

# **Town of Benson**

## **System Development Fee Analysis**

Project No. 2293-CR  
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The logo for Wooten, featuring the word "Wooten" in a bold, dark blue sans-serif font. The letter "W" is stylized with a light blue triangle pointing upwards from its top-left corner.

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# 1. EXECUTIVE SUMMARY

In December 2017, the North Carolina General Assembly amended Chapter 162A of the General Statutes by passing House Bill 436. This amendment created “Article 8: System Development Fees”, and requires local governments to adopt uniform system development fees for public water and sewer systems by July 1, 2018, if the local government desires to charge system development fees thereafter. A factor driving the legislation is application of the ‘rational nexus text’, which requires decision makers to confirm the direct and reasonable connection between the impact of the new development, need for new infrastructure to support that development, and justify the appropriated **System Development Fees (SDFs)** necessary to support that growth. Prescribed methodologies to determine these SDFs are the *Buy-In (Equity) Cost Method, Incremental Cost (Marginal) Method, and Combined Cost Method.*

The Town of Benson has retained the professional engineering services provided by The Wooten Company to conduct the SDF analysis. The most practical methodology to calculate SDFs for the Town is the Combined Cost Method. This method accounts for the costs of existing infrastructure serving both existing and future customers while avoiding adverse financial impacts to existing customers for construction of new infrastructure necessary to support new development.

Based on existing infrastructure costs totaling \$9.4 million and the next five-year planned capital improvement costs totaling \$54.2 million (refer to **Appendix 4**), the unit cost per gallon of water is \$0.47 and unit cost per gallon of sewer is \$7.81, for a maximum allowable combined unit cost of \$8.28 per gallon, as shown in **Table 1.**

**Table 1. Maximum Allowable System Development Fees**

Meter Size, inches	Equivalent Ratio	Water Capacity Cost, \$/gallon	Sewer Capacity Cost, \$/gallon	Total Capacity Cost, \$/gallon	Total Capacity Cost, \$/connection <sup>1</sup>
5/8	1.0	\$0.47	\$7.81	\$8.28	\$2,980
1	2.5				\$7,450
1-1/2	5.0				\$14,900
2	8.0				\$23,840
3	16.0				\$47,690
4	25.0				\$74,520
6	50.0				\$149,040
8	80.0				\$238,460
10	115.0				\$342,790
12	215.0				\$640,870

<sup>1</sup> Based on 360-GPD use for a 5/8” residential connection.



For a 360-GPD residential (5/8" meter size) connection, the maximum allowable combined water and sewer SDF would be \$2,980. The unit cost takes into account \$2.5 million in accumulated depreciation for the existing infrastructure assets of \$9.4 million, for a net total cost of \$6.9 million eligible to recuperate from SDFs.

Commercial, institutional, and industrial connections, which require larger water meters, may be charged higher SDFs based on American Water Works Association (AWWA) – prescribed equivalent ratios or other approved rate adjustment factors. **Table 1** also shows SDFs for meters ranging in size from 1- to 12-inch. This analysis allows policymakers to make an informed decision when allocating system capacity costs between existing and new customers. It is expected that, at the rates listed in **Table 1**, water SDFs will generate \$51,600 and sewer SDFs will generate \$747,900 for a total of \$799,500 over a five-year planning horizon, to support necessary water and sewer infrastructure rehabilitation and expansion. The rates listed in **Table 1** represent the maximum rate supported by the SDF analysis. The Town can elect to assess lower rates at the Town's discretion. As required by the legislation, the Town of Benson will need to re-evaluate this analysis and proposed SDFs at a minimum every five years and make necessary fee adjustments.



## 2. INTRODUCTION

### 2.1 Background

The North Carolina General Assembly (NCGA) ratified House Bill 436 (HB 436)<sup>1</sup> in December of 2017, amending Chapter 162A: *Water and Sewer Systems*, Article 8: *System Development Fees* of the NC General Statutes (NCGS)<sup>2</sup>. HB 436 was codified as Session Law (SL) 2018-34. This legislation became effective on July 1, 2018. System development fees (SDFs) for water and sewer systems collected after that date must comply with HB 436/SL 2018-34, as amended. SDFs, also commonly known as capacity charges, are charges imposed to customers (users) to fund capital improvements for new development, to recuperate costs of existing facilities that serve new development, or a combination<sup>3</sup>. According to N.C. General Statute Chapter 162A, Article 8 beginning at section 162A-201, units of local government, authorities, and districts that provide water and sewer services are required to do the following:

- Calculate SDFs by using a buy-in, incremental, or combined costs method;
- Identify assumptions and limitations of the data analysis;
- Identify metric components of the SDF, demand, and capacity by customer class/category;
- Illustrate clear factors for units of measurement;
- Provide a 5- to 20-year planning timeline;
- Provide public notice and conduct a public hearing;
- Adopt fees by resolution or ordinance to incorporate into the jurisdiction’s annual budget; and
- Update and reevaluate the SDFs every five (5) years.

The University of North Carolina at Chapel Hill (UNC) School of Government (SOG) Environmental Finance Center (EFC)<sup>4</sup> and American Water Works Association (AWWA) *Manual of Water Supply Practices (M1)*<sup>5</sup> provide detailed guidance and considerations for SDF determinations. In general, jurisdictions will

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<sup>1</sup> North Carolina General Assembly (NCGA). “Public Water and Sewer System Development Fee Act.” *Local Government/Regulatory Fees, House Bill 436*. Session Law 2017-138. Ratified 20 December 2017. [HB 436] <https://www.ncleg.net/gascripts/billlookup/billlookup.pl?Session=2017&BillID=H436>

<sup>2</sup> North Carolina General Statutes (NCGS). Chapter 162A. *Water and Sewer Systems*. <https://www.ncleg.net/gascripts/Statutes/StatutesTOC.pl>

<sup>3</sup> NCGA. N.C. General Statute section 162A-207(b). <https://www.ncleg.net/gascripts/billlookup/billlookup.pl?Session=2017&BillID=H436>

<sup>4</sup> Hughes, Jeff & Millonzi, Kara. (2017, August 17). “Update on the Authority to Charge Water System Development Fees.” [Webinar]. University of North Carolina at Chapel Hill (UNC). School of Government (SOG). Environmental Finance Center (EFC). <https://efc.sog.unc.edu/resource/update-authority-charge-water-system-development-fees>

<sup>5</sup> American Water Works Association (AWWA). *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices (M1)*. 7<sup>th</sup> Edition, 2017.



need an inventory and condition of assets, financial commitment to capital improvements, and evidence of master planning strategies.

## **2.2 Purpose**

The Town of Benson, NC has requested The Wooten Company to provide professional consulting services, conduct an in-depth analysis of anticipated system costs, and project estimated revenues from SDFs using the Town’s existing infrastructure depreciation schedule and updated 2017-2032 Capital Improvements Plan (CIP). This analysis will include evaluation of System Development Fee methodologies, investigate the scenario that provides the optimum outcome, present findings, and calculate proposed SDFs for public comment and adoption by the Town Council.

### 3. METHODOLOGIES OF DETERMINING SYSTEM DEVELOPMENT FEES

System Development Fees (SDFs) are charges to new water and wastewater (sewer) system customers for system capacity. Revenue from these development fees funds capital improvements for new development, recuperates costs of existing facilities that serve new development, or some combination<sup>6</sup>. SDFs do not include routine Town administrative or system inspection fees, connection (tap) fees, or ancillary development costs without written agreement regarding credit to the developer. Available methodologies to calculate SDFs are the *Buy-In Method*, *Incremental Cost Method*, and *Combined Method*, as described in more detail below.

#### 3.1 Buy-In Method

The Buy-In Method, otherwise known as the equity method, is appropriate for use when the current system facilities are sufficient to serve existing and future customers or in systems where existing components do not anticipate needing replacement or expansion in the near future. In this approach, the past contributions of existing customers count as built-in equity accrued. New customers contribute equity (buy-in) to the system, relative to the debt-free position of current customers, accounting for their new share of the system cost. In simplest terms, the process of the buy-in method is to:

1. Identify existing capacity of assets;
2. Value that capacity;
3. Calculate a cost per unit of capacity; and
4. Provide conversion units to assign capacity based on customer type and demand.

