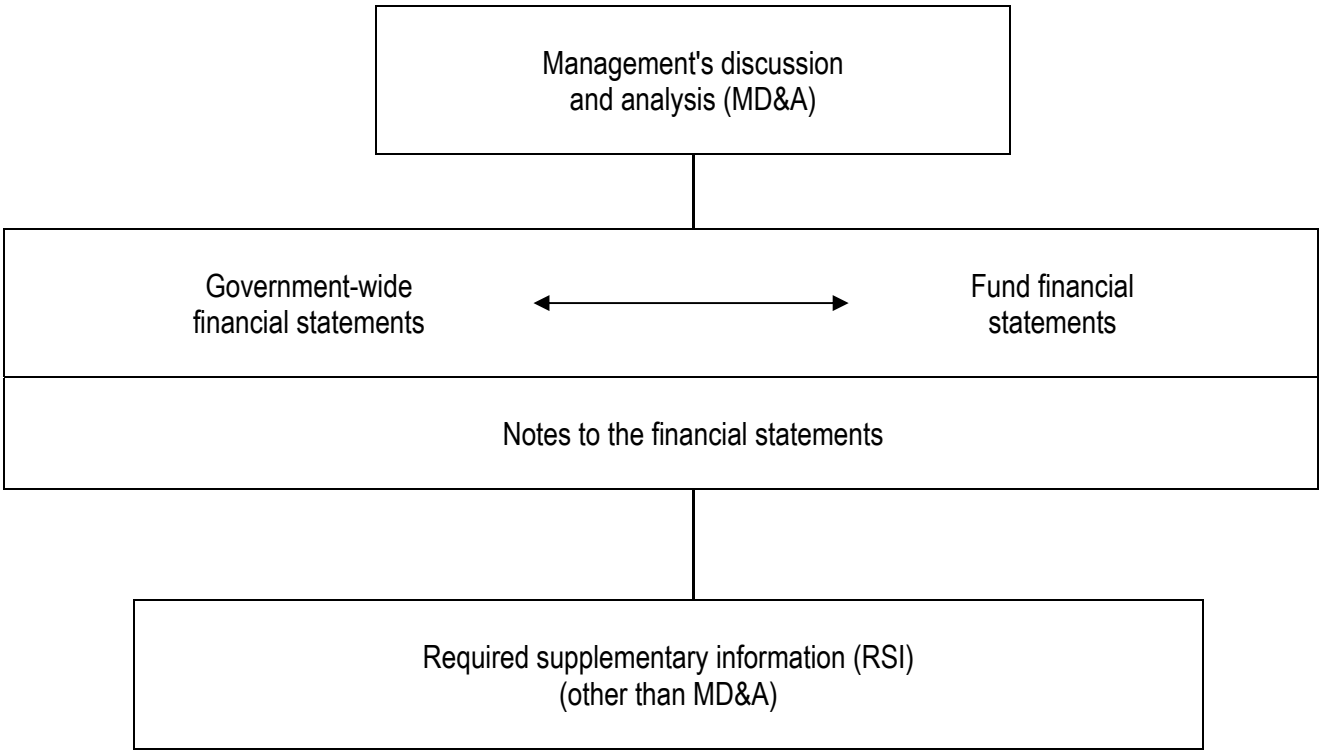
- The Town had general obligation bonds at June 30, 2019 with an ending balance of $1,501,121.

Overview of the Financial Statements

The discussion and analysis is intended to serve as an introduction to the Town's basic financial statements. The Town's basic financial statements consist of three major components: 1) government-wide financial statements, 2) fund financial statements, and 3) notes to the financial statements. This report also contains required supplementary information, in addition to the basic financial statements themselves.

Figure A shows how the required parts of this MD&A and the Town's basic financial statements are arranged and related to one another.

Figure A
Required Components of Richland's Financial Statements



Government-Wide Financial Statements

The *government-wide financial statements* (i.e., the statement of net position and the statement of activities) report information on all of the non-fiduciary activities of the primary government. *Government activities*, which normally are supported by taxes and intergovernmental revenues, are reported separately from *business-type activities,* which rely, to a significant extent, on fees and charges for support.

The statement of activities demonstrates the degree to which the direct expenses of a given function or segment is offset by program revenues. *Direct expenses* are those that are clearly identifiable with a specific function or segment. *Program revenues* include: 1) charges to customers or applicants who purchase, use, or directly benefit from goods, services, or privileges provided by a given function or segment, and 2) grants and contributions that are restricted to meeting the operational or capital requirements of a particular function or segment. Taxes and other items not properly included among program revenues are reported instead as *general revenues.*

The government-wide financial statements can be found on page 18-19 of this report.

Fund Financial Statements

The format of the fund financial statements will be more familiar to traditional users of the Town's financial statements. The fund financial statements provide more detailed information about the Town's most significant funds – not the Town as a whole. Funds are accounting mechanisms that the Town uses to keep track of specific sources of funding and spending for particular purposes. Separate financial statements are provided for governmental and proprietary funds. Major individual government funds and enterprise funds are reported as separate columns in the fund financial statements.

Governmental Funds

Governmental funds account for expendable financial resources other than those accounted for in the proprietary funds. The governmental fund measurement focus is upon determination of financial position and cash flows in and out and the balances that remain at year-end that is available for spending (rather than net income determination as would apply to a commercial enterprise). As a result, the governmental fund statements provide a detailed *short-term* view that helps the reader determine whether there are more or fewer financial resources that can be spent in the near future to finance the Town's programs.

The Town reports one major government fund:

The *general fund* is the government's primary operating fund. It accounts for all financial resources of the general government, with the exception of those accounted for in another fund.

The basic governmental fund financial statements can be found on pages 20 and 22 of this report.

Proprietary Funds

Proprietary funds distinguish *operating* revenues and expenses from *non-operating* items. Operating revenues and expenses generally result from providing services and producing and delivering goods in connection with a proprietary fund's principal ongoing operations. The principal operating revenue of the enterprise funds are charges to customers for sales and services. Operating expenses for enterprise funds include the cost of sales and services, administrative expenses, and depreciation on capital assets. All revenues and expenses not meeting this definition are reported as non-operating revenues and expenses.

The Town reports the following major proprietary funds:

The *electric fund* accounts for the activities of the electric operations.

The *water* and *sewer fund* accounts for the activities of the water operations.

The basic proprietary fund statements can be found on pages 24-26 of this report.

Budgetary Comparison

The Town adopts an annual appropriated budget for all government funds. A budgetary comparison statement has been provided to demonstrate compliance with this budget and will disclose how accurately the governing body was able to forecast the revenues and expenditures of the Town.

Notes to the Financial Statements

The notes provide additional information that is essential to a full understanding of the data provided in the government-wide and fund financial statements. The notes to the financial statements can be found on pages 27-64 of this report.

Government-Wide Financial Analysis

Statement of Net Position

The following table reflects the Town's condensed net position:

Table 1
Summary of Net Position
As of June 30, 2019

	Governmental Activities		Business-type Activities		Totals	
	2018	2019	2018	2019	2018	2019
Current and other assets	$ 1,478,954	$ 1,618,908	$ 7,193,558	$ 7,496,836	$ 8,672,512	$ 9,115,744
Capital assets	10,532,590	10,394,002	10,970,203	10,502,053	21,502,793	20,896,055
Total assets	12,011,544	12,012,910	18,163,761	17,998,889	30,175,305	30,011,799
Deferred outflows of resources	569,644	738,503	293,481	460,555	863,125	1,199,058
Long-term liabilities	5,699,444	5,657,867	4,461,876	4,569,776	10,161,320	10,227,643
Other liabilities	943,866	1,330,218	1,127,948	817,856	2,071,814	2,148,074
Total liabilities	6,643,310	6,988,085	5,589,824	5,387,632	12,233,134	12,375,717
Deferred inflows of resources	544,339	654,181	184,175	127,875	728,514	782,056
Net position:						
Net investment in capital assets	10,532,590	10,379,482	8,776,499	8,440,386	19,309,089	18,819,868
Restricted	228,409	315,324	-	-	228,409	315,324
Unrestricted	(5,367,460)	(5,585,659)	3,906,744	4,503,551	(1,460,716)	(1,082,108)
Total net position	$ 5,393,539	$ 5,109,147	$ 12,683,243	$ 12,943,937	$ 18,076,782	$ 18,053,084

Over time, net position may serve as a useful indicator of a government's financial position. In the case of the Town, assets and deferred outflows exceeded liabilities and deferred inflows by $18,053,084 at the close of fiscal year 2019. The largest portion of the Town's net position (104.2%) reflects its net investment in capital assets (e.g., land, buildings, plant in service, machinery and equipment), less any outstanding related debt used to acquire those assets. The Town uses these capital assets to provide services to citizens and consequently, these assets are not available for future spending. Since the capital assets themselves cannot be used to pay the related debt, the resources needed to service this debt must be provided from other sources.

Statement of Activities

The following table shows the revenues and expenses of the Town's governmental and business-type activities:

Table 2
Changes in Net Position
For the Fiscal Year Ended June 30, 2019

	Governmental Activities		Business-type Activities	
	2018	2019	2018	2019
Revenues:				
Program revenues :				
Charges for services	$ 1,082,893	$ 1,290,813	9,102,539	$ 9,522,909
Operating grants & contributions	1,458,570	1,048,098	-	-
Capital grants & contributions	354,578	-	9,922	-
General revenue:				
Property taxes	538,056	497,664	-	-
Other local taxes	2,044,120	2,207,338	-	-
Unrestricted investment earnings	8,219	10,125	8,568	12,604
Other / Miscellaneous	59,575	102,805	1,962	1,961
Grants and contributions not restricted	4,954	15,515	-	-
Total revenues	5,550,965	5,172,358	9,122,991	9,537,474
Expenses:				
General government administration	235,766	343,375	-	-
Public safety	2,795,730	2,764,887	-	-
Public works	2,200,116	1,802,564	-	-
Parks, recreation, culture	403,439	491,984	-	-
Community development	30,235	53,940	-	-
Nondepartmental	-	-	-	-
Interest-long term debt	226	-	-	-
Electric	-	-	6,780,758	6,486,240
Water & sewer	-	-	2,719,717	2,790,540
Total expenses	5,665,512	5,456,750	9,500,475	9,276,780
Excess (deficiency)	(114,547)	(284,392)	(377,484)	260,694
Change in net position	(114,547)	(284,392)	(377,484)	260,694
Net position-July 1	5,508,086	5,393,539	13,060,727	12,683,243
Net position-June 30	$ 5,393,539	$ 5,109,147	$ 12,683,243	$ 12,943,937

Statement of Activities (Continued)

During the current fiscal year, the Town's net position decreased by $23,698. This is comprised of a decrease from governmental activities of $284,392 and an increase in business-type activities of $260,694.

Governmental activities – Governmental activities decreased the Town's net position by $284,392. Additional factors are noted below.

Revenues from governmental activities totaled $5,172,358, with charges for services (25.0%), other local taxes (42.7%) and operating grants & contributions (20.3%), being the major sources of revenues. Most revenues in comparison to the previous year had nominal changes with the exception of operating grants & contributions, which decreased $410,472, capital grants & contributions, which decreased $354,578 and other local taxes which increased $163,218. The decrease in operating grants & contributions and capital grants & contributions was due to the completion of a VDOT Grant Funded project for Street and Highway Maintenance (paving to be specific) as well as the completion of the VDOT Enhancement Grant funded project for the Restoration of the Town's Railroad Foreman Section House. Both projects were complete, and all grant funding was disbursed during the previous fiscal year. Other local taxes increased due to the implementation of a cigarette tax and water consumption tax during the current fiscal year.

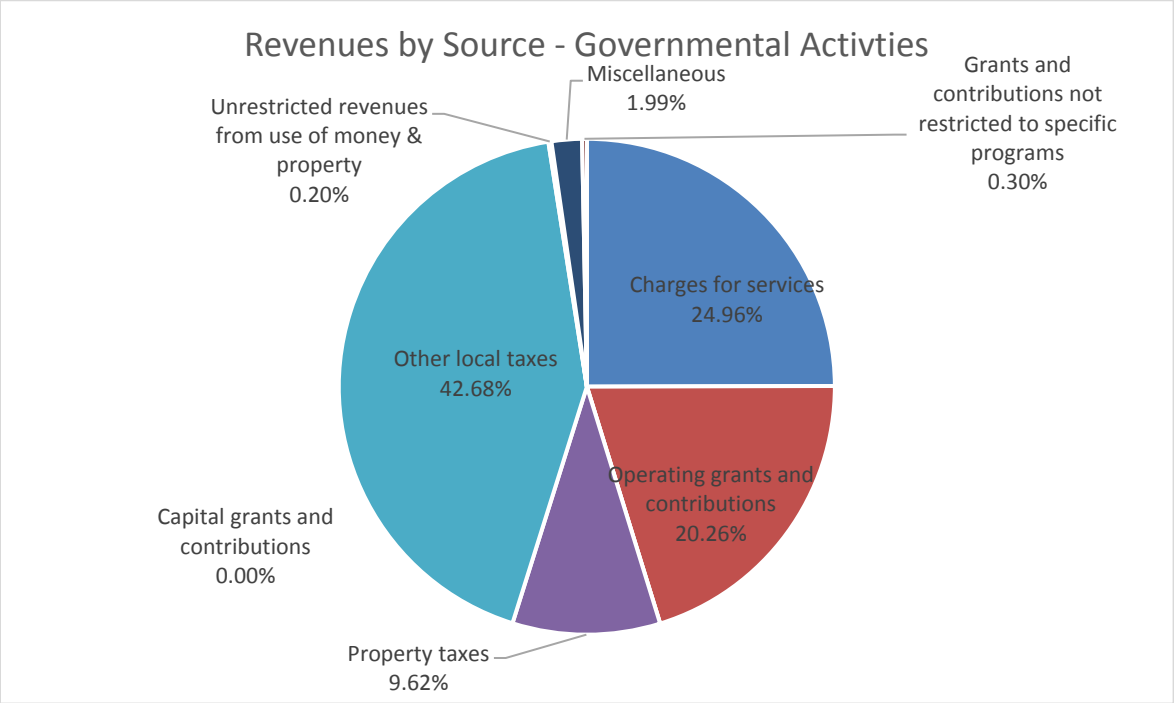
Expenses for governmental activities totaled $5,456,750 with parks, recreation and culture (9.0%), public safety (50.7%), public works (33.0%), accounting for approximately 92.7% of total governmental expenses. Public works expenses decreased $397,552, parks, recreation and culture increased by $88,545, while public safety decreased by $30,843 and general government administration increased by $107,609. The increase in expenses for parks & recreation is due to facility renovations & improvements and the decrease in expenses for public works is due to no paving of street and highways during the current fiscal year. The increase in general government administration is due to an increase in operating and maintenance expenses and capital related purchases. The decreases in expenses were attributed to a decrease in operating and maintenance.

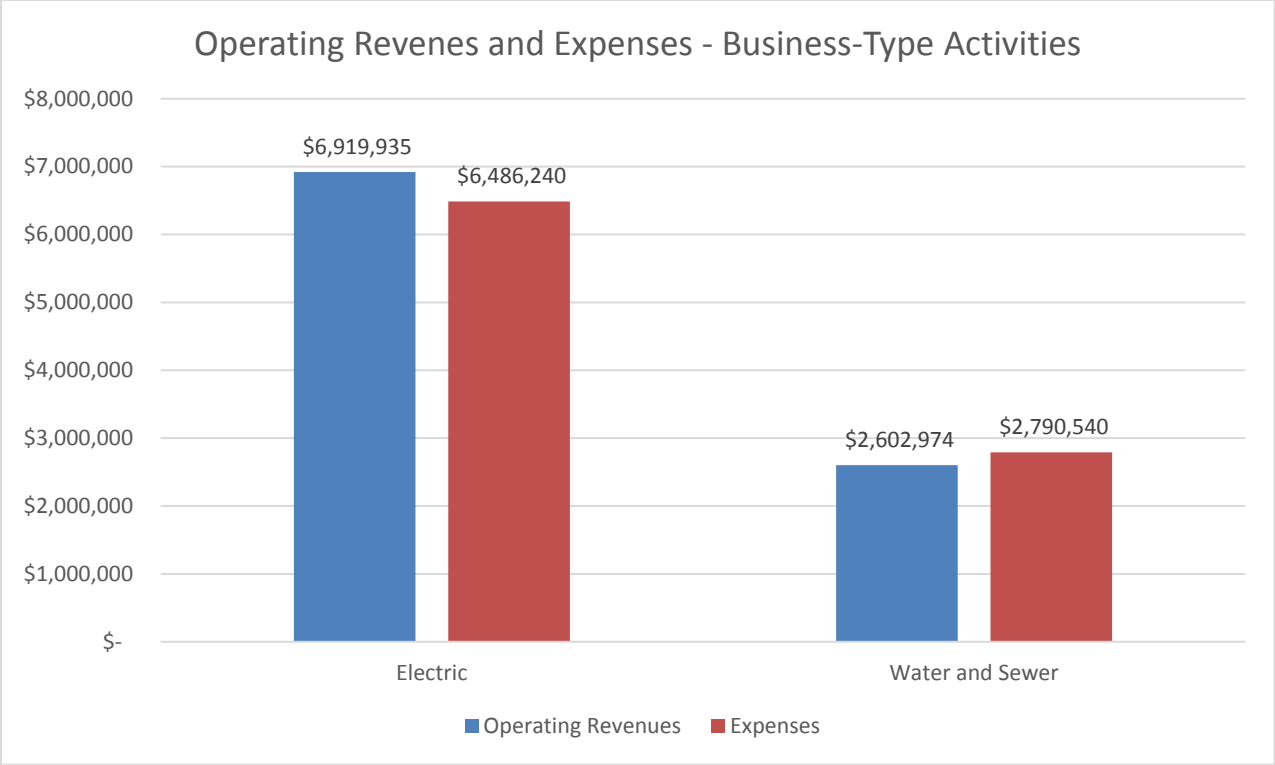
Business-type activities – Net position of the business-type activities was $12,943,937 at June 30, 2019. This was an increase of $260,694 from the prior year net position. The current year increase is $638,178 more than the prior year decrease of $377,484. This is as a result of a decrease in purchased power costs and an increase in charges for services for water and sewer.