The costs of facilities are based on system assets and liabilities, equity sources, and usage. Costs of system assets include replacement costs and depreciated value of that asset. System liabilities and equity include outstanding long-term debt, contributions such as grants, and revenues from existing users and customers. A common unit of measurement by type of customer and demand, such as *equivalent residential unit* (ERU), calculates the cost per unit of increased capacity. ERUs are converted to determine the SDF based on meter size (example “base” meter size, 5/8-inch meter), fixture units (number of water-using devices), square footage of property, or number of bedrooms. Revenue from SDFs using the Buy-In

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<sup>6</sup> NCGA. N.C. General Statute section 162A-205.

<https://www.ncleg.net/gascripts/billlookup/billlookup.pl?Session=2017&BillID=H436>



Method must be expended on repair or rehabilitation of system components, as well as previously completed capital improvements activities where capacity still exists for new customers.

### 3.2 Incremental Cost Method

The Incremental Cost Method, or marginal method, is appropriate for use when the current system facilities are sufficient to serve existing customers, but significant upgrades or expansion are required to serve any new customers. The primary concept of this approach is to charge new customers for the new development without existing user rates being adversely affected, but concurrently tackling the debt service associated with the capital improvements.

A primary step in calculating the SDF is determining the service area, such as jurisdictional boundaries or corporate limits. The SDF planning period aligned with projected growth and demand patterns within an existing master plan or Capital Improvements Plan (CIP), with projected growth and demand patterns for a 5- to 20-year lifespan to ensure adequate increase in needed system capacity.

Predicting future system expansion and capacity needs requires the type of customer, demand by customer type, and rate of growth over the planning period. Examples of customer types generally include residential, commercial, institutional, and industrial categories. Growth rates can include population and employment estimates. Just as with the Buy-In Method, a common unit of measurement by customer type or meter size is assigned a utilization rate equivalent to the typical ERU.

According to N.C. General Statute section 162A-207, the Incremental Cost Method must also account for revenue credit, which is a deduction of either the outstanding debt principal or present value of project revenues of the new development over the timeline of the planning period, at a minimum of twenty-five percent (25%) of cost of the capital improvements<sup>7</sup>. Separate construction or contribution credits may also be calculated to determine the excess cost of developer's share of connecting the new development to oversized facilities that accommodate anticipated future development.

System capacity expansion is more efficient and cost-effective when done in an incremental manner. The cost of each increment shifts to the new customers instead of the existing customers of the system. Revenue from collected SDFs covers the costs of constructing new capital improvements and related professional and technical fees to service new customer growth.

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<sup>7</sup> NCGA. N.C. General Statute section 162A-207(b).

<https://www.ncleg.net/gascripts/billlookup/billlookup.pl?Session=2017&BillID=H436>



### 3.3 Combined Method

The Combined Method is a combination of the two previous methods. The Buy-In Cost component and Incremental Cost component are added together. This approach is generally appropriate for use when the current system facilities have capacity to serve some of the new growth, but the CIP identifies infrastructure to be constructed to meet the needs of the projected growth. Calculation of SDFs using this method includes both existing and planned capacity.

### 3.4 Overall Technical Approach

To determine the most appropriate and logical approach to calculate SDFs, the jurisdiction must evaluate its service area priorities and financial objectives:

- Are major expansions anticipated?
- Will new developments solely pay for new capacity?
- What financial reserves exist for capital improvements?
- What is the current debt situation?
- Does current capacity adequately support the needs of the anticipated demand?
- Do current revenues adequately support the needs of the system?
- Are there any system assumptions or limitations?
- What does the local government hope to achieve by charging SDFs? (What is the financial function for SDFs?)
- Besides state legislation and local ordinances, are there any case law(s) applicable to the local system service area?
- Are there any unique criteria important to the jurisdiction or local system service area?

#### 3.4.1 Rational Nexus Test

A common legal consideration to apply when determining SDFs is the ‘rational nexus test’ to ensure appropriate relationship between the SDF and cost of the new development. The ‘rational nexus test’ requires the following:

- Confirm the direct and reasonable connection between the impact of the new development and need of new or expanded infrastructure (e.g., evaluation of master planning documents);



- Determine the cost of the new infrastructure to support the new development (e.g., evaluating intricacies of how new infrastructure is financed and its economic development contributions); and
- Demonstrate the rationale of appropriating the capital necessary to support that growth (e.g., providing a direct link between the establishment of fair and just fees to the amenities and benefits received by the new users of the new infrastructure).

### 3.4.2 Costs in SDF Calculations

The American Water Works Association (AWWA) *Manual of Water Supply Practices (M1)*<sup>8</sup> provides detailed guidance and considerations for SDF determinations. In general, costs related to existing system assets, estimated capital projects, interest costs, and reclaimed water costs can be included in calculating SDFs. **Table 2** summarizes the typical information needed to calculate the various methods.

**Table 2. Data Needed for SDF Calculations**

Data Needed	Buy-In / Equity Method	Incremental Cost / Marginal Method
Construction/Developer Contribution Credits	X	X
Actual Value of Assets	X	
Replacement Value of Assets	X	
Debt and Grant Credits	X	X
Revenue Credits		X
Existing Asset Inventory	X	
5-20 Year CIP		X
Capacity of Existing Assets	X	
Capacity of Planned CIP Assets		X
Estimated Capacity Needs of Customers based on Demand	X	X

<sup>8</sup> American Water Works Association (AWWA). *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices (M1)*. 7<sup>th</sup> Edition, 2017.



## 4. EXISTING CONDITIONS

Utility system components including water source and distribution as well as wastewater collection, treatment and discharge must be identified, and their overall condition assessed for adequacy to continue providing services to new customers.

### 4.1 Water Distribution System

The Town's primary water service area extends northward to Woodall Dairy Road and southward to Chicopee Road. The service area is bound on the west by Mingo Road and I-95 to the east, with some pipes extending past I-95 along E. Main Street and near the Benson Wastewater Treatment Plant (refer to **Appendix 1**). As shown in **Table 3**, according to the *2020 Local Water Supply Plan (LWSP)*<sup>9</sup>, the Town of Benson receives its potable water from one 16-inch interconnection with the City of Dunn and from one 12-inch interconnection with Johnston County. The contract amounts limit the amount of water that Benson can buy from Dunn and the County to a total of 1.290 MGD, although Benson can sell up to 0.01 MGD back to the County. Johnson County redistributes potable water throughout the county based on the demand requirements in each town. A single booster pump station, located off of Chicopee Road, helps distribute water throughout the Benson distribution system. The distribution system consists of 41 miles of 2- to 16-inch diameter water mains, predominately made of PVC. Lastly, the Town has 0.30 million gallons of elevated storage in a tank located off of E. Mann Street. To meet the requirements of 15A NCAC 18c .0805(c), the Town has contracted with the City of Dunn for an additional 0.20 million gallons of storage capacity.

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<sup>9</sup> North Carolina Department of Environmental Quality (NC DEQ). Division of Water Resources (DWR). *Local Water Supply Plans*. "Benson, 2020". [https://www.ncwater.org/Water\\_Supply\\_Planning/Local\\_Water\\_Supply\\_Plan/search.php](https://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/search.php)



**Table 3. Water System Components**

Component	Design Capacity	Overall Condition
Water Supply <sup>1</sup>	1.290 MGD	Satisfactory
Booster Pump Station	1 (1.25 MGD)	Satisfactory
Finished Water Storage	0.500 MGAL <sup>2</sup>	Satisfactory
Fire Hydrants	196	Satisfactory
Water Mains	41 miles, 2-16 inch	
<i>Asbestos Cement</i>	<i>4.1 miles, 6-16 inch</i>	<i>Satisfactory</i>
<i>Cast Iron</i>	<i>7.5 miles, 6-12 inch</i>	<i>Poor</i>
<i>Ductile Iron</i>	<i>5.2 miles, 6-16 inch</i>	<i>Satisfactory</i>
<i>Galvanized Iron</i>	<i>1.2 miles, 2 inches</i>	<i>Satisfactory</i>
<i>Polyvinyl Chloride</i>	<i>23 miles, 2-12 inch</i>	<i>Satisfactory</i>

<sup>1</sup> Drinking water is supplied through a contract with the City of Dunn (1.20 MGD) and Johnston County (0.09 MGD).

<sup>2</sup> Benson’s elevated storage tank provides 0.30 MGal in storage. The Town also contracts with the City of Dunn for an additional 0.20 MGal in storage.

In order to assess overall current water system demands and supply, Benson’s Local Water Supply Plans (LWSP) for 2015 to 2020 were evaluated (see **Appendix 2**). Finished water purchased from the City of Dunn and Johnston County is used to supply metered customers in the Town and for maintenance of the water distribution and sewer system (cleaning/flushing, flushing fire hydrants, jetting sewers, etc.), with some of the finished water being unmetered, “lost” through leaks, or due to metering inaccuracies (“unaccounted-for” water). On average, the Town of Benson water system loses about 16% of the finished water it produces; in 2020, the water loss was approximately 0.090 MGD. According to the latest 2020 LWSP, the water system serves 1,600 residential customers, 293 commercial customers, 15 institutional customers, and 3 industrial customers. The metered monthly water uses averages 0.195 MGD, 0.103 MGD, 0.008 MGD, and 0.426 MGD for residential, commercial, institutional, and industrial customers, respectively. Thus, a typical residential water customer has a metered average monthly water use of approximately 122 GPD, a typical commercial customer has 352 GPD, a typical institutional customer has 533 GPD, and a typical industrial customer has 142,000 GPD. The 2020 average daily metered total water use, including the 0.061 MGD used for system processes, is approximately 0.793 MGD. Based on the average daily usage and the maximum daily demand for the last five years, the average MDD-to-ADD ratio is about 1.56.



## 4.2 Wastewater Treatment & Collection

The primary sewer service area is nearly the same as the water system, bounded by Woodall Dairy Road to the north, Chicopee Road to the south, Mingo Road to the west, and I-95 to the east, with some pipes extending past I-95 along E. Main Street and near the Benson Wastewater Treatment Plant (WWTP). As shown in **Table 4**, according to the Town’s GIS database, the collection system consists of 11 miles of 2- to 8-inch diameter force main and 35.2 miles of 8- to 24-inch diameter gravity sewer pipe. The majority of the force main pipes are made of polyvinyl chloride (PVC), but some are also made of ductile iron pipe (DIP) and cast-iron pipe. Gravity sewer pipe is predominately made of vitrified clay (VCP) and PVC. The wastewater collection system also includes 11 pump stations and 665 manholes. The Town of Benson discharges all of its collected sewer to its 1.9-MGD WWTP for treatment. The Town also has a contract with Johnston County, in which the County can discharge up to 0.250 MGD of its sewer to Benson via two interconnections; this sewer is then treated at the Benson WWTP.

**Table 4. Sewer System Components**

Component	#/Design Capacity	Overall Condition
WWTP <sup>1</sup>	1.9 MGD	Satisfactory
Pump Stations	11 (50 gpm – 500 gpm)	Satisfactory
Force Main	11.0 miles, 2-8 inch	
<i>Cast Iron</i>	<i>0.65 miles, 6 inch</i>	<i>Satisfactory</i>
<i>Ductile Iron</i>	<i>3.3 miles, 4-6 inch</i>	<i>Satisfactory</i>
<i>PVC</i>	<i>7.0 miles, 2-8 inch</i>	<i>Satisfactory</i>
Manholes	665	Satisfactory
Gravity Main	35.2 miles, 8-24 inch	
<i>Concrete</i>	<i>0.7 miles, 10-15 inch</i>	<i>Satisfactory</i>
<i>Ductile Iron</i>	<i>2.2 miles, 8-24 inch</i>	<i>Satisfactory</i>
<i>Lined</i>	<i>4.0 miles, 8-15 inch</i>	<i>Satisfactory</i>
<i>PVC</i>	<i>15.1 miles, 3-15 inch</i>	<i>Satisfactory</i>
<i>Steel</i>	<i>0.06 miles, 8-16 inch</i>	<i>Satisfactory</i>
<i>Truss</i>	<i>1.60 miles, 8 inch</i>	<i>Satisfactory</i>
<i>VCP</i>	<i>11.5 miles, 8-18 inch</i>	<i>Satisfactory</i>
<i>Other</i>	<i>0.04 miles, 8 inch</i>	<i>Satisfactory</i>

<sup>1</sup> The Benson WWTP is in the process of designing an expansion to 3.75 MGD. Wastewater treatment is contracted to Johnston County.

According to the Town of Benson (refer to **Appendix 2**), the sewer system serves 1,429 residential customers, 256 commercial customers, 15 institutional customers, and 3 industrial customers. The metered monthly sewer productions are approximately 0.172 MGD, 0.197 MGD, 0.008 MGD, 0.300 MGD



and for residential, commercial, institutional, and industrial customers, respectively. Thus, a typical residential sewer customer has a metered average monthly sewer use of approximately 121 GPD, a typical commercial customer has 770 GPD, a typical institutional customer has 538 GPD, and a typical industrial customer has 99,887 GPD. In 2020, the estimated average daily sewer flow treated at the Benson WWTP was approximately 1.567 MGD, with about 0.102 MGD of this flow being from Johnston County. According to the 2020 sewer billed to Benson customers, the total sewer produced by its customers is approximately 0.677 MGD. Comparing this to the total volume of sewer discharged by Benson to its WWTP reveals the Town experience approximately 0.787 MGD in inflow and infiltration (I/I).

### 4.3 Total System Capacity

Available water system supply capacity is based on meeting the maximum daily demand (MDD) through water purchase and storage capacity, while available capacity for the wastewater collection and treatment system is based on average daily demand. For the water system, the MDD can be met by a combination of the Town’s contracted capacity with the City of Dunn and Johnston County capacity as well as by finished water storage in the system. Thus, for the water system, the available MDD capacity for new customers is equal to the contracted capacities with Dunn and Johnston County minus the existing 2020 maximum daily water demand. In 2020, the maximum daily water demand was approximately 1.133 MGD. As stated previously, the Benson WWTP treated approximately 1.567 MGD in 2020. **Table 5** lists available daily capacity for the water and wastewater systems.

**Table 5. Water and Sewer System Available Capacity**

System Capacity Million Gallons Per Day (MGD)	Design Capacity	Maximum Daily Demand	Average Daily Discharge	Available Daily Capacity
Water System	1.290 MGD	1.133 MGD <sup>1</sup>	---	<b>0.157 MGD</b>
Wastewater System	1.900 MGD	---	1.567 MGD	<b>0.333 MGD</b>

<sup>1</sup> Maximum Daily Demand is pulled from the 2020 LWSP



## 5. FUTURE CONDITIONS

To determine future capacity, planned water and sewer system components are identified and prioritized in the service area. Such improvements are typically identified in a 5- to 20-year capital improvements planning (CIP) document adopted by the governing body. The Town of Benson has an assets depreciation schedule compiled as of June 2022 (refer to **Appendix 3**); assets on this schedule were evaluated for SDF eligibility on the Buy-in Method. Benson's 2012 and 2018 Water and Sewer Capital Improvements Plans (CIP) were compiled into one CIP and updated to create a list of capital improvement water and sewer projects for the 2017-2032 period. The updated CIP is included at the end of **Appendix 3**. The projects listed within the 2017-2022 period are evaluated for potential use in the Buy-In Method and the projects listed in the future (2023-2027) are evaluated for potential use in the Incremental Method. Projects identified for the period 2028-2032 are not included in the SDF analysis.

### 5.1 Improvements to Existing Systems

#### 5.1.1 Existing Assets

Capital improvements to the existing water and wastewater systems are necessary to ensure continued reliable operation. System Development Fees (SDFs) may be charged based on existing asset values if excess capacity is available and after the assets have been depreciated to provide a proper current value. In this way, the SDFs can be charged to account for the remaining portion of the assets' useful service life. Currently, the Town annually straight-line depreciates its water and sewer assets based on expected service life. Depreciation is not accounted for in the user charges of existing water and sewer customers. The Wooten Company evaluated the existing depreciation asset schedule and 2017-2021 past projects in the CIP to determine projects to be used in the **Buy-In Method** (refer to **Appendix 3**).