Statement of Activities (Continued)

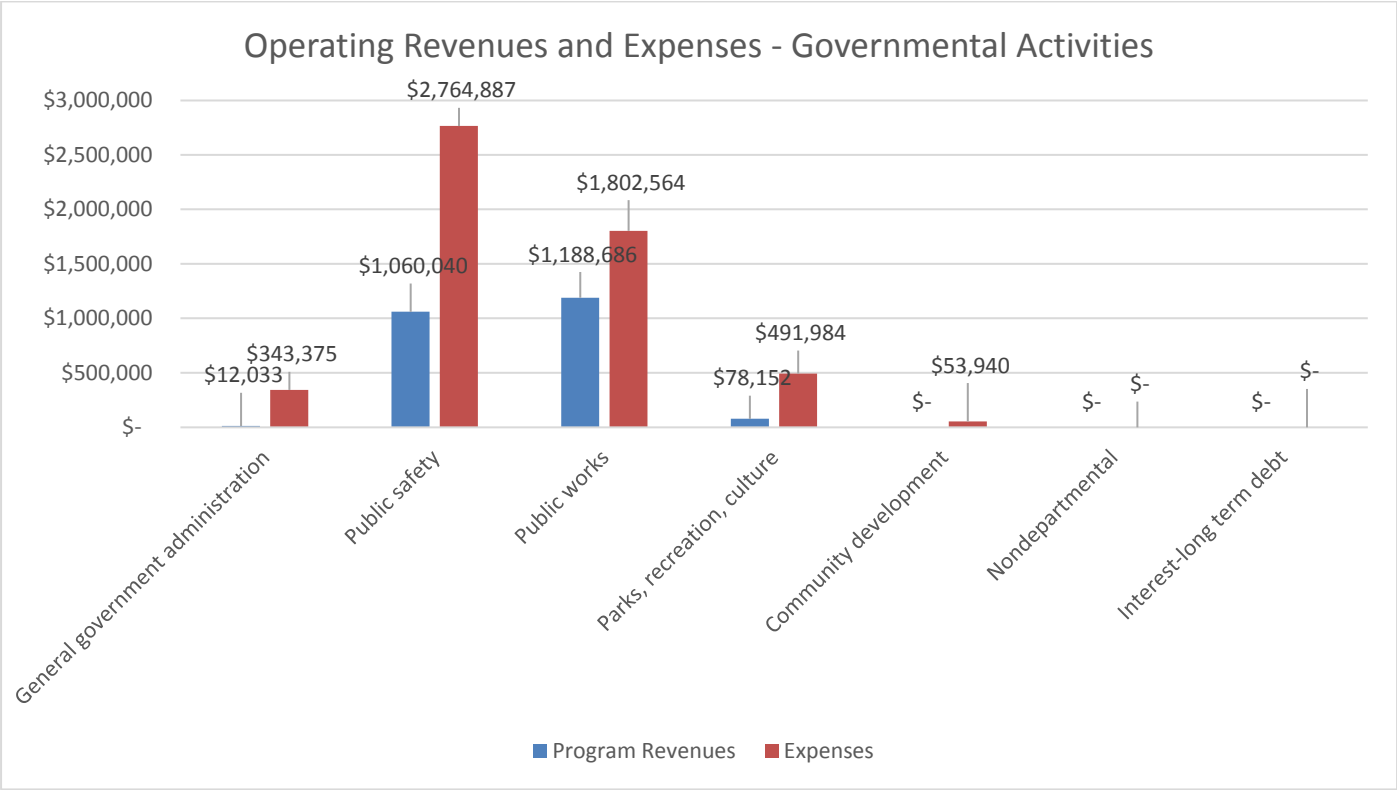
Program revenues for the business-type activities totaled $9,522,909, which were charges for services. Expenses totaled $9,276,780.

- Operating revenues increased from the prior year by $420,370.
- Proprietary operating expenses decreased from the prior year by $221,037.





Statement of Activities (Continued)



Financial Analysis of the Government's Funds

The Town uses fund accounting to ensure and demonstrate compliance with finance-related legal requirements.

Governmental Funds

The focus of the Town's *governmental fund* is to provide information on near-term inflows, outflows, and balances of spendable resources. In particular, *unassigned fund balance* may serve as a useful measure of a government's net resources available for spending at the end of a fiscal year.

The general fund is the government's primary operating fund. At the end of the current fiscal year, the Town's general fund reported an ending fund balance of $177,852, including an unassigned fund balance of $(191,414), which would be available for spending at the government's discretion. As a measure of the general fund's liquidity, it may be useful to compare unassigned fund balance to total fund expenditures. Unassigned fund balance represents approximately -3.4% of total fund expenditures.

The fund balance of the Town's general fund decreased during the current fiscal year by $275,671 from current year activities. Total revenues decreased by $423,826 due primarily to a decrease in intergovernmental revenues; however, total expenditures decreased by $157,030 significantly due to a decrease in public works operating expenses (street & highway maintenance-paving).

Proprietary funds

The Town's proprietary funds provide the same type of information found in the government-wide financial statements, but in more detail.

Unrestricted net position of the electric and water and sewer funds amounted to $2,283,490 and $2,220,061, respectively. The total increase in net position was $260,694 during the current fiscal year.

Electric fund

The electric fund net position increased by $441,798 from current year activities in fiscal year 2019 compared to a prior year decrease of $59,402. The increase was primarily a result of a decrease in operating expenses. Operating expenses decreased by $293,632 (5.0%) due significantly to a decrease in purchased power which equated to $435,117, as well as a slight increase in personnel cost for employees.

Electric fund non-operating revenues increased $3,025 from the prior year, which was related primarily to an increase in investment income during the current fiscal year. Electric fund non-operating expense decreased $886 from the prior year due to a decrease in interest expense on Dell capital lease.

Water and sewer fund

The water and sewer fund net position decreased by $181,104 from current year activities in fiscal year 2019 compared to the prior year decrease of $436,886. The decrease in net position was a result of an increase in operating expense. Operating revenues increased by $335,517 (15.0%) due primarily to an increase in charges for services. Operating expenses increased $72,595 (3.0%), as a result of increased engineering cost and employee and personnel expenses. Non-operating expenses decreased by $1,772 due to a decrease in interest expense and non-operating revenue increased by $1,010 as a result of an increase in investment earning.

General Fund Budgetary Highlights

Differences between the budgeted amounts versus the actual amounts are noted below:

- Actual revenues were less than budgeted revenues by $108,769. The decrease is a result of a combination of a decrease in several revenues; however, an increase in several revenues as well. The most significant budget variances were: $272,952 negative variance in revenues from the commonwealth which is attributed largely to VDOT highway maintenance funds received by the Town but not expended in the current fiscal year; a positive variance of $138,022 under revenue from local resources due to an increase in donations received in the parks & recreation department as well as the public safety departments and an increase in restitution collections; a positive variance of $44,938 under other local taxes revenues as well as a negative variance of $33,761 in fines and forfeitures.

- Actual Expenditures were more than budgeted expenditures by $71,011. This is due primarily to an increase in capital projects as well as a combination of an increase of various expenditures to include general government administration, parks, recreation, and cultural. Public safety, public works and community development expenses were all less than budgeted.

General Fund Budgetary Highlights (Continued)

General Fund
Condensed Budget vs. Actual
Fiscal Year ended June 30, 2019

	Budgeted Amounts		
	Original	Final	Actual Amounts
Revenues	$ 5,339,754	$ 5,339,754	$ 5,230,985
Expenditures	(5,487,841)	(5,487,841)	(5,558,852)
Other Financing Sources	10,000	10,000	52,196
Change in fund balance	$ (138,087)	$ (138,087)	$ (275,671)

Capital Asset and Debt Administration

Capital Assets

The Town's total capital assets for its governmental and business-type activities as of June 30, 2019, amounts to $20,896,055. The capital assets include land, construction in progress, buildings and improvements, improvements other than buildings, equipment, and public domain infrastructure additions in the current fiscal year.

Major capital asset events during the current year included the following:

- Capital asset acquisitions in governmental activities totaled $455,767 (gross) in the current fiscal year. This was for construction in progress ($133,283), machinery and equipment ($309,569), infrastructure ($9,479) and buildings and system ($3,436).

- Capital asset acquisitions in business-type activities totaled $158,608 in the current fiscal year. This was for construction in progress ($53,420), utility plant and buildings in service ($17,959), machinery and equipment ($87,229).

Capital Assets (Continued)

The Town's Capital Assets
(Net of Depreciation)
Fiscal Year ended June 30, 2019

	Governmental Activities		Business-Type Activities	
	2018	2019	2018	2019
Land	$ 1,357,395	$ 1,357,395	$ 517,913	$ 517,913
Construction in Progress	-	133,283	26,959	80,379
Buildings and improvements	2,341,228	2,223,297	9,352,572	8,892,423
Improvements other than buildings	6,106,448	5,868,985	-	-
Equipment	727,519	811,042	1,072,759	1,011,338
Total	$ 10,532,590	$ 10,394,002	$ 10,970,203	$ 10,502,053

Additional information on the Town's capital assets can be found in Note 12 on pages 60-61 of this report.

Long-term debt

At the end of the current fiscal year, the Town had total bonded debt outstanding of $2,061,667. Of this amount, $560,546 is comprised of one revenue bond and the remaining balance of $1,501,121 is general obligation bonds.

The Town's Long-term Bond Debt
Fiscal Year ended June 30, 2019

	Beginning Balance	Additions	Reductions	Ending Balance
Fiscal year 2018				
Business-Type Activities:				
General obligation bonds	$ 1,675,511	$ -	$ 87,196	$ 1,588,315
Revenue bonds	650,233	-	44,844	605,389
Total	$ 2,325,744	$ -	$ 132,040	$ 2,193,704
Fiscal year 2019				
Business-Type Activities:				
General obligation bonds	$ 1,588,315	$ -	$ 87,194	$ 1,501,121
Revenue bonds	605,389	-	44,843	560,546
Total	$ 2,193,704	$ -	$ 132,037	$ 2,061,667

Additional information on the Town's long-term liability can be found in Note 5 on pages 37-39 of this report.

Economic Factors and Next Year's Budget Rates

- The unemployment rate as of June 30, 2019 for the County of Tazewell, in which the Town resides, is 4.3%, which is a decrease from the average for 2018 of 4.9%. This compares to the state's unemployment rate of 2.9% and the national rate of 3.7%.
- The Town is located in the AEP Zone of PJM Interconnection, LLC ("PJM"). The Town is also a member of American Municipal Power ("AMP") and has purchased block power from the PJM market through AMP to meet a portion of its energy needs. Additionally, through AMP, the Town is participating in several generation assets including: 2.588 MW of the Prairie State Coal plant unit #1 and unit #2 PSEC are in full commercial operation, 1.5 MW in the AMP Hydroelectric run-of-the river project (Cannelton, Smithland, and Willow Island) located on the Ohio River and 2.2 MW in the Fremont energy campus project is in full commercial operation. The Town also purchases 0.5 MW of capacity and associated energy from Southeastern Power Administration ("SEPA") through a Purchase Power Agreement ("PPA") that is cancelable by either party. Exposure to the volatile energy commodity market will be greatly reduced by providing over 50% of the Town's load requirements from these projects.
- The Town will continue to monitor the effects of current economic conditions on energy costs in relation to powering water and wastewater plant facilities and rising costs of raw materials needed to maintain the Town and its infrastructure.
- The Town's Water and Wastewater Treatment Facilities are between 25-30 years old with equipment nearing its useful life. Thompson & Litton Engineering Firm has prepared a Water and Wastewater Asset Management/Capital Improvements Plan and is in the process of completing a preliminary engineering report for the rehabilitation of the wastewater treatment plant. Because of the needed improvements and upgrades to both plants; the Town will propose an increase in the water and sewer rates for the upcoming fiscal year 2020 based on recommendations from a Cost of Service Study.
- The downturn in the area economy from the retirement of coal industry related jobs and companies has resulted in a negative economic impact for downtown Richlands and surrounding areas. The Town is working diligently on several projects to revitalize downtown and to stimulate growth and downtown development. The Richlands Council, Planning Commission and Richlands Industrial Development Authority are working together on several projects that will promote growth and stability in downtown Richlands through tourism and community development efforts. The Town has applied for grant funding and plans to apply for additional grants for the following projects.
    - The Downtown Clinch River Walk Trail
    - VHDA Grant for Housing Market Study and Architectural Concepts Plan
    - DHCD Planning Grant
    - DHCD Revitalization Grant
    - Cumberland Plateau Company Economic and Community Development Grant
- The Town hopes to capitalize on upcoming tourism attractions along our town border and within Tazewell County. An All-terrain vehicle (ATV) and Jeep trail are in the final stages of development and are scheduled to open in late 2019 / early 2020. The trail head is adjacent to the Town of Richlands boundary and based on research by the trail development organization will draw many visitors from various states. The trail is unique in the fact that it is the only trail that accommodates Jeeps.

All these factors were considered in preparing the Town's budget for fiscal year 2020.

Unassigned fund balance in the general fund was ($191,414) as of June 30, 2019. As a result, the town has no available funds to be utilized in order to meet any additional obligations to its citizens or to fund future capital projects.

Requests for Information

This financial report is designed to provide a general overview of the Town's finances for all those with an interest in the government's finances. Questions concerning any of the information provided in this report or requests for additional information should be addressed to the Director of Finance, Town of Richlands, 200 Washington Square, Richlands, VA 24641.

Basic Financial Statements

Exhibit 1

Town of Richlands, Virginia
Statement of Net Position
At June 30, 2019

	Primary Government		
	Governmental Activities	Business-Type Activities	Total
ASSETS			
Cash and cash equivalents	$ 967,693	$ 4,736,891	$ 5,704,584
Investments	113,484	428,546	542,030
Receivables (net of allowance for uncollectibles):			
Taxes receivable	91,209	-	91,209
Accounts receivable	305,631	690,558	996,189
Due from other governmental units	86,949	1,063,990	1,150,939
Prepaid items	53,942	288,094	342,036
Restricted assets:			
Cash and cash equivalents	-	288,757	288,757
Capital assets (net of accumulated depreciation):			
Land	1,357,395	517,913	1,875,308
Buildings and system	2,223,297	-	2,223,297
Machinery and equipment	811,042	1,011,338	1,822,380
Infrastructure/utility plant and buildings in service	5,868,985	8,892,423	14,761,408
Construction in progress	133,283	80,379	213,662
Total assets	$ 12,012,910	$ 17,998,889	$ 30,011,799
DEFERRED OUTFLOWS OF RESOURCES			
Pension related items	$ 523,686	$ 460,555	$ 984,241
OPEB related items	214,817	-	214,817
Total deferred outflows of resources	$ 738,503	$ 460,555	$ 1,199,058
LIABILITIES			
Accounts payable	$ 235,592	$ 508,589	$ 744,181
Accrued liabilities	112,029	20,510	132,539
Customers' deposits	-	288,757	288,757
Unearned revenue	982,597	-	982,597
Long-term liabilities:			
Due within one year	237,536	223,141	460,677
Due in more than one year	5,420,331	4,346,635	9,766,966
Total liabilities	$ 6,988,085	$ 5,387,632	$ 12,375,717
DEFERRED INFLOWS OF RESOURCES			
Deferred revenue - prepaid taxes	$ 25,334	$ -	$ 25,334
Pension related items	484,847	127,875	612,722
OPEB related items	144,000	-	144,000
Total deferred inflows of resources	$ 654,181	$ 127,875	$ 782,056
NET POSITION			
Net investment in capital assets	$ 10,379,482	$ 8,440,386	$ 18,819,868
Restricted	315,324	-	315,324
Unrestricted	(5,585,659)	4,503,551	(1,082,108)
Total net position	$ 5,109,147	$ 12,943,937	$ 18,053,084

The notes to the financial statements are an integral part of this statement.

Exhibit 2

Town of Richlands, Virginia
Statement of Activities
For the Year Ended June 30, 2019

Functions/Programs	Expenses	Program Revenues: Charges for Services	Program Revenues: Operating Grants and Contributions	Program Revenues: Capital Grants and Contributions	Net (Expense) Revenue and Changes in Net Position – Primary Government: Governmental Activities	Net (Expense) Revenue and Changes in Net Position – Primary Government: Business-Type Activities	Net (Expense) Revenue and Changes in Net Position – Primary Government: Total
PRIMARY GOVERNMENT:							
Governmental activities:							
General government administration	$ 343,375	$ 12,033	$ -	$ -	$ (331,342)	$ -	$ (331,342)
Public safety	2,764,887	663,611	396,429	-	(1,704,847)	-	(1,704,847)
Public works	1,802,564	537,017	651,669	-	(613,878)	-	(613,878)
Parks, recreation, and cultural	491,984	78,152	-	-	(413,832)	-	(413,832)
Community development	53,940	-	-	-	(53,940)	-	(53,940)
Total governmental activities	$ 5,456,750	$ 1,290,813	$ 1,048,098	$ -	$ (3,117,839)	$ -	$ (3,117,839)
Business-type activities:							
Water and sewer	$ 2,790,540	$ 2,602,974	$ -	$ -	$ -	$ (187,566)	$ (187,566)
Electric	6,486,240	6,919,935	-	-	-	433,695	433,695
Total business-type activities	$ 9,276,780	$ 9,522,909	$ -	$ -	$ -	$ 246,129	$ 246,129
Total primary government	$ 14,733,530	$ 10,813,722	$ 1,048,098	$ -	$ (3,117,839)	$ 246,129	$ (2,871,710)
General revenues:							
General property taxes					$ 497,664	$ -	$ 497,664
Other local taxes:							
Local sales and use taxes					384,909	-	384,909
Consumers' utility taxes					234,560	-	234,560
Business license taxes					460,171	-	460,171
Motor vehicle licenses					34,130	-	34,130
Bank stock tax					207,839	-	207,839
Meals taxes					775,145	-	775,145
Other local taxes					110,584	-	110,584
Unrestricted revenues from use of money and property					10,125	12,604	22,729
Miscellaneous					102,805	1,961	104,766
Grants and contributions not restricted to specific programs					15,515	-	15,515
Total general revenues					$ 2,833,447	$ 14,565	$ 2,848,012
Change in net position					$ (284,392)	$ 260,694	$ (23,698)
Net position - beginning					5,393,539	12,683,243	18,076,782
Net position - ending					$ 5,109,147	$ 12,943,937	$ 18,053,084

The notes to the financial statements are an integral part of this statement.