The 132 projects in the depreciation schedule were reviewed and 61 of these projects were eliminated as these assets were unrelated to water/sewer utilities (e.g., buildings, equipment, land, vehicles, etc.), leaving 71 assets to be considered. Depreciation was provided on the depreciation schedule (refer to the schedule in **Appendix 3**). Out of the 71 assets considered, 17 of these assets were old enough to be considered fully depreciated, leaving 54 assets to be analyzed. These projects are highlighted in yellow in the depreciation schedule, which can be found in **Appendix 3**. Two assets listed on the depreciation schedule encapsulated multiple water/sewer projects or infrastructure with differing design capacities. In order to provide an accurate per-gallon estimate for SDFs, these assets were split



into multiple for analysis (e.g., Water Asset 70 was split into two for analysis since it involved the installation of 8-inch and 12-inch water lines), increasing the 54 assets from the schedule being analyzed in the Buy-in Method to 57. In addition to these 57 assets, there are 16 assets from projects identified in the 2017 – 2022 period of the CIP. In comparing these 16 CIP projects to the 57 depreciation assets, there is some overlap. For example, Depreciation Asset 180 (I-40 Pump Station) is also identified as the CIP Asset “I-40 Pump Station #1 Rehabilitation” Project. In order to be conservative, those CIP Assets that were identified as one of the 57 depreciation assets (i.e., “Manhole Rehabilitation and Repair” and “I-40 Pump Station #1 Rehabilitation”) were excluded from the SDF analysis. As a result, 13 of the 16 assets projects identified in the 2017 – 2022 CIP were included in the SDF worksheets. Adding the 57 assets from the depreciation schedule and the 13 assets from the CIP together produces 70 water and sewer system assets, shown in the Buy-In SDF worksheets in **Appendix 4**.

The evaluation described above provided a listing of (not yet fully depreciated) projects that are potentially eligible to be included in the SDF Buy-in analysis. At this point, The Wooten Company performed additional evaluation to determine the current net project cost for the CIP projects after depreciation. Depreciation was calculated via the straight-line method, which is based on the Construction Cost Index (CCI) and the year of project completion, for the CIP projects (refer to CCI Worksheet in **Appendix 4**). Those projects completed within the past year (2022) were assumed to have negligible depreciation.

Assets were further excluded from eligibility for SDFs if (1) the asset was equipment (i.e., pumps), (2) the asset was fully grant funded, or (3) the specific asset is not of sufficient size to serve additional future users (i.e., 8-inch or smaller gravity sewers, 6-inch or smaller water lines, or wastewater pump stations serving a limited geographic area). The results of the asset evaluation are listed below:

- Based on a total of 70 assets identified, the original asset value of \$9.4 million for these assets was reduced by accumulated depreciation to date of \$2.5 million; to yield a total net asset value of \$6.9 million.
- Of the 70 existing assets, 28 assets were ineligible because the assets were undersized (e.g., 6-inch or smaller water lines, 8-inch gravity sewer) or the capacity of the asset supported only a small portion of the Town (e.g., the Willa Chase Sewer System only serves a small area of the town). In addition, 18 additional assets were ineligible because the cost was for pumps or for operation and maintenance of the Town’s water or sewer lines, manholes, or pump stations. Lastly, two (2) assets were ineligible as they were the costs for installing a spray irrigation system



at the WWTP or the cost of the original 1.5-MGD WWTP, which no longer has capacity for future developers.

- Finally, nine (9) additional assets were considered ineligible because not enough information is known about the assets to analyze further; these were marked ineligible.
- In total, 13 assets are eligible for SDFs. These assets include previous installations of 8- to 16-inch water mains, installation of 10-inch gravity sewer, the Carolyn Drive Pump Station, the S. Walton Avenue Pump Station, the installation of a new 8-inch force main for the Carolyn Drive Pump Station, and the installation of a new 8-inch force main for the S. Walton Avenue Pump Station. The SDF eligible projects are highlighted in bold text on the SDF Buy-in Methodology Table in **Appendix 4**. These assets are also listed in **Tables 9 and 10** in Section 6.1.

### 5.1.2 Future Projects

To evaluate planned projects applicable to the **Incremental Cost Method**, the Town's updated 2017-2032 Capital Improvements Plan (CIP)<sup>10</sup> was examined (refer to **Appendix 3**). The CIP specifically identifies improvements to the existing utility systems, including the necessary utility transmission extensions and expansions to meet future demands. Some of the project costs on the 2023-2029 CIP were updated to future dollars by applying a 3% annual inflation rate. The projects on the CIP for the 2023-2027 period were evaluated in regard to the percentage of the project that could potentially serve future users. Projects from the 2017-2032 CIP were excluded from this SDF analysis if the project's implementation occurs during the year 2027 or beyond. The results of this evaluation for each project are listed below:

#### Water CIP Projects

- **Assets W-1 through W-3:** *Water System Improvements – Phase 3*. This project will involve the replacement of deteriorated 2-inch, 6-inch, 8-inch, and 12-inch water mains. To distinguish between the SDF eligible and the SDF ineligible costs of these improvements, the project was separated into three asset items for the SDF analysis. Each asset is distinguished by the size of the water main that is being replaced as part of the project. The total cost of the project is approximately \$1.19 million. The specifics of each asset are detailed below:

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<sup>10</sup> Town of Benson, NC. 2017-2032 Capital Improvements Plan (CIP).



- **Asset W-1:** Approximately 55% of the length of water main being replaced are 2 and 6 inches in diameter. Therefore, the cost of this asset is \$1.19 million x 55% = \$655,270. This asset is **ineligible** because water mains that are 6 inches or smaller are too small to be eligible.
- **Asset W-2:** Approximately 35% of the length of water main being replaced is 8 inches in diameter. Therefore, the cost of this asset is \$1.19 million x 35% = \$416,990. As discussed in Section 6.3, a 25% credit (~\$104,250) is applied to the remaining cost. It is unknown how much of the capacity of the 8-inch water line is being utilized by existing customers and thus how much is left for use by future customers. Given the 8-inch water line is in a moderately developed area, it was assumed 50% of the capacity in the 8-inch water main is currently being utilized by existing customers, and thus 50% of the 8-inch line's capacity (1.010 MGD) remains to serve future growth. Therefore, this project is **50% SDF eligible**.
- **Asset W-3:** Approximately 10% of the length of water main being replaced is 12 inches in diameter. Therefore, the cost of this asset is \$1.19 million x 10% = \$119,140. As discussed in Section 6.3, a 25% credit (~\$29,800) is applied to the remaining cost. It is unknown how much of the capacity of the 12-inch water line is being utilized by existing customers and thus how much is left for use by future customers. Given the 12-inch water line is in a heavily developed area, it was assumed 75% of the capacity in the 12-inch water main is currently being utilized by existing customers, and thus 25% of the 12-inch line's capacity (2.450 MGD) remains to serve future growth. Therefore, this project is **25% SDF eligible**.
- **Assets W-4 through W-5: *Water System Improvements – Phase 4*.** This project will involve the replacement of deteriorated 2-inch, 6-inch, and 8-inch water mains. To distinguish between the SDF eligible and the SDF ineligible costs of these improvements, the project was separated into two asset items for the SDF analysis. Each asset is distinguished by the size of the water main that is being replaced as part of the project. The total cost of the project is approximately \$1.11 million. The specifics of each asset are detailed below:
  - **Asset W-4:** Approximately 60% of the length of water main being replaced are 2 and 6 inches in diameter. Therefore, the cost of this asset is \$1.11 million x 60% = \$664,200. This asset is **ineligible** because water mains that are 6 inches or smaller are too small to be eligible.
  - **Asset W-5:** Approximately 40% of the length of water main being replaced is 8 inches in diameter. Therefore, the cost of this asset is \$1.11 million x 40% = \$442,800. As discussed in



Section 6.3, a 25% credit (~\$110,700) is applied to the remaining cost. It is unknown how much of the capacity of the 8-inch water line is being utilized by existing customers and thus how much is left for use by future customers. Given the 8-inch water line is in a heavily developed area, it was assumed 75% of the capacity in the 8-inch water main is currently being utilized by existing customers, and thus 25% of the 8-inch line's capacity (1.010 MGD) remains to serve future growth. Therefore, this project is **25% SDF eligible**.