Exhibit 3

Town of Richlands, Virginia
Balance Sheet
Governmental Fund
At June 30, 2019

	General
ASSETS	
Cash and cash equivalents	$ 967,693
Investments	113,484
Receivables (net of allowance for uncollectibles):	
Taxes receivable	91,209
Accounts receivable	305,631
Due from other governmental units	86,949
Prepaid expenses	53,942
Total assets	$ 1,618,908
LIABILITIES	
Accounts payable	$ 235,592
Accrued payroll and related liabilities	112,029
Unearned revenue	982,597
Total liabilities	$ 1,330,218
DEFERRED INFLOWS OF RESOURCES	
Unavailable revenue - property taxes	$ 85,504
Unavailable revenue - prepaid taxes	25,334
Total deferred inflows of resources	$ 110,838
FUND BALANCES	
Nonspendable	$ 53,942
Restricted	315,324
Unassigned	(191,414)
Total fund balances	$ 177,852
Total liabilities, deferred inflows of resources, and fund balances	$ 1,618,908

The notes to the financial statements are an integral part of this statement.

Exhibit 4

Town of Richlands, Virginia
Reconciliation of the Balance Sheet of Governmental Fund
to the Statement of Net Position
At June 30, 2019

Amounts reported for governmental activities in the Statement of Net Position are different because:		
Total fund balances per Exhibit 3 - Balance Sheet - Governmental Fund		$ 177,852
Capital assets used in governmental activities are not financial resources and, therefore, are not reported in the funds.		
Land	$ 1,357,395	
Buildings and improvements	2,223,297	
Machinery and equipment	811,042	
Infrastructure/utility plant and buildings in service	5,868,985	
Construction in progress	133,283	10,394,002
Other long-term assets are not available to pay for current-period expenditures and, therefore, are deferred in the funds.		
Unavailable revenue - property taxes		85,504
Deferred outflows of resources are not available to pay for current-period expenditures and, therefore, are not reported in the funds.		
Pension related items	$ 523,686	
OPEB related items	214,817	738,503
Long-term liabilities, including compensated absences, are not due and payable in the current period and, therefore, are not reported in the funds.		
Capital lease	$ (14,520)	
Compensated absences	(306,555)	
Net pension liability	(4,451,792)	
Net OPEB liability	(885,000)	(5,657,867)
Deferred inflows of resources are not due and payable in the current period and, therefore, are not reported in the funds.		
Pension related items	$ (484,847)	
OPEB related items	(144,000)	(628,847)
Net position of governmental activities		$ 5,109,147

The notes to the financial statements are an integral part of this statement.

Exhibit 5

Town of Richlands, Virginia
Statement of Revenues, Expenditures, and Changes in Fund Balances
Governmental Fund
For the Year Ended June 30, 2019

	General
REVENUES	
General property taxes	$ 466,610
Other local taxes	2,207,338
Permits, privilege fees, and regulatory licenses	1,145
Fines and forfeitures	49,339
Revenue from the use of money and property	10,125
Charges for services	1,240,329
Miscellaneous	102,805
Recovered costs	89,681
Intergovernmental	1,063,613
Total revenues	$ 5,230,985
EXPENDITURES	
Current:	
General government administration	$ 295,268
Public safety	2,806,069
Public works	1,483,770
Parks, recreation, and cultural	462,720
Community development	54,309
Capital projects	449,456
Debt service:	
Principal retirement	7,260
Total expenditures	$ 5,558,852
Excess (deficiency) of revenues over (under) expenditures	$ (327,867)
OTHER FINANCING SOURCES (USES)	
Issuance of capital lease	$ 21,780
Sale of capital assets	30,416
Total other financing sources (uses)	$ 52,196
Net change in fund balances	$ (275,671)
Fund balances - beginning	453,523
Fund balances - ending	$ 177,852

The notes to the financial statements are an integral part of this statement.

Exhibit 6

Town of Richlands, Virginia
Reconciliation of the Statement of Revenues,
Expenditures, and Changes in Fund Balances of Governmental Fund
to the Statement of Activities
For the Year Ended June 30, 2019

Amounts reported for governmental activities in the Statement of Activities are different because:		
Net change in fund balances - total governmental fund		$ (275,671)
Governmental funds report capital outlays as expenditures. However, in the Statement of Activities the cost of those assets is allocated over their estimated useful lives and reported as depreciation expense. This is the amount by which the depreciation expense exceeded capital outlays in the current period.		
Capital outlays	$ 455,767	
Depreciation expense	(594,355)	(138,588)
Revenues in the Statement of Activities that do not provide current financial resources are not reported as revenues in the funds.		
Property taxes		31,054
The issuance of long-term debt (e.g. bonds, leases) provides current financial resources to governmental funds, while the repayment of the principal of long-term debt consumes the current financial resources of governmental funds. Neither transaction, however, has any effect on net position. Also, governmental funds report the effect of premiums, discounts, and similar items when debt is first issued, whereas these amounts are deferred and amortized in the statement of activities. This amount is the net effect of these differences in the treatment of long-term debt and related items.		
Debt issued or incurred:		
Issuance of capital lease	$ (21,780)	
Principal repayments:		
Capital lease	7,260	(14,520)
Some expenses reported in the Statement of Activities do not require the use of current financial resources and, therefore are not reported as expenditures in governmental funds.		
Change in compensated absences	$ (38,438)	
Change in pension related items	186,025	
Change in OPEB related items	(34,254)	113,333
Change in net position of governmental activities		$ (284,392)

The notes to the financial statements are an integral part of this statement.

Exhibit 7

Town of Richlands, Virginia
Statement of Net Position
Proprietary Funds
At June 30, 2019

	Enterprise Funds		
	Water and Sewer	Electric	Total
ASSETS			
Current assets:			
Cash and cash equivalents	$ 2,346,186	$ 2,390,705	$ 4,736,891
Investments	166,971	261,575	428,546
Accounts receivable, net of allowances for uncollectibles	162,093	528,465	690,558
Due from other governmental units	1,063,990	-	1,063,990
Prepaid items	-	288,094	288,094
Total current assets	$ 3,739,240	$ 3,468,839	$ 7,208,079
Noncurrent assets:			
Restricted assets:			
Cash and cash equivalents	$ 59,744	$ 229,013	$ 288,757
Total restricted assets	$ 59,744	$ 229,013	$ 288,757
Capital assets:			
Utility plant and buildings in service	$ 21,215,821	$ 1,098,013	$ 22,313,834
Machinery and equipment	1,026,523	1,723,212	2,749,735
Land	517,913	-	517,913
Accumulated depreciation	(13,182,811)	(1,976,997)	(15,159,808)
Construction in progress	80,379	-	80,379
Net capital assets	$ 9,657,825	$ 844,228	$ 10,502,053
Total noncurrent assets	$ 9,717,569	$ 1,073,241	$ 10,790,810
Total assets	$ 13,456,809	$ 4,542,080	$ 17,998,889
DEFERRED OUTFLOWS OF RESOURCES			
Pension related items	$ 283,376	$ 177,179	$ 460,555
LIABILITIES			
Current liabilities:			
Accounts payable	$ 73,358	$ 435,231	$ 508,589
Accrued wages	14,695	5,815	20,510
Customers' deposits	59,744	229,013	288,757
Revenue bonds payable - current portion	44,844	-	44,844
GO and revenue bonds - current portion	87,195	-	87,195
Compensated absences - current portion	63,997	27,105	91,102
Total current liabilities	$ 343,833	$ 697,164	$ 1,040,997
Noncurrent liabilities:			
Revenue bonds payable - net of current portion	$ 515,702	$ -	$ 515,702
GO and revenue bonds - net of current portion	1,413,926	-	1,413,926
Compensated absences - net of current portion	21,332	9,035	30,367
Net pension liability	1,544,563	842,077	2,386,640
Total noncurrent liabilities	$ 3,495,523	$ 851,112	$ 4,346,635
Total liabilities	$ 3,839,356	$ 1,548,276	$ 5,387,632
DEFERRED INFLOWS OF RESOURCES			
Pension related items	$ 84,610	$ 43,265	$ 127,875
NET POSITION			
Net investment in capital assets	$ 7,596,158	$ 844,228	$ 8,440,386
Unrestricted	2,220,061	2,283,490	4,503,551
Total net position	$ 9,816,219	$ 3,127,718	$ 12,943,937

The notes to the financial statements are an integral part of this statement.

Exhibit 8

Town of Richlands, Virginia
Statement of Revenues, Expenses, and Changes in Net Position
Proprietary Funds
For the Year Ended June 30, 2019

	Enterprise Funds		
	Water and Sewer	Electric	Total
OPERATING REVENUES			
Charges for services:			
Charges for services	$ 2,559,548	$ 6,787,401	$ 9,346,949
Contract work	869	23,825	24,694
Lab testing and septic treatment	5,451	-	5,451
Penalties and service charges	35,556	89,444	125,000
Connection fees	1,550	-	1,550
Utility pole permits	-	19,265	19,265
Total operating revenues	$ 2,602,974	$ 6,919,935	$ 9,522,909
OPERATING EXPENSES			
Salaries, wages and fringes	$ 1,309,267	$ 725,438	$ 2,034,705
Insurance	28,352	11,770	40,122
Audit and legal	29,638	18,495	48,133
Dues, memberships and training	2,764	22,102	24,866
Office supplies and postage	22,017	12,144	34,161
Telecommunications	9,919	3,969	13,888
Equipment and vehicle maintenance	51,803	31,680	83,483
Supplies	249,406	58,400	307,806
Utilities	389,445	19,580	409,025
Heating oil/fuel	30,161	-	30,161
Traffic safety	-	2,248	2,248
Miscellaneous	13,681	23,615	37,296
Plant parts and repairs	15,731	-	15,731
Maintenance, repairs and upgrades	25,049	86,115	111,164
Instrument calibration	850	-	850
Power purchased	-	5,341,472	5,341,472
Street lighting	-	17,629	17,629
Distribution	-	8,483	8,483
Engineering	66,183	-	66,183
Testing	15,723	6,083	21,806
Capital outlays	810	-	810
Depreciation	529,741	97,017	626,758
Total operating expenses	$ 2,790,540	$ 6,486,240	$ 9,276,780
Operating income (loss)	$ (187,566)	$ 433,695	$ 246,129
NONOPERATING REVENUES (EXPENSES)			
Investment income	$ 5,041	$ 7,563	$ 12,604
Miscellaenous	1,421	540	1,961
Total nonoperating revenues (expenses)	$ 6,462	$ 8,103	$ 14,565
Change in net position	$ (181,104)	$ 441,798	$ 260,694
Total net position - beginning	9,997,323	2,685,920	12,683,243
Total net position - ending	$ 9,816,219	$ 3,127,718	$ 12,943,937

The notes to the financial statements are an integral part of this statement.

Exhibit 9

Town of Richlands, Virginia
Statement of Cash Flows
Proprietary Funds
For the Year Ended June 30, 2019

	Enterprise Fund		
	Water and Sewer	**Electric**	**Total**
CASH FLOWS FROM OPERATING ACTIVITIES			
Receipts from customers and users	$ 2,596,616	$ 6,999,422	$ 9,596,038
Payments to suppliers	(927,036)	(6,013,591)	(6,940,627)
Payments to and for employees	(1,325,879)	(692,231)	(2,018,110)
Net cash provided by (used for) operating activities	$ 343,701	$ 293,600	$ 637,301
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES			
Additions to utility plant	$ (134,770)	$ (23,838)	$ (158,608)
Proceeds from the sale of surplus	1,421	540	1,961
Principal payments on general obligation and revenue bonds	(132,037)	-	(132,037)
Capital contributions	60,660	-	60,660
Net cash provided by (used for) capital and related financing activities	$ (204,726)	$ (23,298)	$ (228,024)
CASH FLOWS FROM INVESTING ACTIVITIES			
Interest income	$ 3,526	$ 6,001	$ 9,527
Net cash provided by (used for) investing activities	$ 3,526	$ 6,001	$ 9,527
Net increase (decrease) in cash and cash equivalents	$ 142,501	$ 276,303	$ 418,804
Cash and cash equivalents - beginning	2,263,429	2,343,415	4,606,844
Cash and cash equivalents - ending (including restricted of $288,757)	$ 2,405,930	$ 2,619,718	$ 5,025,648
Reconciliation of operating income (loss) to net cash provided by (used for) operating activities:			
Operating income (loss)	$ (187,566)	$ 433,695	$ 246,129
Adjustments to reconcile operating income (loss) to net cash provided by (used for) operating activities:			
Depreciation	$ 529,741	$ 97,017	$ 626,758
(Increase) decrease in accounts receivable	(9,658)	73,602	63,944
(Increase) decrease in deferred outflows of resources	(105,438)	(61,636)	(167,074)
(Increase) decrease in prepaid items	-	(6,001)	(6,001)
Increase (decrease) in customer deposits	3,300	5,885	9,185
Increase (decrease) in accounts payable	24,496	(343,805)	(319,309)
Increase (decrease) in accrued wages	948	(916)	32
Increase (decrease) in compensated absences	(16,807)	2,266	(14,541)
Increase (decrease) in net pension liability	145,785	108,693	254,478
Increase (decrease) in deferred inflows of resources	(41,100)	(15,200)	(56,300)
Total adjustments	$ 531,267	$ (140,095)	$ 391,172
Net cash provided by (used for) operating activities	$ 343,701	$ 293,600	$ 637,301

The notes to the financial statements are an integral part of this statement.

Note 1-Summary of Significant Accounting Policies:

The financial statements of the Town of Richlands, Virginia have been prepared in conformity with the specifications promulgated by the Auditor of Public Accounts (APA) of the Commonwealth of Virginia, and the accounting principles generally accepted in the United States as specified by the Governmental Accounting Standards Board. The more significant of the government's accounting policies are described below.

A. Financial reporting entity:

The Town is a municipal corporation governed by an elected seven-member Town Council. The accompanying financial statements present the government. Related organizations, if any, are described below.

Blended Component Units - None

Discretely Presented Component Units - None

Related Organizations - None

Jointly Governed Organizations - None

B. Government-wide and fund financial statements:

The government-wide financial statements (i.e., the Statement of Net Position and the Statement of Activities) report information on all of the nonfiduciary activities of the primary government. For the most part, the effect of interfund activity has been removed from these statements. *Governmental activities*, which normally are supported by taxes and intergovernmental revenues, are reported separately from *business-type activities*, which rely to a significant extent on fees and charges for support.

The Statement of Net Position is designed to display the financial position of the primary government (governmental and business-type activities). Governments will report all capital assets in the government-wide Statement of Net Position and will report depreciation expense – the cost of "using up" capital assets – in the Statement of Activities. The net position of a government will be broken down into three categories – 1) net investment in capital assets; 2) restricted; and 3) unrestricted.

The Statement of Activities demonstrates the degree to which the direct expenses of a given function or segment are offset by program revenues. *Direct expenses* are those that are clearly identifiable with a specific function or segment. *Program revenues* include 1) charges to customers or applicants who purchase, use, or directly benefit from goods, services, or privileges provided by a given function or segment and 2) grants and contributions that are restricted to meeting the operational or capital requirements of a particular function or segment. Taxes and other items not properly included among program revenues are reported instead as *general revenues*.

Note 1-Summary of Significant Accounting Policies: (Continued)

C. Measurement focus, basis of accounting, and financial statement presentation:

Budgetary Comparison Schedules demonstrate compliance with the adopted budget, which is an important component of a government's accountability to the public. Many citizens participate in one way or another in the process of establishing the annual operating budgets of state and local governments, and have a keen interest in following the actual financial progress of their governments over the course of the year. Many governments revise their original budgets over the course of the year for a variety of reasons. The budgetary comparison schedules present the original budget, the final budget, and the actual activity of the major governmental funds.

The government-wide financial statements are reported using the *economic resources measurement focus* and the *accrual basis of accounting*, as is the proprietary fund. Revenues are recorded when earned and expenses are recorded when a liability is incurred, regardless of the timing of related cash flows. Property taxes are recognized as revenues in the year for which they are levied. Grants and similar items are recognized as revenue as soon as all eligibility requirements imposed by the provider have been met.

Governmental fund financial statements are reported using the *current financial resources measurement focus* and the *modified accrual basis of accounting*. Revenues are recognized as soon as they are both measurable and available. Revenues are considered to be *available* when they are collectible within the current period or soon enough thereafter to pay liabilities of the current period. For this purpose, the government considers revenues to be available if they are collected within 60 days of the end of the current fiscal period. Expenditures generally are recorded when a liability is incurred, as under accrual accounting. However, expenditures related to compensated absences and claims and judgments, are recorded only when payment is due.

Property taxes, franchise taxes, licenses, and interest associated with the current fiscal period are all considered to be susceptible to accrual and so have been recognized as revenues of the current fiscal period. Accordingly, real and personal property taxes are recorded as revenues and receivables when billed, net of allowances for uncollectible amounts. Property taxes not collected within 60 days after year-end are reflected as unavailable revenues. Sales and utility taxes, which are collected by the state or utilities and subsequently remitted to the Town, are recognized as revenues and receivables upon collection by the state or utility, which is generally in the month preceding receipt by the Town.

Licenses, permits, fines and rents are recorded as revenues when received. Intergovernmental revenues, consisting primarily of federal, state and other grants for the purpose of funding specific expenditures, are recognized when earned or at the time of the specific expenditure. Revenues from general-purpose grants are recognized in the period to which the grant applies. All other revenue items are considered to be measurable and available only when the government receives cash.

Note 1-Summary of Significant Accounting Policies: (Continued)

C. Measurement focus, basis of accounting, and financial statement presentation: (Continued)

The Town reports the following major governmental fund:

The *general fund* is the Town's primary operating fund. It accounts for and reports all financial resources of the general government, except those required to be accounted for in other funds. All general tax revenue and other receipts that are not restricted by law or contractual agreement to some other fund are accounted for in this fund. General operating expenditures, fixed charges, and capital improvement costs that are not paid through other funds are paid from the general fund.

The Town reports the following major proprietary funds:

Proprietary funds account for operations that are financed in a manner similar to private business enterprises. The proprietary funds utilize the accrual basis of accounting where the measurement focus is upon determination of net income, financial position, and changes in financial position. Proprietary funds consist of enterprise funds.

The Town operates a sewage collection and treatment system and a water distribution system. The activities of the systems are accounted for in the water and sewer fund.

The Town operates an electric distribution system. The activities of the system are accounted for in the electric fund.

As a general rule the effect of interfund activity has been eliminated from the government-wide financial statements. Exceptions to this general rule are other charges between the government's water and sewer function and various other functions of the government. Elimination of these charges would distort the direct costs and program revenues reported for the various functions concerned.

Amounts reported as *program revenues* include 1) charges to customers or applicants for goods, services, or privileges provided, 2) operating grants and contributions, and 3) capital grants and contributions, including special assessments. Internally dedicated resources are reported as *general revenues* rather than as program revenues. Likewise, general revenues include all taxes.

Proprietary funds distinguish *operating* revenues and expenses from *nonoperating* items. Operating revenues and expenses generally result from providing services and producing and delivering goods in connection with a proprietary fund's principal ongoing operations. The principal operating revenues of the Town's enterprise funds are charges to customers for sales and services. The Town also recognizes as operating revenue the portion of tap fees intended to recover the cost of connecting new customers to the system. Operating expenses for enterprise funds include the cost of sales and services, administrative expense, and depreciation on capital assets. All revenues and expenses not meeting this definition are reported as nonoperating revenues and expenses.

Note 1-Summary of Significant Accounting Policies: (Continued)

D. Assets, liabilities, deferred outflows/inflows of resources, and net position/fund balance:

1. Cash and Cash Equivalents

The government's cash and cash equivalents are considered to be cash on hand, demand deposits, and short-term investments with original maturities of three months or less from the date of acquisition.

2. Prepaid Expenses

Prepaid expenses are for payments made by the Town in the current fiscal year to provide services occurring in the subsequent fiscal year.

3. Receivables and Payables

Activity between funds that are representative of lending/borrowing arrangements outstanding at the end of the fiscal year are referred to as "due to/from other funds." All other outstanding balances between funds are "advances to/from other funds."

All trade and property tax receivables are shown net of an allowance for uncollectibles. The Town calculates its allowance for uncollectible accounts using historical collection data and, in certain cases, specific account analysis.

4. Allowance for Uncollectible Accounts

For the General Fund, the allowance amounted to approximately $12,130 for property taxes, $12,106 for garbage billings, and $89,263 for EMS billings at June 30, 2019. For the Proprietary Funds, the allowance amounted to approximately $23,056 for water and sewer billings and $64,683 for electric billings at June 30, 2019.

5. Property Taxes

Property is assessed at its value on January 1. Property taxes attach as an enforceable lien on property as of December 31st. Taxes are payable in December of the following fiscal year. The Town bills and collects its own property taxes.

6. Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Accordingly, actual results could differ from those estimates.

Note 1-Summary of Significant Accounting Policies: (Continued)

D. Assets, liabilities, deferred outflows/inflows of resources, and net position/fund balance: (Continued)

7. Compensated Absences

Vested or accumulated vacation leave that is expected to be liquidated with expendable available financial resources is reported as an expenditure and a fund liability of the governmental fund that will pay it. No liability is recorded for non-vesting accumulating rights to receive sick pay benefits. The Town accrues salary-related payments associated with the payment of compensated absences. All vacation pay is accrued when incurred in the government-wide and proprietary fund financial statements.

8. Capital Assets

Capital assets, which include property, plant, equipment, and infrastructure assets (e.g., roads, bridges, sidewalks, and similar items), are reported in the applicable governmental or business-type activities columns in the government-wide financial statements. Capital assets are defined by the government as assets with an initial, individual cost of more than $5,000 (amount not rounded) and an estimated useful life in excess of one year. Such assets are recorded at historical cost or estimated historical cost if purchased or constructed. Donated capital assets are recorded at acquisition value at the date of donation.

The cost of normal maintenance and repairs that do not add to the value of the asset or materially extend the asset's life are not capitalized. Major outlays for capital assets and improvements are capitalized as projects are constructed. Interest incurred during the construction phase of capital assets of business-type activities is included as part of the capitalized value of the assets constructed. No interest was capitalized during the current or previous year.

Property, plant, and equipment and infrastructure of the primary government is depreciated using the straight-line method over the following estimated useful lives:

Assets	Years
Buildings	40-50
Plant, equipment and system	10-50
Infrastructure	20-25
Machinery and equipment	3-20

Note 1-Summary of Significant Accounting Policies: (Continued)

D. Assets, liabilities, deferred outflows/inflows of resources, and net position/fund balance: (Continued)

9. Deferred Outflows/Inflows of Resources

In addition to assets, the statement of financial position will sometimes report a separate section for deferred outflows of resources. This separate financial statement element, deferred outflows of resources, represents a consumption of net position that applies to a future period(s) and so will not be recognized as an outflow of resources (expense) until then. The Town has one item that qualifies for reporting in this category. It is comprised of certain items related to the measurement of the net pension liability and net OPEB liability and contributions to the pension and OPEB plans made during the current year and subsequent to the net pension liability and net OPEB liability measurement date. For more detailed information on these items, reference the related notes.

In addition to liabilities, the statement of financial position will sometimes report a separate section for deferred inflows of resources. This separate financial statement element, deferred inflows of resources, represents an acquisition of net position that applies to a future period(s) and so will not be recognized as an inflow of resources (revenue) until that time. The Town has two types of items that qualify for reporting in this category. Under a modified accrual basis of accounting, unavailable revenue representing property taxes receivable is reported in the governmental funds balance sheet. This amount is comprised of uncollected property taxes due prior to June 30 and prepaid tax amounts and is deferred and recognized as an inflow of resources in the period that the amount becomes available. Under the accrual basis, prepaid amounts are reported as deferred inflows of resources. In addition, certain items related to the measurement of the net pension liability and net OPEB liability are reported as deferred inflows of resources. For more detailed information on these items, reference the related notes.

10. Long-Term Obligations

In the government-wide financial statements and proprietary fund types in the fund financial statements long-term obligations are reported as liabilities in the applicable governmental activities, business-type activities, or proprietary fund type Statement of Net Position. Bond premiums and discounts are deferred and amortized over the life of the bonds using the effective interest method. Bonds payable are reported net of the applicable bond premium or discount.

In the fund financial statements, governmental fund types recognize bond premiums and discounts during the current period. The face amount of debt issued is reported as other financing sources. Premiums received on debt issuances are reported as other financing sources while discounts on debt issuances are reported as other financing uses.

Note 1-Summary of Significant Accounting Policies: (Continued)

D. Assets, liabilities, deferred outflows/inflows of resources, and net position/fund balance: (Continued)

11. Pensions

For purposes of measuring the net pension liability, deferred outflows of resources and deferred inflows of resources related to pensions, and pension expense, information about the fiduciary net position of the Town Retirement Plan's and the additions to/deductions from the Town Retirement Plan's net fiduciary position have been determined on the same basis as they were reported by the Virginia Retirement System (VRS). For this purpose, benefit payments (including refunds of employee contributions) are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

12. Other Postemployment Benefits (OPEB) – Line of Duty Act Program

For purposes of measuring the net LODA OPEB liability, deferred outflows of resources and deferred inflows of resources related to the LODA OPEB, and related LODA OPEB expense, information about the fiduciary net position of the VRS LODA Program OPEB Plan and the additions to/deductions from the VRS LODA Program OPEB Plan's net fiduciary position have been determined on the same basis as they were reported by VRS. In addition, benefit payments are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

13. Net Position

Net position is the difference between (a) assets and deferred outflows of resources and (b) liabilities and deferred inflows of resources. Net investment in capital assets represents capital assets, less accumulated depreciation, less any outstanding debt related to the acquisition, construction or improvement of those assets. Deferred outflows of resources and deferred inflows of resources that are attributable to the acquisition, construction, or improvement of those assets or related debt are also included in this component of net position.

14. Net Position Flow Assumption

Sometimes the Town will fund outlays for a particular purpose from both restricted (e.g., restricted bond or grant proceeds) and unrestricted resources. In order to calculate the amounts to report as restricted – net position and unrestricted – net position in the government-wide and proprietary fund financial statements, a flow assumption must be made about the order in which the resources are considered to be applied. It is the Town's policy to consider restricted – net position to have been depleted before unrestricted – net position is applied.

Note 1-Summary of Significant Accounting Policies: (Continued)

D. Assets, liabilities, deferred outflows/inflows of resources, and net position/fund balance: (Continued)

15. Concentration of Credit Risk

The Town has a credit risk associated with water, sewer, and electric fund accounts receivable due to geographic proximity of the Town's customers. The risk is mitigated by the large number of customers and relatively low individual balances.

16. Fund Balance

The following classifications describe the relative strength of the spending constraints placed on the purposes for which resources can be used:

- Nonspendable fund balance – amounts that are not in spendable form (such as inventory and prepaids) or are required to be maintained intact (corpus of a permanent fund);
- Restricted fund balance – amounts constrained to specific purposes by their providers (such as grantors, bondholders, and higher levels of government), through constitutional provisions, or by enabling legislation;
- Committed fund balance – amounts constrained to specific purposes by a government itself, using its highest level of decision-making authority; to be reported as committed, amounts cannot be used for any other purpose unless the government takes the same highest level action to remove or change the constraint;
- Assigned fund balance – amounts a government intends to use for a specific purpose; intent can be expressed by the governing body or by an official or body to which the governing body delegates the authority;
- Unassigned fund balance – amounts that are available for any purpose; positive amounts are only reported in the general fund.

When fund balance resources are available for a specific purpose in more than one classification, it is the Town's policy to use the most restrictive funds first in the following order: restricted, committed, assigned, and unassigned as they are needed.

The Town establishes (and modifies or rescinds) fund balance commitments by passage of a resolution. This is typically done through adoption and amendment of the budget. A fund balance commitment is further indicated in the budget document as a designation or commitment of the fund (such as for special incentives). Assigned fund balance is established by the Town Council through adoption or amendment of the budget as intended for specific purpose (such as the purchase of capital assets, construction, debt service, or for other purposes).

Note 2-Stewardship, Compliance, and Accountability:

A. Budgetary information

The following procedures are used by the Town in establishing the budgetary data reflected in the financial statements:

1. The Town Manager submits to the Town Council a proposed operating and capital budget for the fiscal year commencing the following July 1. The operating and capital budget includes proposed expenditures and the means of financing them. The General fund has a legally adopted budget.
2. Public hearings are conducted to obtain citizen comments.
3. Prior to June 30, the budget is legally enacted through passage of an Appropriations Resolution.
4. The Appropriations Resolution places legal restrictions on expenditures at the function level. Only the Town Council can revise the appropriation for each category. The Town Manager is authorized to transfer budgeted amounts within general government departments.
5. Formal budgetary integration is employed as a management control device during the year for the General Fund.
6. All budgets are adopted on a basis consistent with generally accepted accounting principles (GAAP).
7. Appropriations lapse on June 30, for all Town units.
8. Encumbrance accounting, under which purchase orders, contracts, and other commitments for the expenditure of monies are recorded in order to commit that portion of the applicable appropriations, is not part of the Town's accounting system.

B. Excess of expenditures over appropriations

The general fund had expenditures in excess of appropriations as measured at the fund basis level.

c. Deficit fund equity

At June 30, 2019, there were no funds with deficit fund equity.

Note 3-Deposits and Investments:

Deposits:
Deposits with banks are covered by the Federal Deposit Insurance Corporation (FDIC) and collateralized in accordance with the Virginia Security for Public Deposits Act (the "Act"), Section 2.2-4400 et. Seq. of the Code of Virginia. Under the Act, banks and savings institutions holding public deposits in excess of the amount insured by the FDIC must pledge collateral to the Commonwealth of Virginia Treasury Board. Financial Institutions may choose between two collateralization methodologies and depending upon that choice, will pledge collateral that ranges in the amounts from 50% to 130% of excess deposits. Accordingly, all deposits are considered fully collateralized.

Note 3-Deposits and Investments: (Continued)

Investments:
Statutes authorize local governments and other public bodies to invest in obligations of the United States or agencies thereof, obligations of the Commonwealth of Virginia or political subdivisions thereof, obligations of the International Bank for Reconstruction and Development (World Bank), the Asian Development Bank, the African Development Bank, "prime quality" commercial paper and certain corporate notes, bankers' acceptances, repurchase agreements, and the State Treasurer's Local Government Investment Pool (LGIP).

The investments, as reported in the financial statements as of June 30, 2019, consist of non-negotiable certificates of deposit with original maturity dates of 12 months and have a balance of $542,030 at year end.

Note 4-Due from Other Governmental Units:

The following amounts represent receivables from other governments at year-end:

	General Fund	Water and Sewer Fund
Local Government:		
Tazewell County Public Service Authority	$ -	$ 1,063,990
Commonwealth of Virginia:		
Non-categorical aid	555	-
State sales tax	67,881	-
Federal Government:		
Categorical aid	18,513	-
Total	$ 86,949	$ 1,063,990

Note 5-Long-Term Obligations:

Governmental Activities Obligations:

The following is a summary of long-term obligation transactions of the Town for the year ended June 30, 2019.

	Balance July 1, 2018	Increases/ Issuances	Decreases/ Retirements	Balance June 30, 2019
Capital lease	$ -	$ 21,780	$ (7,260)	$ 14,520
Compensated absences	268,117	239,526	(201,088)	306,555
Net pension liability	4,740,327	726,358	(1,014,893)	4,451,792
Net OPEB liability	691,000	367,000	(173,000)	885,000
Total	$ 5,699,444	$ 1,354,664	$ (1,396,241)	$ 5,657,867

Details of long-term obligations:

Type/ Project	Interest Rates	Issue Date	Final Maturity Date	Amount of Original Issue	Balance Governmental Activities	Amount Due Within One Year
Other Obligations:						
Capital lease	0.00%	Nov-18	2021	$ 21,780	$ 14,520	$ 7,620
Compensated Absences	n/a	n/a	n/a	n/a	306,555	229,916
Net pension liability	n/a	n/a	n/a	n/a	4,451,792	-
Net OPEB liability	n/a	n/a	n/a	n/a	885,000	-
Total Other Obligations					$ 5,657,867	$ 237,536
Total Long-term obligations					$ 5,657,867	$ 237,536

Other obligations are typically liquidated by the general fund.

Note 5-Long-Term Obligations: (Continued)

Business-type Activities Obligations:

The following is a summary of long-term obligation transactions of the Enterprise Fund for the year ended June 30, 2019.

	Balance July 1, 2018	Increases/ Issuances	Decreases/ Retirements	Balance June 30, 2019
Direct borrowings and placements:				
GO and revenue bonds	$ 1,588,315	$ -	$ (87,194)	$ 1,501,121
Revenue bond	605,389	-	(44,843)	560,546
Compensated absences	136,010	87,467	(102,008)	121,469
Net pension liability	2,132,162	655,771	(401,293)	2,386,640
Total	$ 4,461,876	$743,238	$ (635,338)	$ 4,569,776

Annual requirements to amortize long-term obligations and the related interest are as follows:

	Direct Borrowings and Placements			
Year Ending	GO and Revenue Bonds		Revenue Bond	
June 30,	Principal	Interest	Principal	Interest
2020	$ 87,195	$ -	$ 44,844	$ -
2021	87,195	-	44,844	-
2022	87,195	-	44,844	-
2023	87,195	-	44,844	-
2024	87,195	-	44,844	-
2025-2029	435,973	-	224,218	-
2030-2034	418,473	-	112,108	-
2035-2037	210,700	-	-	-
Totals	$ 1,501,121	$ -	$ 560,546	$ -

Note 5-Long-Term Obligations: (Continued)

Business-type Activities Obligations: (Continued)

Details of long-term obligations:

	Interest Rates	Issue Date	Final Maturity Date	Amount of Original Issue	Balance Business-type Activities	Amount Due Within One Year
Direct Borrowings and Placements:						
Revenue Bond:						
Wastewater Series 2010	0.00%	2010	2024	$1,121,250	$ 560,546	$ 44,844
General Obligation and Revenue Bonds:						
Series 2000	0.00%	2000	2031	175,000	70,000	5,834
Series 2005	0.00%	2005	2037	2,002,799	1,168,299	66,760
Series 2006	0.00%	2006	2037	438,037	262,822	14,601
Total Direct Borrowings and Placements					$ 2,061,667	$ 132,039
Other Obligations:						
Compensated Absences	n/a	n/a	n/a	n/a	$ 121,469	$ 91,102
Net Pension Liability	n/a	n/a	n/a	n/a	2,386,640	-
Total other obligations					$ 2,508,109	$ 91,102
Total long-term obligations					$ 4,569,776	$ 223,141

Revenue bonds are secured by revenue of the water/sewer fund.