- **Asset W-6: West Parrish Drive (6") Waterline Replacement.** This project involves the replacement of the existing 6-inch water line along West Parrish Drive. These improvements are conservatively anticipated to cost \$738,100. This project is **ineligible** because water mains that are 6 inches or smaller are too small to be eligible.
- **Asset W-7: Elm Street (6") Waterline Replacement.** This project involves the replacement of the existing 6-inch water line along Elm Street. These improvements are conservatively anticipated to cost \$345,500. This project is **ineligible** because water mains that are 6 inches or smaller are too small to be eligible.
- **Asset W-8: West Woodall Street (6") Waterline Replacement.** This project involves the replacement of an existing 6-inch water line along West Woodall Street. These improvements are conservatively anticipated to cost \$325,300. This project is **ineligible** because water mains that are 6 inches or smaller are too small to be eligible.
- **Asset W-9: Chicopee Road Waterline Replacement.** This project involves the replacement of an existing 16-inch water line along Chicopee Road, which is the main water line from the Town's booster pump station. These improvements are conservatively anticipated to cost \$271,400, with credits of \$67,850 (25%). In 2022, the pump runtimes for the Booster Pump Station indicate that the station was pumping approximately 0.671 MGD. All water from the booster pump station is pumped through the Chicopee Road 16-inch water line before reaching the Town's elevated storage tank. This means that, of the 16-inch water line's 4.460-MGD total capacity, only 0.671 MGD is being utilized by existing customers. As a result, 85% of the capacity of the 16-inch water line is available for future growth. Therefore, this project is **85% SDF eligible**.
- **Assets W-10 through W-13: Replace Existing Asbestos Cement Pipes.** This project will involve the replacement of 6-inch, 8-inch, 12-inch, and 16-inch asbestos cement water mains throughout the Town. The costs of this project are distributed over the 2027-2031 period. For this SDF analysis,



only the costs incurred during the year 2027 are analyzed. The total cost of the project in 2027 is approximately \$1.10 million. To distinguish between the SDF eligible and the SDF ineligible costs of these improvements, the project was separated into four asset items for the SDF analysis. Each asset is distinguished by the size of the water main that is being replaced as part of the project. The specifics of each asset are detailed below:

- **Asset W-10:** Approximately 28% of the length of water main being replaced are 6 inches in diameter. Therefore, the cost of this asset is \$1.10 million x 28% = \$309,288. This asset is **ineligible** because water mains that are 6 inches or smaller are too small to be eligible.
- **Asset W-11:** Approximately 11% of the length of water main being replaced is 8 inches in diameter. Therefore, the cost of this asset is \$1.10 million x 11% = \$121,506. As discussed in Section 6.3, a 25% credit (~\$30,400) is applied to the remaining cost. It is unknown how much of the capacity of the 8-inch water line is being utilized by existing customers and thus how much is left for use by future customers. Given the 8-inch water line is in a heavily developed area, it was assumed 75% of the capacity in the 8-inch water main is currently being utilized by existing customers, and thus 25% of the 8-inch line's capacity (1.010 MGD) remains to serve future growth. Therefore, this project is **25% SDF eligible**.
- **Asset W-12:** Approximately 14% of the length of water main being replaced is 12 inches in diameter. Therefore, the cost of this asset is \$1.10 million x 14% = \$154,644. As discussed in Section 6.3, a 25% credit (~\$38,700) is applied to the remaining cost. It is unknown how much of the capacity of the 12-inch water line is being utilized by existing customers and thus how much is left for use by future customers. Given the 12-inch water line is in a heavily developed area, it was assumed 75% of the capacity in the 12-inch water main is currently being utilized by existing customers, and thus 25% of the 12-inch line's capacity (2.450 MGD) remains to serve future growth. Therefore, this project is **25% SDF eligible**.
- **Asset W-13:** Approximately 47% of the length of water main being replaced are 16 inches in diameter. Therefore, the cost of this asset is \$1.10 million x 47% = \$519,162. As discussed in Section 6.3, a 25% credit (~\$129,800) is applied to the remaining cost. It is unknown how much of the capacity of the 16-inch water line is being utilized by existing customers and thus how much is left for use by future customers. Given the 16-inch water line is in a moderately developed area, it was assumed 50% of the capacity in the 16-inch water main is currently



being utilized by existing customers, and thus 50% of the 16-inch line's capacity (4.460 MGD) remains to serve future growth. Therefore, this project is **50% SDF eligible**.

- **Asset W-14:** *Remove Existing 2" Galvanized Iron Pipes.* The 2-inch Galvanized Iron pipes throughout the Town will be abandoned in place and the service laterals initially connect to the 2-inch pipes will be reconnected to the nearest larger water main. These improvements are conservatively anticipated to cost \$327,000. This project is **ineligible** because water mains that are 6 inches or smaller are too small to be eligible.
- **Asset W-15:** *Upsize Fire Protection Mains to 6-inch Pipes.* Undersized water mains throughout the Town will be replaced with 6-inch pipes in order to improve fire protection for the Town. These improvements are conservatively anticipated to cost \$84,900. This project is **ineligible** because water mains that are 6 inches or smaller are too small to be eligible. Furthermore, this project will only serve existing customers.
- **Asset W-16:** *Elevated Water Tank Improvements.* The existing elevate storage tank will be rehabilitated in the year 2023. These improvements are conservatively anticipated to cost \$500,000, with credits of \$125,000 (25%). The tank currently discharges into a 12-inch water main (2.450 MGD). According to the 2020 LWSP, Benson's Maximum Daily Demand was 1.133 MGD. This means that there is  $2.450 \text{ MGD} - 1.133 \text{ MGD} = 1.317 \text{ MGD}$  for future water customers. Therefore, this project is **54% SDF eligible**.
- **Asset W-17:** *Rehabilitate Existing Water Tower Vault.* Rehabilitation of the vault at the Town's water elevated tank was not included in the Elevated Water Tank Improvements. These improvements are conservatively anticipated to cost \$52,000. This project is **ineligible** because it involves a minor improvement to the water tower.
- **Asset W-18:** *12" Insert Valve for Water Tower Isolation.* Rehabilitation of the vault at the Town's water elevated tank was not included in the Elevated Water Tank Improvements. These improvements are conservatively anticipated to cost \$27,000. This project is **ineligible** because it involves a minor improvement to the water tower.
- **Asset W-19:** *Booster Station Rehabilitation.* The Town's booster pump station will have its pumps and motors replaced. These improvements are conservatively anticipated to cost \$34,000, with credits of \$8,500 (25%). In 2022, the pump runtimes for the Booster Pump Station indicate that the station was pumping approximately 0.671 MGD. Given the 1.25-MGD capacity of the booster



pump station will remain unchanged, this means that 46% of the capacity of the booster pump station is available for future growth. Therefore, this project is **46% SDF eligible**.

### Sewer CIP Projects

- **Asset S-1: Benson WWTP Improvements.** During Hurricane Matthew and again during Florence, the 1.9-MGD Benson WWTP experienced critical issues as a result of receiving volumes of flow beyond the peak hydraulic treatment capacity of critical treatment units. Specifically, the plant's headworks (mechanical screen and grit removal system) was incapable of manage screenings and grit load to the plant during Florence, and the abrasive nature of the grit that passes through the headworks has led directly to increased wear on the downstream components. This has resulted in continual increased maintenance of the subject mechanical components of the headworks. Additionally, the brush aerators in the oxidation ditches are compromised during high flow events, requiring more attention than normal with regards to maintenance and measures to keep the units operable, leading to increased manhours and maintenance costs. The purpose of this project is to replace the headworks and oxidation ditch brush aerators at the Benson WWTP. These improvements are conservatively anticipated to cost \$3,533,000 and will be funded via a CWSRF loan. According to the Benson WWTP's Discharge Monitoring Reports (DMR) for the year 2021, the WWTP discharged an average daily flow of 1.269 MGD. Given the 1.9-MGD capacity of the WWTP will remain unchanged, this means that 33% of the capacity of the WWTP is available for future growth. Therefore, this project is **33% SDF eligible**. A required SDF credit of \$883,250 (25%) is applied to this item.
- **Asset S-2: Benson WWTP Expansion to 3.75 MGD.** When the Benson WWTP received flow in excess of 80% of its capacity, state law requires that the Town begin the process of planning the expansion of their plant. The Benson WWTP will be expanded to a permitted capacity of 3.75 MGD by the year 2024, in order to provide additional treatment capacity to the future customers of the town. These improvements are conservatively anticipated to cost \$35.3 million, with credits of \$8.825 million (25%). Comparing the 2021 average daily flow of 1.269 MGD experienced by the plant to the 3.75-MGD capacity the plant will have as a result of this project, this project is considered **66% SDF eligible**.
- **Asset S-3: Catherine St. Area – Hydraulic Modeling Results.** As part of the 2018 Wastewater Collection System CIP, hydraulic modeling was completed of the Town's sewer system. The model identified one location where the pipes were nearing full capacity: the 8-inch gravity sewer pipes



(0.203 MGD) along Catherine Street. This project will upsize these gravity sewers to 10-inch pipes (0.308 MGD) to provide more capacity and to ensure that increased commercial and industrial development will not cause a sanitary sewer overflow. These improvements are conservatively anticipated to cost \$830,000, with credits of \$207,500 (25%). This project will be **34% SDF eligible**.