Other obligations of the electric and water/sewer fund are typically liquidated by those funds.

The Town's general obligation bonds are subject to the State intercept program under which State funds may be withheld and remitted to bond holders upon the event of default.

In the event of default, outstanding amounts on bonds (all types) may become due and payable at the option of the bondholder(s).

Note 6-Capital Lease:

The Town has entered into a capital lease for the purchase of a Stryker Flex Power Pro Ambulance Cot and Stair-Pro Model 6252. This lease agreement qualifies as a capital lease for accounting purposes and therefore has been recorded at the present value of future minimum lease payments as of the inception date.

Total capital assets acquired through capital leases are as follows:

Stryker Flex Power Pro Ambulance Cot	$	18,457
Accumulated Depreciation		(2,245)
Net Book Value of Capital Asset	$	16,212

The Stair-Pro Model 6252 did not meet the Town's capitalization threshold, therefore it was not capitalized.

Present value of future minimum lease payments:

Year Ending June 30,		Capital Leases
2020	$	7,260
2021		7,260
Total minimum lease payments	$	14,520
Less: amount representing interest		-
Present value of future minimum lease payments	$	14,520

Note 7-Pension Plan:

Plan Description

All full-time, salaried permanent employees of the Town are automatically covered by a VRS Retirement Plan upon employment. This is an agent multiple-employer plan administered by a Virginia Retirement System (the System) along with plans for other employer groups in the Commonwealth of Virginia. Members earn one month of service credit for each month they are employed and for which they and their employer pay contributions to VRS. Members are eligible to purchase prior service, based on specific criteria as defined in the Code of Virginia, as amended. Eligible prior service that may be purchased includes prior public service, active military service, certain periods of leave, and previously refunded service.

Note 7-Pension Plan: (Continued)

Benefit Structures

The System administers three different benefit structures for covered employees – Plan 1, Plan 2 and Hybrid. Each of these benefit structures has different eligibility criteria, as detailed below.

a. Employees hired before July 1, 2010, vested as of January 1, 2013, and have not taken a refund, are covered under Plan 1, a defined benefit plan. Non-hazardous duty employees are eligible for an unreduced retirement benefit beginning at age 65 with at least 5 years of creditable service or age 50 with at least 30 years of creditable service. Non-hazardous duty employees may retire with a reduced benefit as early as age 55 with at least 5 years of creditable service or age 50 with at least 10 years of creditable service. Hazardous duty employees (law enforcement officers, firefighters, and sheriffs) are eligible for an unreduced benefit beginning at age 60 with at least 5 years of creditable service or age 50 with at least 25 years of creditable service. Hazardous duty employees may retire with a reduced benefit as early as age 50 with at least 5 years of creditable service.

b. Employees hired on or after July 1, 2010, or their membership date is before July 1, 2010, and they were not vested as of January 1, 2013 are covered under Plan 2, a defined benefit plan. Non-hazardous duty employees are eligible for an unreduced benefit beginning at their normal social security retirement age with at least 5 years of creditable service or when the sum of their age and service equals 90. Non-hazardous duty employees may retire with a reduced benefit as early as age 60 with at least 5 years of creditable service. Hazardous duty employees are eligible for an unreduced benefit beginning at age 60 with at least 5 years of creditable service or age 50 with at least 25 years of creditable service. Hazardous duty employees may retire with a reduced benefit as early as age 50 with at least 5 years of creditable service.

c. Non-hazardous duty employees hired on or after January 1, 2014 are covered by the Hybrid Plan combining the features of a defined benefit plan and a defined contribution plan. Plan 1 and Plan 2 members also had the option of opting into this plan during the election window held January 1 – April 30, 2014 with an effective date of July 1, 2014. Employees covered by this plan are eligible for an unreduced benefit beginning at their normal social security retirement age with at least 5 years of creditable service, or when the sum of their age and service equal 90. Employees may retire with a reduced benefit as early as age 60 with at least 5 years of creditable service. For the defined contribution component, members are eligible to receive distributions upon leaving employment, subject to restrictions.

Note 7-Pension Plan: (Continued)

Average Final Compensation and Service Retirement Multiplier

The VRS defined benefit is a lifetime monthly benefit based on a retirement multiplier as a percentage of the employee's average final compensation multiplied by the employee's total creditable service. Under Plan 1, average final compensation is the average of the employee's 36 consecutive months of highest compensation and the multiplier is 1.7% for non-hazardous duty employees, 1.85% for sheriffs and regional jail superintendents, and 1.7% or 1.85% for hazardous duty employees as elected by the employer. Under Plan 2, average final compensation is the average of the employee's 60 consecutive months of highest compensation and the retirement multiplier is 1.65% for non-hazardous duty employees, 1.85% for sheriffs and regional jail superintendents, and 1.7% or 1.85% for hazardous duty employees as elected by the employer. Under the Hybrid Plan, average final compensation is the average of the employee's 60 consecutive months of highest compensation and the multiplier is 1.00%. For members who opted into the Hybrid Retirement Plan from Plan 1 or Plan 2, the applicable multipliers for those plans will be used to calculate the retirement benefit for service credited in those plans.

Cost-of-Living Adjustment (COLA) in Retirement and Death and Disability Benefits

Retirees with an unreduced benefit or with a reduced benefit with at least 20 years of creditable service are eligible for an annual COLA beginning July 1 after one full calendar year from the retirement date. Retirees with a reduced benefit and who have less than 20 years of creditable service are eligible for an annual COLA beginning on July 1 after one calendar year following the unreduced retirement eligibility date. Under Plan 1, the COLA cannot exceed 5.00%. Under Plan 2 and the Hybrid Plan, the COLA cannot exceed 3.00%. The VRS also provides death and disability benefits. Title 51.1 of the Code of Virginia, as amended, assigns the authority to establish and amend benefit provisions to the General Assembly of Virginia.

Employees Covered by Benefit Terms

As of the June 30, 2017 actuarial valuation, the following employees were covered by the benefit terms of the pension plan:

	Number
Inactive members or their beneficiaries currently receiving benefits	28
Inactive members:	
Vested inactive members	3
Non-vested inactive members	10
Inactive members active elsewhere in VRS	5
Total inactive members	18
Active members	73
Total covered employees	119

Note 7-Pension Plan: (Continued)

Contributions

The contribution requirement for active employees is governed by §51.1-145 of the Code of Virginia, as amended, but may be impacted as a result of funding options provided to political subdivisions by the Virginia General Assembly. Employees are required to contribute 5.00% of their compensation toward their retirement.

The Town's contractually required employer contribution rate for the year ended June 30, 2019 was 21.02% of covered employee compensation. This rate was based on an actuarially determined rate from an actuarial valuation as of June 30, 2017.

This rate, when combined with employee contributions, was expected to finance the costs of benefits earned by employees during the year, with an additional amount to finance any unfunded accrued liability. Contributions to the pension plan from the Town were $601,271 and $573,053 for the years ended June 30, 2019 and June 30, 2018, respectively.

Net Pension Liability

The net pension liability (NPL) is calculated separately for each employer and represents that particular employer's total pension liability determined in accordance with GASB Statement No. 68, less that employer's fiduciary net position. The Town's net pension liability was measured as of June 30, 2018. The total pension liability used to calculate the net pension liability was determined by an actuarial valuation performed as of June 30, 2017 and rolled forward to the measurement date of June 30, 2018.

Actuarial Assumptions – General Employees

The total pension liability for General Employees in the Town's Retirement Plan was based on an actuarial valuation as of June 30, 2017, using the Entry Age Normal actuarial cost method and the following assumptions, applied to all periods included in the measurement and rolled forward to the measurement date of June 30, 2018.

Inflation	2.5%
Salary increases, including inflation	3.5% – 5.35%
Investment rate of return	7.0%, net of pension plan investment expense, including inflation*

* Administrative expenses as a percent of the market value of assets for the last experience study were found to be approximately 0.06% of the market assets for all of the VRS plans. This would provide an assumed investment return rate for GASB purposes of slightly more than the assumed 7.0%. However, since the difference was minimal, and a more conservative 7.0% investment return assumption provided a projected plan net position that exceeded the projected benefit payments, the long-term expected rate of return on investments was assumed to be 7.0% to simplify preparation of pension liabilities.

Note 7-Pension Plan: (Continued)

Actuarial Assumptions – General Employees (Continued)

Mortality rates:

Largest 10 – Non-Hazardous Duty: 20% of deaths are assumed to be service related

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with scale BB to 2020; males 95% of rates; females 105% of rates.

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with scale BB to 2020; males set forward 3 years; females 1.0% increase compounded from ages 70 to 90.

Post-Disablement:

RP-2014 Disability Mortality Rates projected with scale BB to 2020; males set forward 2 years, 110% of rates; females 125% of rates.

All Others (Non 10 Largest) – Non-Hazardous Duty: 15% of deaths are assumed to be service related

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with scale BB to 2020; males 95% of rates; females 105% of rates.

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with scale BB to 2020; males set forward 3 years; females 1.0% increase compounded from ages 70 to 90.

Post-Disablement:

RP-2014 Disability Mortality Rates projected with scale BB to 2020; males set forward 2 years, 110% of rates; females 125% of rates.

Note 7-Pension Plan: (Continued)

Actuarial Assumptions – General Employees (Continued)

The actuarial assumptions used in the June 30, 2017 valuation were based on the results of an actuarial experience study for the period from July 1, 2012 through June 30, 2016. Changes to the actuarial assumptions as a result of the experience study are as follows:

Largest 10 – Non-Hazardous Duty:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Lowered rates at older ages and changed final retirement from 70 to 75
Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
Disability Rates	Lowered rates
Salary Scale	No change
Line of Duty Disability	Increased rate from 14% to 20%

All Others (Non 10 Largest) – Non-Hazardous Duty:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Lowered rates at older ages and changed final retirement from 70 to 75
Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
Disability Rates	Lowered rates
Salary Scale	No change
Line of Duty Disability	Increased rate from 14% to 15%

Actuarial Assumptions – Public Safety Employees with Hazardous Duty Benefits

The total pension liability for Public Safety employees with Hazardous Duty Benefits in the Town's Retirement Plan was based on an actuarial valuation as of June 30, 2017, using the Entry Age Normal actuarial cost method and the following assumptions, applied to all periods included in the measurement and rolled forward to the measurement date of June 30, 2018.

Inflation	2.5%
Salary increases, including inflation	3.5% – 4.75%
Investment rate of return	7.0%, net of pension plan investment expense, including inflation*

Note 7-Pension Plan: (Continued)

Actuarial Assumptions – Public Safety Employees with Hazardous Duty Benefits (Continued)

* Administrative expenses as a percent of the market value of assets for the last experience study were found to be approximately 0.06% of the market assets for all of the VRS plans. This would provide an assumed investment return rate for GASB purposes of slightly more than the assumed 7.0%. However, since the difference was minimal, and a more conservative 7.0% investment return assumption provided a projected plan net position that exceeded the projected benefit payments, the long-term expected rate of return on investments was assumed to be 7.0% to simplify preparation of pension liabilities.

Mortality rates:

Largest 10 – Hazardous Duty: 70% of deaths are assumed to be service related

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with scale BB to 2020; males 90% of rates; females set forward 1 year.

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with scale BB to 2020; males set forward 1 year, 1.0% increase compounded from ages 70 to 90; females set forward 3 years.

Post-Disablement:

RP-2014 Disability Mortality Rates projected with scale BB to 2020; males set forward 2 years; unisex using 100% male.

All Others (Non 10 Largest) – Hazardous Duty: 45% of deaths are assumed to be service related

Pre-Retirement:

RP-2014 Employee Rates to age 80, Healthy Annuitant Rates at ages 81 and older projected with scale BB to 2020; males 90% of rates; females set forward 1 year.

Post-Retirement:

RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with scale BB to 2020; males set forward 1 year, 1.0% increase compounded from ages 70 to 90; females set forward 3 years.

Post-Disablement:

RP-2014 Disability Mortality Rates projected with scale BB to 2020; males set forward 2 years; unisex using 100% male.

Note 7-Pension Plan: (Continued)

Actuarial Assumptions – Public Safety Employees with Hazardous Duty Benefits (Continued)

The actuarial assumptions used in the June 30, 2017 valuation were based on the results of an actuarial experience study for the period from July 1, 2012 through June 30, 2016. Changes to the actuarial assumptions as a result of the experience study are as follows:

Largest 10 – Hazardous Duty:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Lowered rates at older ages
Withdrawal Rates	Adjusted rates to better fit experience
Disability Rates	Increased rates
Salary Scale	No change
Line of Duty Disability	Increased rate from 60% to 70%

All Others (Non 10 Largest) – Hazardous Duty:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Increased age 50 rates, and lowered rates at older ages
Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
Disability Rates	Adjusted rates to better fit experience
Salary Scale	No change
Line of Duty Disability	Decreased rate from 60% to 45%

Note 7-Pension Plan: (Continued)

Long-Term Expected Rate of Return

The long-term expected rate of return on pension System investments was determined using a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected returns, net of pension System investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The target asset allocation and best estimate of arithmetic real rates of return for each major asset class are summarized in the following table:

Asset Class (Strategy)	Target Allocation	Arithmetic Long-term Expected Rate of Return	Weighted Average Long-term Expected Rate of Return
Public Equity	40.00%	4.54%	1.82%
Fixed Income	15.00%	0.69%	0.10%
Credit Strategies	15.00%	3.96%	0.59%
Real Assets	15.00%	5.76%	0.86%
Private Equity	15.00%	9.53%	1.43%
Total	100.00%		4.80%
		Inflation	2.50%
		*Expected arithmetic nominal return	7.30%

* The above allocation provides a one-year return of 7.30%. However, one-year returns do not take into account the volatility present in each of the asset classes. In setting the long-term expected return for the system, stochastic projections are employed to model future returns under various economic conditions. The results provide a range of returns over various time periods that ultimately provide a median return of 6.83%, including expected inflation of 2.50%.

Note 7-Pension Plan: (Continued)

Discount Rate

The discount rate used to measure the total pension liability was 7.00%. The projection of cash flows used to determine the discount rate assumed that System member contributions will be made per the VRS Statutes and the employer contributions will be made in accordance with the VRS funding policy at rates equal to the difference between actuarially determined contribution rates adopted by the VRS Board of Trustees and the member rate. Consistent with the phased-in funding provided by the General Assembly for state and teacher employer contributions; the Town was also provided with an opportunity to use an alternative employer contribution rate. For the year ended June 30, 2018, the alternate rate was the employer contribution rate used in FY 2012 or 90% of the actuarially determined employer contribution rate from the June 30, 2015 actuarial valuations, whichever was greater. From July 1, 2018 on, participating employers are assumed to continue to contribute 100% of the actuarially determined contribution rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current active and inactive employees. Therefore the long-term expected rate of return was applied to all periods of projected benefit payments to determine the total pension liability.

Changes in Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at June 30, 2017	$ 12,738,522	$ 5,866,033	$ 6,872,489
Changes for the year:			
Service cost	$ 243,691	$ -	$ 243,691
Interest	868,052	-	868,052
Differences between expected and actual experience	(9,905)	-	(9,905)
Contributions - employer	-	573,053	(573,053)
Contributions - employee	-	132,681	(132,681)
Net investment income	-	434,183	(434,183)
Benefit payments, including refunds of employees contributions	(675,568)	(675,568)	-
Administrative expenses	-	(3,629)	3,629
Other changes	-	(393)	393
Net changes	$ 426,270	$ 460,327	$ (34,057)
Balances at June 30, 2018	$ 13,164,792	$ 6,326,360	$ 6,838,432

Note 7-Pension Plan: (Continued)

Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following presents the net pension liability of the Town using the discount rate of 7.00%, as well as what the Town's net pension liability would be if it were calculated using a discount rate that is one percentage point lower (6.00%) or one percentage point higher (8.00%) than the current rate:

	Rate		
	1% Decrease	Current Discount	1% Increase
	(6.00%)	(7.00%)	(8.00%)
Town Net Pension Liability	$ 8,471,955	$ 6,838,432	$ 5,469,767

Pension Expense and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

For the year ended June 30, 2019, the Town recognized pension expense of $447,406.

At June 30, 2019, the Town reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	$ 180,033	$ 251,798
Changes in proportion and differences between employer contributions and proportionate share of contributions	202,937	202,937
Changes of assumptions	-	99,550
Net difference between projected and actual earnings on pension plan investments	-	58,437
Employer contributions subsequent to the measurement date	601,271	-
Total	$ 984,241	$ 612,722

Note 7-Pension Plan: (Continued)

Pension Expense and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions (continued)

$601,271 reported as deferred outflows of resources related to pensions resulting from the Town's contributions subsequent to the measurement date will be recognized as a reduction of the Net Pension Liability in the fiscal year ending June 30, 2020. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to pensions will be recognized in pension expense in future reporting periods as follows:

Year ended June 30		
2020	$	(58,323)
2021		(64,801)
2022		(67,820)
2023		(38,039)
Thereafter		(769)

Pension Plan Data
Information about the VRS Political Subdivision Retirement Plan is also available in the separately issued VRS 2018 Comprehensive Annual Financial Report (CAFR). A copy of the 2018 VRS CAFR may be downloaded from the VRS website at http:www.varetire.org/Pdf/Publications/2018-annual-report.pdf, or by writing to the System's Chief Financial Officer at P.O. Box 2500, Richmond, VA 23218-2500.

Note 8-Line of Duty Act (LODA) Program:

Plan Description

The Virginia Retirement System (VRS) Line of Duty Act Program (LODA) was established pursuant to §9.1-400 et seq. of the Code of Virginia, as amended, and which provides the authority under which benefit terms are established or may be amended. The LODA Program provides death and health insurance benefits to eligible state employees and local government employees, including volunteers, who die or become disabled as a result of the performance of their duties as a public safety officer. In addition, health insurance benefits are provided to eligible survivors and family members. Participating employers made contributions to the program beginning in FY 2012. The employer contributions are determined by the System's actuary using anticipated program costs and the number of covered individuals associated with all participating employers.

Note 8-Line of Duty Act (LODA) Program: (Continued)

The specific information for the LODA Program OPEB, including eligibility, coverage and benefits is described below:

Eligible Employees

All paid employees and volunteers in hazardous duty positions in Virginia localities and hazardous duty employees who are covered under the Virginia Retirement System (VRS), the State Police Officers' Retirement System (SPORS), or the Virginia Law Officers' Retirement System (VaLORS) are automatically covered by the Line of Duty Act Program (LODA). As required by statute, the Virginia Retirement System (the System) is responsible for managing the assets of the program.

Benefit Amounts

The LODA program death benefit is a one-time payment made to the beneficiary or beneficiaries of a covered individual. Amounts vary as follows: $100,000 when a death occurs as the direct or proximate result of performing duty as of January 1, 2006, or after; $25,000 when the cause of death is attributed to one of the applicable presumptions and occurred earlier than five years after the retirement date; or an additional $20,000 benefit is payable when certain members of the National Guard and U.S. military reserves are killed in action in any armed conflict on or after October 7, 2001.

The LODA program also provides health insurance benefits. Prior to July 1, 2017, these benefits were managed through the various employer plans and maintained the benefits that existed prior to the employee's death or disability. These premiums were reimbursed to the employer by the LODA program. Beginning July 1, 2017, the health insurance benefits are managed through the Virginia Department of Human Resource Management (DHRM). The health benefits are modeled after the State Employee Health Benefits Program plans and provide consistent, premium-free continued health plan coverage for LODA-eligible disabled individuals, survivors and family members. Individuals receiving the health insurance benefits must continue to meet eligibility requirements as defined by LODA.

Contributions

The contribution requirements for the LODA Program are governed by §9.1-400.1 of the Code of Virginia, as amended, but may be impacted as a result of funding provided to state agencies by the Virginia General Assembly. Each employer's contractually required employer contribution rate for the LODA Program for the year ended June 30, 2019 was $705.77 per covered full-time-equivalent employee. This rate was based on an actuarially determined rate from an actuarial valuation as of June 30, 2017 and represents the pay-as-you-go funding rate and not the full actuarial cost of the benefits under the program. The actuarially determined pay-as-you-go rate was expected to finance the costs and related expenses of benefits payable during the year. Contributions to the LODA Program from the entity were $38,817 and $30,071 for the years ended June 30, 2019 and June 30, 2018, respectively.

Note 8-Line of Duty Act (LODA) Program: (Continued)

LODA OPEB Liabilities, LODA OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to the LODA OPEB

At June 30, 2019, the entity reported a liability of $885,000 for its proportionate share of the Net LODA OPEB Liability. The Net LODA OPEB Liability was measured as of June 30, 2018 and the total LODA OPEB liability used to calculate the Net LODA OPEB Liability was determined by an actuarial valuation as of that date. The entity's proportion of the Net LODA OPEB Liability was based on the entity's actuarially determined pay-as-you-go employer contributions to the LODA OPEB plan for the year ended June 30, 2018 relative to the total of the actuarially determined pay-as-you-go employer contributions for all participating employers. At June 30, 2018, the entity's proportion was 0.2823% as compared to 0.2630% at June 30, 2017.

For the year ended June 30, 2019, the entity recognized LODA OPEB expense of $72,000. Since there was a change in proportionate share between measurement dates, a portion of the LODA OPEB expense was related to deferred amounts from changes in proportion.

At June 30, 2019, the entity reported deferred outflows of resources and deferred inflows of resources related to the LODA OPEB from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	$ 127,000	$ -
Net difference between projected and actual earnings on LODA OPEB plan investments	-	2,000
Change in assumptions	-	102,000
Change in proportion	49,000	40,000
Employer contributions subsequent to the measurement date	38,817	-
Total	$ 214,817	$ 144,000

Note 8-Line of Duty Act (LODA) Program: (Continued)

LODA OPEB Liabilities, LODA OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to the LODA OPEB (Continued)

$38,817 reported as deferred outflows of resources related to the LODA OPEB resulting from the entity's contributions subsequent to the measurement date will be recognized as a reduction of the Net LODA OPEB Liability in the fiscal year ending June 30, 2020. Other amounts reported as deferred outflows of resources and deferred inflows of resources related to the LODA OPEB will be recognized in LODA OPEB expense in future reporting periods as follows:

Year Ended June 30		
2020	$	3,000
2021		3,000
2022		3,000
2023		4,000
2024		4,000
Thereafter		15,000

Actuarial Assumptions

The total LODA OPEB liability was based on an actuarial valuation as of June 30, 2017, using the Entry Age Normal actuarial cost method and the following assumptions, applied to all periods included in the measurement and rolled forward to the measurement date of June 30, 2018. The assumptions include several employer groups as noted below. Mortality rates included herein are for relevant employer groups. Information for other groups can be referenced in the VRS CAFR.

Inflation	2.5%
Salary increases, including inflation:	
General state employees	3.50%-5.35%
SPORS employees	3.50%-4.75%
VaLORS employees	3.50%-4.75%
Locality employees	3.50%-4.75%
Medical cost trend rates assumption:	
Under age 65	7.75%-5.00%
Ages 65 and older	5.75%-5.00%
Year of ultimate trend rate	Fiscal year ended 2024
Investment rate of return	3.89%, net of OPEB plan investment expenses, including inflation*

Note 8-Line of Duty Act (LODA) Program: (Continued)

Actuarial Assumptions: (Continued)

*Administrative expenses as a percent of the market value of assets for the last experience study were found to be approximately 0.06% of the market assets for all of the VRS plans. This would provide an assumed investment return rate for GASB purposes of slightly more than the assumed 3.89%. However, since the difference was minimal, a more conservative 3.89% investment return assumption has been used. Since LODA is funded on a current-disbursement basis, the assumed annual rate of return of 3.89% was used since it approximates the risk-free rate of return.

Mortality Rates – Largest Ten Locality Employers with Public Safety Employees

Pre-Retirement:
RP-2014 Employee Rates to age 80, Healthy Annuitant Rates to 81 and older projected with scale BB to 2020; males 90% of rates; females set forward 1 year.

Post-Retirement:
RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with scale BB to 2020; males set forward 1 year with 1.0% increase compounded from ages 70 to 90; females set forward 3 years.

Post-Disablement:
RP-2014 Disability Life Mortality Table projected with scale BB to 2020; males set forward 2 years; unisex using 100% male.

The actuarial assumptions used in the June 30, 2017 valuation were based on the results of an actuarial experience study for the period from July 1, 2012 through June 30, 2016. Changes to the actuarial assumptions as a result of the experience study are as follows:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Lowered retirement rates at older ages
Withdrawal Rates	Adjusted termination rates to better fit experience at each age and service year
Disability Rates	Increased disability rates
Salary Scale	No change
Line of Duty Disability	Increased rate from 60% to 70%

Note 8-Line of Duty Act (LODA) Program: (Continued)

Actuarial Assumptions: (Continued)

Mortality Rates – Non-Largest Ten Locality Employers with Public Safety Employees

Pre-Retirement:
RP-2014 Employee Rates to age 80, Healthy Annuitant Rates to 81 and older projected with scale BB to 2020; males 90% of rates; females set forward 1 year.

Post-Retirement:
RP-2014 Employee Rates to age 49, Healthy Annuitant Rates at ages 50 and older projected with scale BB to 2020; males set forward 1 year with 1.0% increase compounded from ages 70 to 90; females set forward 3 years.

Post-Disablement:
RP-2014 Disability Life Mortality Table projected with scale BB to 2020; males set forward 2 years; unisex using 100% male.

The actuarial assumptions used in the June 30, 2017 valuation were based on the results of an actuarial experience study for the period from July 1, 2012 through June 30, 2016. Changes to the actuarial assumptions as a result of the experience study are as follows:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Increased age 50 rates and lowered rates at older ages
Withdrawal Rates	Adjusted termination rates to better fit experience at each age and service year
Disability Rates	Adjusted rates to better match experience
Salary Scale	No change
Line of Duty Disability	Decreased rate from 60% to 45%

Note 8-Line of Duty Act (LODA) Program: (Continued)

Net LODA OPEB Liability

The net OPEB liability (NOL) for the LODA Program represents the program's total OPEB liability determined in accordance with GASB Statement No. 74, less the associated fiduciary net position. As of the measurement date of June 30, 2018, NOL amounts for the LODA Program is as follows (amounts expressed in thousands):

		LODA Program
Total LODA OPEB Liability	$	315,395
Plan Fiduciary Net Position		1,889
Employers' Net OPEB Liability (Asset)	$	313,506
Plan Fiduciary Net Position as a Percentage of the Total LODA OPEB Liability		0.60%

The total LODA OPEB liability is calculated by the System's actuary, and each plan's fiduciary net position is reported in the System's financial statements. The net OPEB liability is disclosed in accordance with the requirements of GASB Statement No. 74 in the System's notes to the financial statements and required supplementary information.

Long-Term Expected Rate of Return

The long-term expected rate of return on LODA OPEB Program's investments was set at 3.89% for this valuation. Since LODA is funded on a current-disbursement basis, it is not able to use the VRS Pooled Investments 7.00% assumption. Instead, the assumed annual rate of return of 3.89% was used since it approximates the risk-free rate of return. This Single Equivalent Interest Rate (SEIR) is the applicable municipal bond index rate based on the Bond Buyer General Obligation 20-year Municipal Bond Index as of the measurement date of June 30, 2018.

Discount Rate

The discount rate used to measure the total LODA OPEB liability was 3.89%. The projection of cash flows used to determine the discount rate assumed that employer contributions will be made per the VRS Statutes and that they will be made in accordance with the VRS funding policy and at rates equal to the actuarially determined contribution rates adopted by the VRS Board of Trustees. Through the fiscal year ended June 30, 2018, the rate contributed by participating employers to the LODA OPEB Program will be subject to the portion of the VRS Board-certified rates that are funded by the Virginia General Assembly.

Note 8-Line of Duty Act (LODA) Program: (Continued)

Sensitivity of the Covered Employer's Proportionate Share of the Net LODA OPEB Liability to Changes in the Discount Rate

The following presents the covered employer's proportionate share of the net LODA OPEB liability using the discount rate of 3.89%, as well as what the covered employer's proportionate share of the net LODA OPEB liability would be if it were calculated using a discount rate that is one percentage point lower (2.89%) or one percentage point higher (4.89%) than the current rate:

	Discount Rate		
	1% Decrease (2.89%)	Current (3.89%)	1% Increase (4.89%)
Town's proportionate share of the total LODA Net OPEB Liability	$ 1,014,000	$ 885,000	$ 781,000

Sensitivity of the Covered Employer's Proportionate Share of the Net LODA OPEB Liability to Changes in the Health Care Trend Rate

Because the LODA Program contains a provision for the payment of health insurance premiums, the liabilities are also impacted by the health care trend rates. The following presents the covered employer's proportionate share of the net LODA OPEB liability using the health care trend rate of 7.75% decreasing to 5.00%, as well as what the covered employer's proportionate share of the net LODA OPEB liability would be if it were calculated using a health care trend rate that is one percentage point lower (6.75% decreasing to 4.00%) or one percentage point higher (8.75% decreasing to 6.00%) than the current rate:

	Health Care Trend Rates		
	1% Decrease (6.75% decreasing to 4.00%)	Current (7.75% decreasing to 5.00%)	1% Increase (8.75% decreasing to 6.00%)
Town's proportionate share of the total LODA Net OPEB Liability	$ 754,000	$ 885,000	$ 1,049,000

LODA OPEB Fiduciary Net Position

Detailed information about the LODA Program Fiduciary Net Position is available in the separately issued VRS 2018 Comprehensive Annual Financial Report (CAFR). A copy of the 2018 VRS CAFR may be downloaded from the VRS website at http://www.varetire.org/Pdf/Publications/2018-annual-report.pdf, or by writing to the System's Chief Financial Officer at P.O. Box 2500, Richmond, VA, 23218-2500.

Note 9-Unearned Revenue:

Unearned revenue represents amounts for which asset recognition criteria have been met, but for which revenue recognition criteria have not been met. Under the modified accrual basis of accounting, such amounts are measurable, but not available. Unearned revenue totaling $985,597 is comprised of the following:

Lease Revenue – Lease revenue proceeds received in advance totaled $15,598 at year end.

Miscellaneous – Funding received in advance and carried over for use in the next fiscal year from Department of Transportation totaling $966,999.

Note 10-Unavailable Revenue:

Unavailable revenue represents amounts for which asset recognition criteria have been met, but for which revenue recognition criteria have not been met. Under the modified accrual basis of accounting, such amounts are measurable, but not available under the accrual basis, assessments for future periods are deferred. Unavailable revenue totaling $110,838 is comprised of the following:

Property Taxes - Property tax revenue representing uncollected tax billings not available for funding current expenditures of $85,504.

Prepaid Property Taxes – Property taxes due subsequent to June 30, 2018 but paid in advance by the taxpayers totaled $25,334.

Note 11-Restricted Fund Balance/Net Position:

Fund balance and net position were restricted for the following purposes at year end:

Purpose	Amount
Big Creek payments	$ 62,231
Public Safety Funds	129,608
Restricted Donations	77,553
Asset Forfeiture/Policing Funds	45,932
Total	$ 315,324

Note 12-Capital Assets:

Capital asset activity for the year ended June 30, 2019 was as follows:

	Beginning Balance	Increases	Decreases	Ending Balance
Governmental Activities:				
Capital assets, not being depreciated:				
Land	$ 1,357,395	$ -	$ -	$ 1,357,395
Construction in progress	-	133,283	-	133,283
Total capital assets not being depreciated	$ 1,357,395	$ 133,283	$ -	$ 1,490,678
Capital assets, being depreciated:				
Buildings and system	$ 3,964,152	$ 3,436	$ -	$ 3,967,588
Infrastructure	9,451,566	9,479	-	9,461,045
Machinery and equipment	6,830,114	309,569	(118,331)	7,021,352
Total capital assets being depreciated	$ 20,245,832	$ 322,484	$ (118,331)	$ 20,449,985
Accumulated depreciation:				
Buildings and system	$ (1,622,924)	$ (121,367)	$ -	$ (1,744,291)
Infrastructure	(3,345,118)	(246,942)	-	(3,592,060)
Machinery and equipment	(6,102,595)	(226,046)	118,331	(6,210,310)
Total accumulated depreciation	$ (11,070,637)	$ (594,355)	$ 118,331	$ (11,546,661)
Total capital assets being depreciated, net	$ 9,175,195	$ (271,871)	$ -	$ 8,903,324
Governmental activities capital assets, net	$ 10,532,590	$ (138,588)	$ -	$ 10,394,002

Note 12-Capital Assets: (Continued)

	Beginning Balance	Increases	Decreases	Ending Balance
Business-type Activities:				
Capital assets, not being depreciated:				
Land	$ 517,913	$ -	$ -	$ 517,913
Construction in progress	26,959	53,420	-	80,379
Total capital assets not being depreciated	$ 544,872	53,420	$ -	$ 598,292
Capital assets, being depreciated:				
Utility plant and buildings in service	$ 22,295,875	$ 17,959	$ -	$ 22,313,834
Machinery and equipment	2,662,506	87,229	-	2,749,735
Total capital assets being depreciated	$ 24,958,381	$ 105,188	$ -	$ 25,063,569
Accumulated depreciation:				
Utility plant and buildings in service	$ (12,943,303)	$ (478,108)	$ -	$ (13,421,411)
Machinery and equipment	(1,589,747)	(148,650)	-	(1,738,397)
Total accumulated depreciation	$ (14,533,050)	$ (626,758)	$ -	$ (15,159,808)
Total capital assets being depreciated, net	$ 10,425,331	$ (521,570)	$ -	$ 9,903,761
Business-type activities capital assets, net	$ 10,970,203	$ (468,150)	$ -	$ 10,502,053

Depreciation expense was charged to functions/programs of the Town as follows:

Governmental activities:	
General government administration	$ 42,768
Public safety	169,419
Public works	309,012
Parks and recreation	73,156
Total depreciation expense - governmental activities	$ 594,355
Business-type activities:	
Water and sewer	$ 529,741
Electric	97,017
Total depreciation expense - business-type activities	$ 626,758

Note 13-Risk Management:

The Town is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors and omissions; injuries to employees; and natural disasters. The Town participates with other localities in a public entity risk pool for their coverage of property, general liability and auto insurance with the Virginia Municipal Liability Pool (Pool). Each member of this risk pool jointly and severally agrees to assume, pay and discharge any liability. The Town pays the Pool contributions and assessments into a designated cash reserve fund out of which expenses of the pool, claims and awards are to be paid. In the event of a loss, deficit, or depletion of all available resources, the pool may assess all members in the proportion to which the premium of each bears to the total premiums of all members in the year in which such deficit occurs. The Town continues to carry commercial insurance for all other risks of loss. Settled claims resulting from these risks have not exceeded commercial insurance coverage in any of the past three fiscal years.

Note 14-Contingencies:

Grant funds are subject to audit by the funding agencies to determine compliance with various grant requirements. Should any expenditure be disallowed, they must be refunded to the granting agencies. Any liability for reimbursement, which may arise as the result of these audits is believed to be immaterial.