- **Asset S-4:** *N. Lincoln St. / W. Martin St. Sewer Improvements*. This project's main goal is to address inflow and infiltration issues at sewer manholes E004 and E005. When a large storm would come through the Town, these manholes would consistently overflow. To reduce inflow and infiltration, the gravity sewer in the area surrounding the manholes will be replaced with equal or larger diameter pipes. The project will also include reparation, rehabilitation, or replacement of manholes. These improvements are conservatively anticipated to cost \$2,060,000 and will be fully funded through a CDBG-I grant. Because the project is fully funded via a grant, there is no cost lost by the Town via this project that must be recouped with SDFs. Therefore, it was excluded from further analysis.
- **Asset S-5:** *I-40 Pump Station #1 Rehabilitation*. The I-40 Pump Station will need to be rehabilitated in the year 2025. These improvements are conservatively anticipated to cost \$500,000. This project is considered **ineligible** because the station only serves a small section of the Town.
- **Asset S-6:** *Burriss Pump Station #10 Rehabilitation*. Like the I-40 Pump Station, the Burriss Pump Station will need to be rehabilitated in the year 2025. These improvements are conservatively anticipated to cost \$500,000. This project is considered **ineligible** because the station only serves a small section of the Town.
- **Asset S-7:** *Smoke Testing and Cleaning Sewers*. As part of the 2018 Wastewater Collection System CIP, smoke testing and CCTV was completed to further identify defects in the gravity sewer system that require repair. Smoke testing primarily identifies areas of smoke egress which directly connect into the sewer lines, contributing to increased inflow of stormwater into the sanitary sewers. This smoke testing will be continued over the 2023-2029 period. Over the 2023-2027 period, this project is conservatively anticipated to cost \$377,000. Smoke testing and cleaning of sewers is not considered an eligible expense to be recouped by SDFs, as it is considered operation and maintenance. Therefore, this project is considered **ineligible**.



- **Asset S-8: Find-and-Fix Capital Repairs.** As part of the 2018 Wastewater Collection System CIP, smoke testing and CCTV was completed to further identify defects in the gravity sewer system that require repair. These line repairs are conservatively anticipated to cost \$1.69 million over the 2025-2027 period. Point repairs of sewer lines are not considered an eligible expense to be recouped by SDFs. Therefore, this project is considered **ineligible**.
- **Asset S-9: Long Range Sewer Line Master Plan.** A master plan was recommended by the 2018 Wastewater Collection System CIP. The plan will project future growth for the system based on demands from new subdivision, residential growth, and commercial/industrial growth and include the results of an updated hydraulic model. The study will allow the Town to see where capacity issues will be as a result of the growth. While the study is conservatively anticipated to cost \$47,000, it is considered **ineligible** as it is a study.
- **Asset S-10: Abandon Lake Shore & Boardwalk Pump Stations.** The Lake Shore and Boardwalk Pump Stations will be abandoned and replaced with an 8-inch gravity sewer system that will divert flows from the areas served by these stations to the Carolyn Pump Station. The purpose of this project is to improve operational efficiency and reduce costs, as well as to increase the system's reliability. These improvements are conservatively anticipated to cost \$1.57 million. This project is considered **ineligible** because it only serves a small portion of Town and does not allow for additional growth to tie into the downstream pump stations.
- **Asset S-11: Abandon King Circle & Chicopee Pump Stations.** The King Circle and Chicopee Pump Stations will be abandoned and replaced with a gravity sewer system that will divert flows from the areas served by these stations to a new pump station to be built adjacent to I-95. As with **Asset S-10**, the purpose of this project is to improve operational efficiency, reduce operation and maintenance costs, and increase the sewer system's reliability. These improvements are conservatively anticipated to cost \$1.57 million. This project is considered **ineligible** because it only serves a small portion of Town and does not allow for additional growth to tie into the downstream pump stations.
- **Assets S-12 through S-13: Rehabilitate Sewer Lines from Manholes A088 to A084.** This project will involve the rehabilitation of 15-inch and 16-inch gravity sewers along a section of Chicopee Road. The total cost of the project is approximately \$68,000. The project was separated into two asset items for the SDF analysis, each distinguished by the size of the gravity sewer being rehabilitated. The specifics of each asset are detailed below:



- **Asset S-12:** Approximately 20% of the length of gravity sewers being rehabilitated are 16 inches in diameter. Therefore, the cost of this asset is  $\$68,000 \times 20\% = \$13,600$ . As discussed in Section 6.3, a 25% credit ( $\sim \$3,400$ ) is applied to the remaining cost. The biggest industry in this service area (as well as in the entire Town) is Berry Global. From June 2019 to May 2020, Berry Global discharged approximately 0.256 MGD into the nearby gravity sewers. It is assumed Berry Global makes up the majority of the flow in this area and thus all other contributions to the sewer line are negligible. This means that only 0.256 MGD of the capacity of the 16-inch gravity sewer (0.763 MGD) is being utilized by existing customers and thus only 66% of the 16-inch line's capacity remains to serve future growth. Therefore, this project is **66% SDF eligible**.
- **Asset S-13:** Approximately 80% of the length of gravity sewer being rehabilitated are 15 inches in diameter. Therefore, the cost of this asset is  $\$68,000 \times 80\% = \$54,400$ . As discussed in Section 6.3, a 25% credit ( $\sim \$13,600$ ) is applied to the remaining cost. The biggest industry in this service area (as well as in the entire Town) is Berry Global. From June 2019 to May 2020, Berry Global discharged approximately 0.256 MGD into the nearby gravity sewers. This means that only 0.256 MGD of the capacity of the 15-inch gravity sewer (0.665 MGD) is being utilized by existing customers and thus only 62% of the 15-inch line's capacity remains to serve future growth. Therefore, this project is **62% SDF eligible**.

## 5.2 Future Demand

The future water and sewer demands are projected five years forward through 2027 to gauge the need for improvements during the five-year planning period. Based on historic population trends in the US Census data, Benson population increased from 3,311 persons in 2010 to 3,967 persons in 2020. This increase of 656 persons is equivalent to an annual residential growth rate of 1.98%. The North Carolina State Data Center projects that Johnston County will experience population growth at a rate of about 1.96% annually. It is, therefore, reasonable to estimate future population growth in Benson to be approximately 2% for the next five years. Using a 2% annual growth rate and a 2020 population of 3,967 people, the projected 2027 service population for Benson is estimated to be 4,522 people (555 additional people).

In addition to the projected population, future demand estimates must also account for future developments and annexations. According to the Town of Benson, there are 17 proposed developments



in the near future. **Appendix 4** includes a list of the developments and the number of metered connections they will add to the Benson water and sewer systems. Seven of the proposed developments will all add new commercial metered connections to the Benson system, while the remaining 10 proposed developments will add new residential metered connections to the system. In total, the proposed developments will contribute 386 residential metered connections and 9 commercial metered connections.

Based on these anticipated numbers, the number of residential metered connections is expected to increase at an annual growth rate of 3.3% – 3.7% and non-residential connections will grow up to 0.50% per year (see the Growth Projections Worksheet in **Appendix 4**). Because the Town population is expected to grow at 2% per year, it is reasonable to assume that the number of active residential connections will grow at 3% per year for this SDF analysis; this will also provide a more conservative estimate. In regard to non-residential connections (commercial, institutional, and industrial), it was assumed that the number of connections will grow at 0.50% per year for the next five years. Based on these numbers, **Table 6** shows the projected number of water and sewer future connections for the Town during the 2020-2027 period.

**Table 6. Number of Projected Connections**

<b>WATER CONNECTIONS</b>	<i>Existing (2020)</i>	<i>Future (2027)</i>
Residential	1,600	1,936
Commercial	293	303
Industrial	15	16
Institutional	3	3
<b>TOTAL WATER</b>	<b>1,911</b>	<b>2,258</b>

<b>SEWER CONNECTIONS</b>	<i>Existing (2020)</i>	<i>Future (2027)</i>
Residential	1,429	1,729
Commercial	256	265
Industrial	15	16
Institutional	3	3
<b>TOTAL SEWER</b>	<b>1,703</b>	<b>2,013</b>



According to calculation guidelines from state administrative code and statutes<sup>11,12,13</sup>, increases in population and water and sewer demands are anticipated with the additional connections in **Table 6**. Projected water demands are based on the existing average demands and MDD peaking factors as determined in Section 4.1 and then adding the new customers from **Table 6** (for 2027). For future water demands, a metered average monthly water use of 150 gpd/connection was used for future residential water demands and non-residential demands were based on 2020 LWSP data. For future sewer demands, a metered average monthly sewer use of 135 gpd/connection (i.e., 90% of the future residential water demand, 150 gpd/connection) was used for future residential sewer demands and non-residential demands were based on 2020 town billing information (refer to **Appendix 2**).

**Table 7** lists the estimated 2027 water demands. In 2020, the total metered flow was approximately 0.793 MGD. About 16% of the water purchased by the Town for distribution is lost before reaching the customers and it is assumed that this will remain constant for the next five years. Therefore, the total projected 2027 ADD is equivalent to the sum of the existing ADD, the additional flow as a result of the additional connections, and the additional water lost (i.e., ~16% x ADD Total). In order to calculate the projected 2027 MDD, the average MDD-to-ADD ratio of 1.56 was utilized. The projected 2027 MDD of 1.574 MGD exceeds the current contracted capacity of 1.290 MGD with Johnston County and the City of Dunn. To meet this future demand, the Town will need to negotiate a new agreement with the City of Dunn and/or Johnston County. Improvements to the Dunn and Johnston County Water Systems in meeting this demand is at the discretion of the City and the County.

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<sup>11</sup> North Carolina Administrative Code (NCAC). 15A NCAC 02T. *Waste Not Discharged to Surface Waters*.

<http://reports.oah.state.nc.us/ncac.asp?folderName=\Title%2015A%20-%20Environmental%20Quality\Chapter%2018%20-%20Environmental%20Health>

<sup>12</sup> NCAC. 15A NCAC 18C .0409. *Service Connections*. <http://reports.oah.state.nc.us/ncac.asp?folderName=\Title%2015A%20-%20Environmental%20Quality\Chapter%2018%20-%20Environmental%20Health>

<sup>13</sup> NCGS. Chapter 162A. *Water and Sewer Systems*. <https://www.ncleg.net/gascripts/Statutes/StatutesTOC.pl>



**Table 7. Estimated Water Demands, 2027**

Expanded Service Area Customer Type	Quantity	Design Flow (gallons per unit per day)	Average Daily Design Flow (MGD)
Existing Customer Demand	---	---	0.793
New Residential	336	150	0.050
New Commercial	10	350	0.004
New Institutional	1	530	0.001
New Industrial	0	142,000	0.000
<b>ADD Billable Total</b>			<b>0.848</b>
<b>Unaccounted-For Water:</b>			0.161
<b>ADD Total</b>			<b>1.009</b>
<b>MDD:ADD Ratio</b>			1.56
<b>MDD Total</b>			<b>1.574</b>

**Table 8** provides estimated sewer demands based on existing average daily demand for the residential, commercial, institutional, and industrial customer categories and projected demand per connection for future customers. As stated in Section 4.2, the Town billed its customers for approximately 0.677 MGD (not including I/I flow) in 2020. For this calculation, it is assumed the volume of I/I in 2020 (0.787 MGD) will remain constant for the next five years. New residential and non-residential wastewater flows are based on the Town’s 2020 sewer billing information. In addition to the metered sewer flow and I/I flow from Benson, the Town must have enough sewer treatment capacity available to treat up to 0.250 MGD from Johnston County. Therefore, the 2027 Average Daily Flow (ADF) estimates result in a total ADF of 1.763 MGD, which is just under the current capacity of the 1.90-MGD Benson WWTP. However, as stated previously, Benson is in the process of designing the expansion to their WWTP in order to increase its capacity to 3.75 MGD, which will cover this sewer demand.



**Table 8. Estimated Sewer Demand, 2027**

Expanded Service Area Customer Type	Quantity	Design Flow (gallons per unit per day)	Average Daily Design Flow (MGD)
Existing Base Wastewater Flow	---	---	0.677
New Residential	300	135	0.041
New Commercial	9	770	0.007
New Institutional	1	540	0.001
New Industrial	0	99,900	0.000
		<b>ADF Billable Total</b>	<b>0.725</b>
		I/I	0.787
		<b>Contracted Sewer</b>	<b>0.250</b>
		<b>ADF Total</b>	<b>1.763</b>

### 5.3 Assumptions & Limitations

The projected 2027 water and wastewater demands are subject to change, given the developmental pace of the Town of Benson. The intent of the capacity discussion above was to demonstrate the future water and sewer demands required of Benson to sufficiently handle the projected population within the five-year planning period of the SDF analysis.

### 5.4 Water System and Sewer System Future Improvements

Future improvements for the water distribution system and the wastewater collection system to serve future growth within the five-year SDF planning period were identified. These improvements were detailed in Section 5.1.2.

### 5.5 Methodology Selection

Remaining capacity exists within both the water and wastewater systems to serve near term growth within Benson. Because the depreciated assets identified in Section 5.1.1 can serve future population growth without expansion, their remaining non-depreciated value is appropriate to recover using the Buy-in Cost Methodology.

Likewise, projects identified in Section 5.1.2 are associated with projects required that are needed to service future growth. The Incremental Cost Methodology is appropriate to charge new development for the increased capacity to serve it. For example, the costs for the additional capacity related to



wastewater collection and treatment to extend service to the proposed subdivision developments should be borne by the new development being served.

Therefore, the **Combined Cost Method**, employing both the Buy-in Cost Methodology and Incremental Cost Methodology, is appropriate for the Town of Benson to assess System Development Fees.



## 6. ANALYSIS OF SYSTEM DEVELOPMENT FEES

The **Buy-In (Equity) Cost Method** is appropriate when the existing system facilities are sufficient to service existing and new customers. The primary concept of this approach is to charge new customers for their equitable share of an asset with remaining service life. The **Incremental Cost (Marginal) Method** is appropriate when the existing system facilities are sufficient to serve existing customers, but significant upgrades or expansion are required to serve any new customers. The primary concept of this approach is to charge new customers for the new development without adversely affecting user rates for the existing customers. Benson has a need for both methodologies; therefore, the **Combined Cost Method** is appropriate. The full tables for the SDF Combined Cost Method are presented in **Appendix 4**.

### 6.1 Buy-In Component for Existing Facilities

**Water System:** Water system improvements are grouped into three categories in **Table 9** – 8”, 12”, and 16” diameter water lines. The 8” water line category includes the installation of water lines from US Hwy 301 to NC Hwy 27, along S. McLamb Street, and along N. McLamb Street from Main Street to W. Hill Street. The 12” water line category includes the extension of water lines from US Hwy 301 to NC Hwy 27, W. Church Street, and along S. Walton Drive from Main Street to 300 S. Walton Drive. With a net total cost of approximately \$190,000 eligible for SDFs, the total water cost per gallon of capacity is \$0.03.

**Wastewater System:** Wastewater system improvements have been grouped into three categories in **Table 10** – 10” diameter sewer extension, the Carolyn Drive Pump Station #2 with its corresponding force main, and the S. Walton Avenue Pump Station #7 with its corresponding force main. The 10” sewer extension is the installation of gravity sewer along S. Walton Drive from Main Street to 300 S. Walton Drive. With a net total cost of \$1.2 million eligible for SDFs, the total sewer cost per gallon of capacity is \$1.95.