Note 15-Electric Power Agreement:

The Town is a participant in American Municipal Power-Ohio, Inc. (AMP-Ohio), a nonprofit corporation, organized to own and operate facilities for the generation, transmission, and distribution of electrical power. Other participants in AMP-Ohio are political subdivisions which operate electric systems in Ohio, Michigan, Pennsylvania, Virginia, and West Virginia. As a participant, the Town has agreed to purchase specified kilowatts of power at AMP-Ohio's incurred cost through December 31, 2057. In accordance with this agreement the Town remits funds to an escrow account for the payment of power bills.

Note 16-Pledged Revenues:

The Town has pledged future water and sewer customer revenues to repay water and wastewater revenue bonds. Proceeds from the bonds provided financing for the construction of the water and sewer systems.

Note 17-Electric Rate Stabilization Plan:

The Town entered into a rate stabilization plan with American Municipal Power, Inc. to reduce the effects of volatility in energy markets. As of June 30, 2019, the Town carried a balance of $288,094 in an escrow account maintained for the Town's benefit. This amount has been reported in the financial statements as a prepaid item.

Note 18-Service Agreements:

On September 3, 2003, the Town and Tazewell County Public Service Authority (TCPSA) entered into an agreement to share the costs of construction and operation of a water transmission facility known as Kent's Ridge Road Project. The project was financed by two thirty year, interest-free loans from the Virginia Resources Authority (VRA). The loans are secured by a pledge of revenues from the Town's water and wastewater systems and by a pledge of the Town's full faith and credit. Also, County of Tazewell, Virginia has undertaken, to the extent permitted by law, a non-binding but moral obligation to pay such amounts as may be needed, with respect to the notes, for the payment of principal and interest pursuant to the terms of the agreement. The Town has recorded an amount due from the TCPSA of $1,063,990 at year end for their share of debt service payments.

The Town has also entered into separate agreements with the TCPSA and Town of Cedar Bluff, Virginia to provide water treatment. The agreements allocate operating costs and the cost of construction based on usage (or an estimate thereof).

The Town; Town of Cedar Bluff, Virginia; and Tazewell County Public Service Authority (TCPSA) entered into an agreement dated March 15, 1989, whereby each of the parties would participate in the allocation of capacity and costs with respect to the design, construction, operation and maintenance of a regional wastewater treatment facility. The Town is responsible for the operation of the facility. The Town is also responsible for budgeting and financing subject to agreed upon procedures by the three participants. Monthly user charges are paid by the participants for their share of the cost of the project and are recognized as charges for services in the accompanying financial statements.

Payments received by the Town during the fiscal year for the aforementioned agreements are as follow:

Entity	Amounts
Town of Cedar Bluff	$ 196,176
Tazewell County PSA	709,632
Tazewell County PSA - loan payments	60,660
Total	$ 966,468

Note 19-Adoption of Accounting Principles:

The Town implemented the financial reporting provisions of Governmental Accounting Standards Board Statement No. 88, *Certain Disclosures Related to Debt, Including Direct Borrowings and Direct Placements* during the fiscal year ended June 30, 2019. This Statement clarifies which liabilities governments should include when disclosing information related to debt. It also requires that additional essential information related to debt be disclosed in notes to financial statements. No restatement was required as a result of this implementation.

Note 20-Upcoming Pronouncements:

Statement No. 84, *Fiduciary Activities*, establishes criteria for identifying fiduciary activities of all state and local governments for accounting and financial reporting purposes and how those activities should be reported. The requirements of this Statement are effective for reporting periods beginning after December 15, 2018.

Statement No. 87, *Leases*, requires recognition of certain lease assets and liabilities for leases that previously were classified as operating leases and recognized as inflows of resources or outflows of resources based on the payment provisions of the contract. It establishes a single model for lease accounting based on the foundational principle that leases are financings of the right to use an underlying asset. The requirements of this Statement are effective for reporting periods beginning after December 15, 2019.

Statement No. 89, *Accounting for Interest Cost Incurred Before the End of a Construction Period*, provides guidance for reporting capital assets and the cost of borrowing for a reporting period and simplifies accounting for interest cost incurred before the end of a construction period. The requirements of this Statement are effective for reporting periods beginning after December 15, 2019.

Statement No. 90, *Majority Equity Interests – An Amendment of GASB Statements No, 14 and No. 61*, provides guidance for reporting a government's majority equity interest in a legally separate organization and for reporting financial statement information for certain component units. The requirements of this Statement are effective for reporting periods beginning after December 15, 2018.

Statement No. 91, *Conduit Debt Obligations*, provides a single method of reporting conduit debt obligations by issuers and eliminates diversity in practice associated with (1) commitments extended by issuers, (2) arrangements associated with conduit debt obligations, and (3) related note disclosures. The requirements of this Statement are effective for reporting periods beginning after December 15, 2020.

Management is currently evaluating the impact these standards will have on the financial statements when adopted.

Required Supplementary Information

Exhibit 10

Town of Richlands, Virginia
General Fund
Schedule of Revenues, Expenditures, and Changes in Fund Balances - Budget and Actual
For the Year Ended June 30, 2019

	Budgeted Amounts			
	Original	Final	Actual Amounts	Variance with Final Budget - Positive (Negative)
REVENUES				
General property taxes	$ 482,250	$ 482,250	$ 466,610	$ (15,640)
Other local taxes	2,162,400	2,162,400	2,207,338	44,938
Permits, privilege fees, and regulatory licenses	1,500	1,500	1,145	(355)
Fines and forfeitures	83,100	83,100	49,339	(33,761)
Revenue from the use of money and property	4,000	4,000	10,125	6,125
Charges for services	1,198,100	1,198,100	1,240,329	42,229
Miscellaneous	24,500	24,500	102,805	78,305
Recovered costs	73,500	73,500	89,681	16,181
Intergovernmental	1,310,404	1,310,404	1,063,613	(246,791)
Total revenues	$ 5,339,754	$ 5,339,754	$ 5,230,985	$ (108,769)
EXPENDITURES				
Current:				
General government administration	$ 289,858	$ 289,858	$ 295,268	$ (5,410)
Public safety	3,015,059	3,015,059	2,806,069	208,990
Public works	1,543,555	1,543,555	1,483,770	59,785
Parks, recreation, and cultural	408,704	408,704	462,720	(54,016)
Community development	78,165	78,165	54,309	23,856
Capital projects	152,500	152,500	449,456	(296,956)
Debt service:				
Principal retirement	-	-	7,260	(7,260)
Total expenditures	$ 5,487,841	$ 5,487,841	$ 5,558,852	$ (71,011)
Excess (deficiency) of revenues over (under) expenditures	$ (148,087)	$ (148,087)	$ (327,867)	$ (179,780)
OTHER FINANCING SOURCES (USES)				
Issuance of capital lease	$ -	$ -	$ 21,780	$ 21,780
Sale of capital assets	10,000	10,000	30,416	20,416
Total other financing sources (uses)	$ 10,000	$ 10,000	$ 52,196	$ 42,196
Net change in fund balances	$ (138,087)	$ (138,087)	$ (275,671)	$ (137,584)
Fund balances - beginning	138,087	138,087	453,523	315,436
Fund balances - ending	$ -	$ -	$ 177,852	$ 177,852

Exhibit 11

Town of Richlands, Virginia
Pension Plan
Schedule of Changes in Net Pension Liability and Related Ratios
For the Measurement Dates of June 30, 2014 through June 30, 2018

	2018	2017	2016	2015	2014
Total pension liability					
Service cost	$ 243,691	$ 254,948	$ 248,209	$ 233,924	$ 228,999
Interest	868,052	856,598	794,150	790,952	759,699
Differences between expected and actual experience	(9,905)	(186,039)	367,567	(408,168)	-
Changes in assumptions	-	(156,273)	-	-	-
Benefit payments, including refunds of employee contributions	(675,568)	(535,639)	(499,997)	(642,038)	(442,432)
Net change in total pension liability	$ 426,270	$ 233,595	$ 909,929	$ (25,330)	$ 546,266
Total pension liability - beginning	12,738,522	12,504,927	11,594,998	11,620,328	11,074,062
Total pension liability - ending (a)	$ 13,164,792	$ 12,738,522	$ 12,504,927	$ 11,594,998	$ 11,620,328
Plan fiduciary net position					
Contributions - employer	$ 573,053	$ 548,986	$ 592,036	$ 556,985	$ 499,158
Contributions - employee	132,681	128,023	126,916	120,115	119,403
Net investment income	434,183	633,234	92,686	205,782	599,476
Benefit payments, including refunds of employee contributions	(675,568)	(535,639)	(499,997)	(642,038)	(442,432)
Administrative expense	(3,629)	(3,447)	(2,781)	(2,752)	(3,098)
Other	(393)	(573)	(37)	(46)	32
Net change in plan fiduciary net position	$ 460,327	$ 770,584	$ 308,823	$ 238,046	$ 772,539
Plan fiduciary net position - beginning	5,866,033	5,095,449	4,786,626	4,548,580	3,776,041
Plan fiduciary net position - ending (b)	$ 6,326,360	$ 5,866,033	$ 5,095,449	$ 4,786,626	$ 4,548,580
Town's net pension liability - ending (a) - (b)	$ 6,838,432	$ 6,872,489	$ 7,409,478	$ 6,808,372	$ 7,071,748
Plan fiduciary net position as a percentage of the total pension liability	48.06%	46.05%	40.75%	41.28%	39.14%
Covered payroll	$ 2,726,708	$ 2,611,141	$ 2,594,810	$ 2,433,045	$ 2,391,408
Town's net pension liability as a percentage of covered payroll	250.79%	263.20%	285.55%	279.83%	295.71%

Schedule is intended to show information for 10 years. Information prior to the 2014 valuation is not available. However, additional years will be included as they become available.

Exhibit 12

Town of Richlands, Virginia
Pension Plan
Schedule of Employer Contributions
For the Years Ended June 30, 2010 through June 30, 2019

Date	Contractually Required Contribution (1)	Contributions in Relation to Contractually Required Contribution (2)	Contribution Deficiency (Excess) (3)	Employer's Covered Employee Payroll (4)	Contributions as a % of Covered Employee Payroll (5)
2019	$ 601,271	$ 601,271	$ -	$ 2,893,205	20.78%
2018	573,053	573,053	-	2,726,708	21.02%
2017	548,986	548,986	-	2,611,141	21.02%
2016	592,036	592,036	-	2,594,810	22.82%
2015	556,985	556,985	-	2,433,045	22.89%
2014	499,326	499,326	-	2,391,408	20.88%
2013	496,596	496,596	-	2,378,333	20.88%
2012	554,563	554,563	-	2,349,843	23.60%
2011	558,180	558,180	-	2,365,170	23.60%
2010	49,485	49,485	-	209,683	23.60%

Current year contributions are from Town records and prior year contributions are from the VRS actuarial valuation performed each year.

Town of Richlands, Virginia
Pension Plan
Notes to Required Supplementary Information
For the Year Ended June 30, 2019

Changes of benefit terms – There have been no actuarially material changes to the System benefit provisions since the prior actuarial valuation.

Changes of assumptions – The following changes in actuarial assumptions were made effective June 30, 2016 based on the most recent experience study of the System for the four-year period ending June 30, 2016:

Largest 10 – Non-Hazardous Duty:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Lowered rates at older ages and changed final retirement from 70 to 75
Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
Disability Rates	Lowered rates
Salary Scale	No change
Line of Duty Disability	Increased rate from 14% to 20%

All Others (Non 10 Largest) – Non-Hazardous Duty:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Lowered rates at older ages and changed final retirement from 70 to 75
Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
Disability Rates	Lowered rates
Salary Scale	No change
Line of Duty Disability	Increased rate from 14% to 15%

Largest 10 – Hazardous Duty:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Lowered rates at older ages
Withdrawal Rates	Adjusted rates to better fit experience
Disability Rates	Increased rates
Salary Scale	No change
Line of Duty Disability	Increased rate from 60% to 70%

All Others (Non 10 Largest) – Hazardous Duty:

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Increased age 50 rates, and lowered rates at older ages
Withdrawal Rates	Adjusted rates to better fit experience at each year age and service through 9 years of service
Disability Rates	Adjusted rates to better fit experience
Salary Scale	No change
Line of Duty Disability	Decreased rate from 60% to 45%

Exhibit 14

Town of Richlands, Virginia
Other Postemployment Benefits - Line of Duty Act Program (LODA)
Schedule of Employer's Share of Net LODA OPEB Liability
For the Measurement Dates of June 30, 2018 and 2017

Date (1)	Employer's Proportion of the Net LODA OPEB Liability (Asset) (2)	Employer's Proportionate Share of the Net LODA OPEB Liability (Asset) (3)	Covered-Employee Payroll * (4)	Employer's Proportionate Share of the Net LODA OPEB Liability (Asset) as a Percentage of its Covered-Employee Payroll (3)/(4) (5)	Plan Fiduciary Net Position as a Percentage of Total LODA OPEB Liability (6)
2018	0.2823%	$ 885,000	$ 1,369,285	64.63%	0.60%
2017	0.2630%	691,000	1,312,173	52.66%	1.30%

* The contributions for the Line of Duty Act Program are based on the number of participants in the Program using a per capita-based contribution versus a payroll-based contribution. Therefore, covered-employee payroll is the relevant measurement, which is the total payroll of the employees in the OPEB plan.

Schedule is intended to show information for 10 years. Since 2018 is the first year for this presentation, only one year of data is available. However, additional years will be included as they become available.

Exhibit 15

Town of Richlands, Virginia
Other Postemployment Benefits - Line of Duty Act Program (LODA)
Schedule of Employer Contributions
For the Years Ended June 30, 2017 through June 30, 2019

Date	Contractually Required Contribution (1)	Contributions in Relation to Contractually Required Contribution (2)	Contribution Deficiency (Excess) (3)	Covered-Employee Payroll * (4)	Contributions as a % of Covered - Employee Payroll (5)
2019	$ 38,817	$ 38,817	$ -	$ 1,426,561	2.72%
2018	30,071	30,071	-	1,369,285	2.20%
2017	28,369	28,369	-	1,312,173	2.16%

* The contributions for the Line of Duty Act Program are based on the number of participants in the Program using a per capita-based contribution versus a payroll-based contribution. Therefore, covered-employee payroll is the relevant measurement, which is the total payroll of employees in the OPEB plan.

FY 2011 was the first year for the Line of Duty Act Program (LODA), however there were no contributions. Schedule is intended to show information for 10 years. Information is only available for years after FY 2017. However, additional years will be included as they become available.

Town of Richlands, Virginia
Other Postemployment Benefits - Line of Duty Act Program (LODA)
Notes to Required Supplementary Information
For the Year Ended June 30, 2019

Changes of benefit terms – There have been no actuarially material changes to the System benefit provisions since the prior actuarial valuation.

Changes of assumptions – The following changes in actuarial assumptions were made effective June 30, 2016 based on the most recent experience study of the System for the four-year period ending June 30, 2016:

Employees in the Largest Ten Locality Employers with Public Safety Employees

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Lowered retirement rates at older ages
Withdrawal Rates	Adjusted termination rates to better fit experience at each age and service year
Disability Rates	Increased disability rates
Salary Scale	No change
Line of Duty Disability	Increased rate from 60% to 70%

Employees in the Non-Largest Ten Locality Employers with Public Safety Employees

Mortality Rates (pre-retirement, post-retirement healthy, and disabled)	Updated to a more current mortality table - RP-2014 projected to 2020
Retirement Rates	Increased age 50 rates and lowered rates at older ages
Withdrawal Rates	Adjusted termination rates to better fit experience at each age and service year
Disability Rates	Adjusted rates to better match experience
Salary Scale	No change
Line of Duty Disability	Decreased rate from 60% to 45%

Other Supplementary Information

Supporting Schedules

Town of Richlands, Virginia
Schedule of Revenues - Budget and Actual
Governmental Fund
For the Year Ended June 30, 2019

Fund, Major and Minor Revenue Source	Original Budget	Final Budget	Actual	Variance with Final Budget - Positive (Negative)
General Fund:				
Revenue from local sources:				
General property taxes:				
Real property taxes	$ 435,000	$ 435,000	$ 395,392	$ (39,608)
Real and personal public service corporation taxes	31,250	31,250	32,541	1,291
Mobile home taxes	12,000	12,000	13,935	1,935
Penalties and Interest	4,000	4,000	24,742	20,742
Total general property taxes	$ 482,250	$ 482,250	$ 466,610	$ (15,640)
Other local taxes:				
Local sales and use taxes	$ 390,000	$ 390,000	$ 384,909	$ (5,091)
Consumers utility tax	236,400	236,400	234,560	(1,840)
Local consumption tax	22,000	22,000	20,276	(1,724)
Business license taxes	450,000	450,000	460,171	10,171
Motor vehicle licenses	34,000	34,000	34,130	130
Bank stock taxes	180,000	180,000	207,839	27,839
Tobacco taxes	80,000	80,000	90,308	10,308
Meals taxes	770,000	770,000	775,145	5,145
Total other local taxes	$ 2,162,400	$ 2,162,400	$ 2,207,338	$ 44,938
Permits, privilege fees, and regulatory licenses:				
Zoning permits	$ 1,500	$ 1,500	$ 1,145	$ (355)
Fines and forfeitures:				
Court fines and forfeitures	$ 83,000	$ 83,000	$ 42,257	$ (40,743)
Asset forfeitures	-	-	2,199	2,199
Parking violations	100	100	50	(50)
E-citation fees	-	-	4,833	4,833
Total fines and forfeitures	$ 83,100	$ 83,100	$ 49,339	$ (33,761)
Revenue from use of money and property:				
Revenue from use of money	$ 4,000	$ 4,000	$ 6,305	$ 2,305
Revenue from use of property	-	-	3,820	3,820
Total revenue from use of money and property	$ 4,000	$ 4,000	$ 10,125	$ 6,125
Charges for services:				
Contract work - Streets	$ 5,000	$ 5,000	$ 7,299	$ 2,299
Rescue Squad billings	600,000	600,000	613,127	13,127
Swimming pool fees	15,000	15,000	17,177	2,177
Concession collections	30,000	30,000	20,592	(9,408)
Basketball fees	5,000	5,000	7,859	2,859
Indoor tennis fees	500	500	10	(490)
Outdoor tennis fees	500	500	140	(360)
Membership fees	-	-	615	615
Room rental	5,000	5,000	4,200	(800)
Miscellaneous recreation fees	55,000	55,000	8,914	(46,086)
Convenience fees	8,500	8,500	12,033	3,533
Garbage collections	473,600	473,600	529,718	56,118
Farmer's market revenue	-	-	18,645	18,645
Total charges for services	$ 1,198,100	$ 1,198,100	$ 1,240,329	$ 42,229

Town of Richlands, Virginia
Schedule of Revenues - Budget and Actual
Governmental Fund
For the Year Ended June 30, 2019

Fund, Major and Minor Revenue Source	Original Budget	Final Budget	Actual	Variance with Final Budget - Positive (Negative)
General Fund: (continued)				
Revenue from local sources: (continued)				
Miscellaneous:				
Miscellaneous	$ 8,000	$ 8,000	$ 17,937	$ 9,937
Gifts and donations	-	-	11,019	11,019
Gifts and donations - Fire	2,500	2,500	10,723	8,223
Gifts and donations - Recreation	6,000	6,000	42,150	36,150
Gifts and donations - Police	8,000	8,000	11,091	3,091
Gifts and donations - Rescue	-	-	9,885	9,885
Total miscellaneous	$ 24,500	$ 24,500	$ 102,805	$ 78,305
Recovered costs:				
County of Tazewell - fire program	$ 70,500	$ 70,500	$ 70,500	$ -
Returned check fees	2,000	2,000	2,070	70
Restitution	1,000	1,000	17,111	16,111
Total recovered costs	$ 73,500	$ 73,500	$ 89,681	$ 16,181
Total revenue from local sources	$ 4,029,350	$ 4,029,350	$ 4,167,372	$ 138,022
Intergovenmental:				
Revenue from the Commonwealth:				
Noncategorical aid:				
Mobile home titling tax	$ 2,500	$ 2,500	$ 2,355	$ (145)
Motor vehicles carrier's tax	2,000	2,000	3,134	1,134
Railroad rolling stock tax	-	-	10,026	10,026
Total noncategorical aid	$ 4,500	$ 4,500	$ 15,515	$ 11,015
Categorical aid:				
Other categorical aid:				
Litter control grant	$ 2,700	$ 2,700	$ 2,950	$ 250
Street maintenance	943,114	943,114	648,719	(294,395)
Law enforcement grant	138,003	138,003	143,108	5,105
Drug enforcement	76,087	76,087	76,087	-
EMS grants	112,000	112,000	100,722	(11,278)
Fire grants	-	-	20,155	20,155
Asset forfeitures	-	-	4,607	4,607
Other state revenue	16,000	16,000	7,589	(8,411)
Total categorical aid	$ 1,287,904	$ 1,287,904	$ 1,003,937	$ (283,967)
Total revenue from the Commonwealth	$ 1,292,404	$ 1,292,404	$ 1,019,452	$ (272,952)
Revenue from the federal government:				
Categorical aid:				
Police grants	$ -	$ -	$ 26,857	$ 26,857
High intensity drug trafficking areas grant	18,000	18,000	17,304	(696)
Total categorical aid	$ 18,000	$ 18,000	$ 44,161	$ 26,161
Total revenue from the federal government	$ 18,000	$ 18,000	$ 44,161	$ 26,161
Total General Fund	$ 5,339,754	$ 5,339,754	$ 5,230,985	$ (108,769)

Town of Richlands, Virginia
Schedule of Expenditures - Budget and Actual
Governmental Fund
For the Year Ended June 30, 2019

Fund, Function and Department Expenditures	Original Budget	Final Budget	Actual	Variance with Final Budget - Positive (Negative)
General Fund:				
General government administration:				
General and financial administration:				
Town Council	$ 21,307	$ 21,307	$ 19,415	$ 1,892
Administration	268,551	268,551	275,853	(7,302)
Total general government administration	$ 289,858	$ 289,858	$ 295,268	$ (5,410)
Public safety:				
Law enforcement and traffic control:				
Police grants	$ -	$ -	$ 16,667	$ (16,667)
Drug task force	94,087	94,087	50,047	44,040
Police department	1,951,227	1,951,227	1,832,732	118,495
Total law enforcement and traffic control	$ 2,045,314	$ 2,045,314	$ 1,899,446	$ 145,868
Fire and rescue services:				
Fire Department	$ 223,273	$ 223,273	$ 135,927	$ 87,346
Rescue Squad	746,472	746,472	770,696	(24,224)
Total fire and rescue services	$ 969,745	$ 969,745	$ 906,623	$ 63,122
Total public safety	$ 3,015,059	$ 3,015,059	$ 2,806,069	$ 208,990
Public works:				
Maintenance of highways, streets, bridges and sidewalks:				
Highways, streets, bridges and sidewalks	$ 1,083,046	$ 1,083,046	$ 1,007,228	$ 75,818
Sanitation and waste removal:				
Refuse collection and disposal	$ 460,509	$ 460,509	$ 476,542	$ (16,033)
Total public works	$ 1,543,555	$ 1,543,555	$ 1,483,770	$ 59,785
Parks, recreation, and cultural:				
Cultural enrichment:				
Recreation	$ 382,654	$ 382,654	$ 450,055	$ (67,401)
Library:				
Library	$ 26,050	$ 26,050	$ 12,665	$ 13,385
Total parks, recreation, and cultural	$ 408,704	$ 408,704	$ 462,720	$ (54,016)

Town of Richlands, Virginia
Schedule of Expenditures - Budget and Actual
Governmental Fund
For the Year Ended June 30, 2019

Fund, Function and Department Expenditures	Original Budget	Final Budget	Actual	Variance with Final Budget - Positive (Negative)
General Fund: (continued)				
Community development:				
Planning and community development:				
Downtown activities	$ 78,165	$ 78,165	$ 54,309	$ 23,856
Capital projects/outlays:				
Capital projects and capital outlays	$ 152,500	$ 152,500	$ 449,456	$ (296,956)
Debt service:				
Principal retirement	$ -	$ -	$ 7,260	$ (7,260)
Total General Fund	$ 5,487,841	$ 5,487,841	$ 5,558,852	$ (71,011)

Statistical Information

Table 1

Town of Richlands, Virginia
Government-Wide Expenses by Function
Last Ten Fiscal Years

Fiscal Year	General Government Administration	Public Safety	Public Works	Parks, Recreation, and Cultural	Community Development	Interest on Long-Term Debt	Water and Sewer	Electric	Total
2009-10	$ 517,043	$ 2,800,286	$ 1,406,509	$ 349,495	$ 141,269	$ 17,501	$ 2,014,444	$ 6,156,711	$ 13,403,258
2010-11	271,310	2,764,620	1,544,774	390,015	206,662	16,801	2,106,703	5,833,916	13,134,801
2011-12	270,119	2,688,745	1,636,116	382,314	38,246	11,921	2,259,778	5,227,037	12,514,276
2012-13	290,591	2,838,354	1,551,236	391,472	129,783	9,285	2,282,333	5,291,893	12,784,947
2013-14	285,960	2,863,825	1,500,829	354,456	58,493	7,164	2,392,826	6,743,677	14,207,230
2014-15	269,723	2,645,744	1,595,057	343,926	52,705	4,949	2,408,886	6,094,861	13,415,851
2015-16	292,353	2,749,662	1,719,756	379,405	27,499	2,628	2,465,129	6,005,247	13,641,679
2016-17	333,731	2,828,938	1,773,908	377,855	25,850	3,873	2,489,894	6,091,102	13,925,151
2017-18	235,766	2,795,730	2,200,116	403,439	30,235	226	2,719,717	6,780,758	15,165,987
2018-19	343,375	2,764,887	1,802,564	491,984	53,940	-	2,790,540	6,486,240	14,733,530

Table 2

Town of Richlands, Virginia
Government-Wide Revenues
Last Ten Fiscal Years

	PROGRAM REVENUES			GENERAL REVENUES					
Fiscal Year	Charges for Services	Operating Grants and Contributions	Capital Grants and Contributions	General Property Taxes	Other Local Taxes	Unrestricted Investment Earnings	Miscellaneous	Grants and Contributions Not Restricted to Specific Programs	Total
2009-10	$ 10,020,767	$ 1,983,278	$ -	$ 461,000	$ 1,704,768	$ 39,784	$ 486,673	$ -	$ 14,696,270
2010-11	10,517,188	1,162,629	1,773,617	408,275	1,671,219	27,512	196,854	9,598	15,766,892
2011-12	9,278,334	1,331,617	245,517	434,748	1,751,238	17,868	124,600	4,081	13,188,003
2012-13	9,672,614	1,778,186	93,941	464,070	1,848,254	16,874	364,230	13,685	14,251,854
2013-14	10,035,089	1,280,498	4,607,782	469,162	1,941,856	14,050	167,513	4,057	18,520,007
2014-15	9,550,616	980,826	31,432	478,340	2,035,854	13,880	130,668	16,754	13,238,370
2015-16	9,066,108	1,319,735	1,225	467,740	2,014,265	14,016	170,664	22,046	13,075,799
2016-17	9,416,956	1,105,238	33,838	485,587	1,961,647	13,769	103,080	15,893	13,136,008
2017-18	10,185,432	1,458,570	364,500	538,056	2,044,120	16,787	61,537	4,954	14,673,956
2018-19	10,813,722	1,048,098	-	497,664	2,207,338	22,729	104,766	15,515	14,709,832

Table 3

Town of Richlands, Virginia
General Governmental Expenditures by Function
Last Ten Fiscal Years

Fiscal Year	General and Financial Administration	Public Safety	Public Works	Parks, Recreation, and Cultural	Community Development	Non-departmental	Debt Service	Total (1)
2009-10	$ 295,497	$ 2,747,120	$ 1,331,514	$ 356,386	$ 141,269	$ -	$ 58,912	$ 4,930,698
2010-11	286,319	2,615,615	1,333,176	451,633	206,662	-	86,081	4,979,486
2011-12	267,218	2,529,280	1,388,996	340,314	38,246	-	86,085	4,650,139
2012-13	254,595	2,639,835	1,297,287	349,064	129,783	-	55,364	4,725,928
2013-14	263,515	2,623,164	1,219,929	310,872	58,493	-	55,364	4,531,337
2014-15	267,560	2,535,244	1,311,842	300,353	52,705	-	55,365	4,523,069
2015-16	280,546	2,681,036	1,367,609	341,942	27,499	113,910	95,376	4,907,918
2016-17	316,937	2,631,827	1,226,139	323,389	25,850	-	92,806	4,616,948
2017-18	285,390	2,704,981	1,883,504	356,127	30,235	-	38,681	5,298,918
2018-19	295,268	2,806,069	1,483,770	462,720	54,309	-	7,260	5,109,396

(1) Excludes Capital Projects.

Table 4

Town of Richlands, Virginia
General Governmental Revenues by Source
Last Ten Fiscal Years

Fiscal Year	General Property Taxes	Other Local Taxes	Permits, Privilege Fees, Regulatory Licenses	Fines and Forfeitures	Revenue from the Use of Money and Property	Charges for Services	Miscellaneous	Recovered Costs	Inter-governmental	Total
2009-10	$ 425,420	$ 1,704,768	$ 1,585	$ 85,661	$ 19,021	$ 1,264,454	$ 286,617	$ -	$ 1,338,364	$ 5,125,890
2010-11	432,840	1,671,219	2,225	162,930	15,894	1,121,649	185,927	150,408	1,339,879	5,082,971
2011-12	433,863	1,751,238	2,090	50,562	11,853	1,190,198	117,765	140,780	1,373,185	5,071,534
2012-13	458,103	1,848,254	1,715	62,675	8,747	1,142,404	351,811	62,726	1,856,074	5,792,509
2013-14	460,876	1,941,856	1,270	237,281	8,938	1,116,902	158,987	63,189	1,319,989	5,309,288
2014-15	481,056	2,035,854	1,755	99,052	9,139	1,072,943	126,508	139,441	1,029,012	4,994,760
2015-16	467,433	2,014,265	1,280	107,308	9,238	1,122,305	164,755	73,104	1,343,006	5,302,694
2016-17	484,317	1,961,647	1,290	93,918	7,985	965,461	101,516	77,446	1,144,891	4,838,471
2017-18	558,985	2,044,120	1,265	66,354	8,219	1,015,274	59,575	82,917	1,818,102	5,654,811
2018-19	466,610	2,207,338	1,145	49,339	10,125	1,240,329	102,805	89,681	1,063,613	5,230,985

Table 5

Town of Richlands, Virginia
Property Tax Levies and Collections
Last Ten Fiscal Years

Fiscal Year	Total Tax Levy (1)	Current Tax Collections (1)	Percent of Levy Collected	Delinquent Tax Collections (1)	Total Tax Collections	Percent of Total Tax Collections to Tax Levy
2009-10	$ 418,224	$ 372,689	89.11%	$ 19,895	$ 392,584	93.87%
2010-11	421,699	394,301	93.50%	21,144	415,445	98.52%
2011-12	424,866	392,515	92.39%	24,079	416,594	98.05%
2012-13	457,827	434,546	94.91%	18,364	452,910	98.93%
2013-14	458,280	431,776	94.22%	22,171	453,947	99.05%
2014-15	453,872	431,469	95.06%	28,133	459,602	101.26%
2015-16	455,304	426,994	93.78%	21,212	448,206	98.44%
2016-17	458,300	428,053	93.40%	27,776	455,829	99.46%
2017-18	469,457	452,063	96.29%	60,038	512,101	109.08%
2018-19	463,375	381,222	82.27%	46,711	427,933	92.35%

(1) Exclusive of penalties and interest.

(2) Delinquent taxes include only amounts that have been delinquent less than three years.

Table 6

Town of Richlands, Virginia
Assessed Value of Taxable Property
Last Ten Fiscal Years

Fiscal Year	Real Estate	Public Service Corporation	Total
2009-10	$ 250,972,225	$ 10,417,493	$ 261,389,718
2010-11	253,304,900	9,916,473	263,221,373
2011-12	254,672,500	10,460,117	265,132,617
2012-13	274,891,300	11,250,521	286,141,821
2013-14	274,606,600	11,818,369	286,424,969
2014-15	275,127,700	10,719,704	285,847,404
2015-16	275,640,700	11,200,407	286,841,107
2016-17	276,450,600	12,692,299	289,142,899
2017-18	276,560,400	19,530,975	296,091,375
2018-19	271,870,300	20,337,852	292,208,152

Table 7

Town of Richlands, Virginia
Property Tax Rates
Last Ten Fiscal Years

Fiscal Year	Real Estate (1)
2009-10	$ 0.16
2010-11	0.16
2011-12	0.16
2012-13	0.16
2013-14	0.16
2014-15	0.16
2015-16	0.16
2016-17	0.16
2017-18	0.16
2018-19	0.16

(1) Per $100 of assessed value.

Table 8

Town of Richlands, Virginia
Ratio of Net General Bonded Debt to
Assessed Value and Net Bonded Debt Per Capita
Last Ten Fiscal Years

Fiscal Year	Population (1)	Assessed Value (in thousands)	Gross and Net Bonded Debt (2)	Ratio of Net Bonded Debt to Assessed Value	Net Bonded Debt per Capita
2009-10	5,639	$ 261,390	$ 3,934,684	1.51%	$ 698
2010-11	5,823	263,221	3,567,306	1.36%	613
2011-12	5,823	265,133	3,133,236	1.18%	538
2012-13	5,823	286,142	2,714,671	0.95%	466
2013-14	5,823	286,425	2,288,371	0.80%	393
2014-15	5,823	285,847	1,849,899	0.65%	318
2015-16	5,823	286,841	1,762,704	0.61%	303
2016-17	5,823	289,143	1,675,511	0.58%	288
2017-18	5,823	296,091	1,588,315	0.54%	273
2018-19	5,265	292,208	1,501,121	0.51%	285

(1) U.S. Census Bureau.

(2) Includes all long-term general obligation bonded debt and bonded anticipation notes. Excludes revenue bonds, capital leases, and compensated absences.

Table 9

Town of Richlands, Virginia
Computation of Legal Debt Margin
At June 30, 2019

Total assessed value of taxed real property	$ 292,208,152
Debt limit - 10 percent of total assessed value	29,220,815
Amount of debt applicable to debt limit	(1,501,121)
Legal debt margin	$ 27,719,694

COMPLIANCE SECTION

Independent Auditors' Report on Internal Control over Financial Reporting and on Compliance and Other Matters Based on an Audit of Financial Statements Performed in Accordance with *Government Auditing Standards*

To the Honorable Members of the Town Council
Town of Richlands, Virginia
Richlands, Virginia

We have audited, in accordance with the auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards,* issued by the Comptroller General of the United States; and the *Specifications for Audits of Counties, Cities, and Towns,* issued by the Auditor of Public Accounts of the Commonwealth of Virginia, the financial statements of the governmental activities, the business-type activities, and each major fund of the Town of Richlands, Virginia, as of and for the year ended June 30, 2019, and the related notes to the financial statements, which collectively comprise the Town of Richlands, Virginia's basic financial statements, and have issued our report thereon dated November 7, 2019.

Internal Control over Financial Reporting

In planning and performing our audit of the financial statements, we considered the Town of Richlands, Virginia's internal control over financial reporting (internal control) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing our opinions on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the Town of Richlands, Virginia's internal control. Accordingly, we do not express an opinion on the effectiveness of the Town of Richlands, Virginia's internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

Compliance and Other Matters

As part of obtaining reasonable assurance about whether the Town of Richlands, Virginia's financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the entity's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

Robinson, Farmer, Cox Associates

Blacksburg, Virginia
November 7, 2019