**Table 9. Water System Buy-In Valuation**

Group Asset ID	Total Costs, \$	Total Credits, \$	Net Total Cost, \$	Capacity, MGD	% SDF Eligible	Net Total Cost per Gal Capacity, \$/GPD
8" Water Lines (Asset 70-A)	80,000	[35,940]	44,060	1.010	40%	0.02
8" Water Lines (Assets 166 and 179)	50,845	[42,782]	8,063	1.010	25%	0.00
12" Water Lines (Assets 70-B and 175)	255,150	[119,487]	135,663	2.450	25%	0.01
12" Water Lines (Asset 242)	10,240	[10,181]	59	2.450	97%	0.00
16" Water Lines (Asset 228)	21,190	[19,479]	1,711	4.460	79%	0.00
16" Water Lines (Asset 229)	5,690	[5,063]	627	4.460	94%	0.00
<b>TOTAL WATER COST/GALLON CAPACITY</b>						<b>0.03</b>

**Table 10. Sewer System Buy-In Valuation**

Group Asset ID	Total Costs, \$	Total Credits, \$	Net Total Cost, \$	Capacity, MGD	% SDF Eligible	Net Total Cost per Gal Capacity, \$/GPD
10" Sewer Extension (Asset 59)	43,193	[25,313]	17,879	0.308	81%	0.05
Carolyn Drive Pump Station #2 & Force Main (Asset 189-A & CIP-S2)	499,473	[68,322]	431,151	0.720	96%	0.57
S. Walton Ave. Pump Station #7 & Force Main (Assets 189-B & CIP-S6)	803,552	[99,105]	704,447	0.461	87%	1.33
<b>TOTAL SEWER COST/GALLON CAPACITY</b>						<b>1.95</b>



## 6.2 Incremental Component for Future Facilities

**Water System:** Future capacity related assets for the water system shown in **Table 11** are included in the Town's CIP (and as identified in Section 5.1.2). Out of the 19 water assets from the CIP identified for further analysis, nine water assets were identified to serve future growth and are eligible for SDFs – 8", 12", and 16" diameter water lines, the booster station rehabilitation, and the elevated water tank improvements. With a net total cost of \$2.6 million eligible for SDFs, the total water cost per gallon of capacity is \$0.44.

**Sewer System:** Future capacity related assets for the sewer system shown in **Table 12** are included in the Town's CIP (refer to Section 5.1.2). Out of the 13 sewer assets from the CIP identified for further analysis, five water assets were identified to serve future growth and are eligible for SDFs – improvements to the 1.9-MGD WWTP, expansion of the WWTP to 3.75 MGD, rehabilitate 16" sewer line, rehabilitate 15" sewer line, and replacement of an 8" diameter gravity sewer along Catherine Street with a 15" pipe. Dividing the net total cost of \$39.7 million by the incremental increase in capacities yields a total sewer cost per gallon capacity of \$5.86.



**Table 11. Water System Incremental Valuation**

CIP Project Description	Total Costs, \$	Total Credits, \$	Net Total Cost, \$	Capacity, MGD	% Credit <sup>1</sup>	% SDF Eligible	Net Total Cost per Gal Capacity, \$/GPD
Chicopee Road 16" Waterline Replacement (Asset W-9)	271,400	0	271,400	4.460	25%	85%	0.04
16" Water Lines, 50% capacity (Asset W-13)	519,162	0	519,162	4.460	25%	50%	0.04
Elevated Water Tank Improvements (Asset W-16)	500,000	0	500,000	2.450	25%	54%	0.08
12" Water Lines, 25% capacity (Assets W-3 & W-12)	273,784	0	273,784	2.450	25%	25%	0.02
Booster Station Rehabilitation (Asset W-19)	34,000	0	34,000	1.250	25%	46%	0.01
8" Water Lines, 50% capacity (Asset W-2)	416,990	0	416,990	1.010	25%	50%	0.15
8" Water Lines, 25% capacity (Assets W-5 & W-11)	564,306	0	564,306	1.010	25%	25%	0.10
<b>TOTAL WATER COST/GALLON CAPACITY</b>							<b>0.44</b>

<sup>1</sup> Includes minimum 25% credit per N.C. General Statute section 162A-207(b).

**Table 12. Sewer System Incremental Valuation**

CIP Project Description	Total Costs, \$	Total Credits, \$	Net Total Cost, \$	Capacity, MGD	% Credit <sup>1</sup>	% SDF Eligible	Net Total Cost per Gal Capacity, \$/GPD
Benson WWTP Improvements (Asset S-1)	3,533,000	0	3,533,000	1.900	25%	33%	0.46
Benson WWTP Expansion to 3.75 MGD (Asset S-2)	35,300,000	0	35,300,000	3.750	25%	66%	4.66
Rehabilitate 16" Sewer Lines (Asset S-12)	13,600	0	13,600	0.763	25%	66%	0.01
Rehabilitate 15" Sewer Lines (Asset S-13)	54,400	0	54,400	0.665	25%	62%	0.04
Replace 8" with 15" (Asset S-3)	830,000	0	830,000	0.308	25%	34%	0.69
<b>TOTAL WATER COST/GALLON CAPACITY</b>							<b>5.86</b>

<sup>1</sup> Includes minimum 25% credit per N.C. General Statute section 162A-207(b).



### 6.3 Valuation Adjustments

N.C. General Statute section 162A-207(b) specifies that a minimum 25% credit be applied towards the calculated incremental cost per gallon capacity. This credit assumes that existing retail user rates and charges will generate at least 25% of the present worth capital costs through the five-year planning period necessary to construct new infrastructure. To avoid collecting revenues twice (first through the SDF, and secondly through retail water and sewer rates), credits were applied to the incremental costs calculated in **Tables 11 and 12** above.

Note this credit adjustment is different from specific credits given to an individual developer for constructing infrastructure *above and beyond* its proportionate share to service anticipated future connections. These additional credits may be applied by the Town to individual developers on a case-by-case basis.

Adding the buy-in cost to the incremental cost yields a combined cost per gallon of capacity, as shown in **Table 13**. The combined water cost is \$0.47 per gallon and combined sewer cost is \$7.81 per gallon. The total water and sewer combined cost is \$8.28 per gallon.

**Table 13. Combined Cost Valuation**

Utility	Buy-In Cost per Gallon, \$	Incremental Cost per Gallon, \$	Combined Cost per Gallon, \$
Water	0.03	0.44	<b>0.47</b>
Sewer	1.95	5.86	<b>7.81</b>
<b>Total</b>	<b>1.98</b>	<b>6.30</b>	<b>8.28</b>

### 6.4 Cost per Unit of Volume

The maximum-allowable combined cost of \$0.47 per one-gallon capacity of water and \$7.81 per one-gallon capacity of sewer serves as the basis for adjusting the fees for different customer classes. Using an equivalent ratio recommended by *AWWA Manual M1*, increased operational demands on the water and sewer systems for larger customers are calculated to produce higher SDFs.

In this analysis, meter sizes are utilized to estimate how much water or sewer the new customer can be expected to use. The equivalent ratio for larger meters represents the higher demand of larger customers, computed using the 5/8-inch meter as a base unit. The ratio is representative of the maximum



safe operating flow through the meter as compared to a residential meter. **Table 14** calculates the water and sewer capacity costs for larger meter sizes using the equivalent ratios.

As an alternative to equivalent meter ratios, which are conservative by nature, the Town may also consider charging non-residential (i.e., commercial, institutional, and industrial) customers based on estimated water consumption, number of plumbing fixture units, or other special considerations that may affect water or sewer demand.

Given that a residential customer consumes 360 gallons per day (GPD) per NCDEQ, the water and sewer capacity costs from **Table 13** are converted into typical ‘per connection’ fees for the various water meter sizes, using the same equivalent ratios. These typical ‘per connection’ costs, illustrated in **Table 14**, are the basis for the annual revenue forecasts in Section 7.0. For example, a residential customer with a 5/8” water meter may be charged a maximum-allowable system development fee of \$2,980 for both water and sewer service.

**Table 14. Maximum Allowable Capacity Cost Per Equivalent Connection**

Meter Size, inches	Equivalent Ratio	Water Capacity Cost, \$/connection	Sewer Capacity Cost, \$/connection	Total Capacity Cost, \$/connection <sup>1</sup>
5/8	1.0	\$169	\$2,812	<b>\$2,980</b>
1	2.5	\$423	\$7,029	<b>\$7,450</b>
1-1/2	5.0	\$846	\$14,058	<b>\$14,900</b>
2	8.0	\$1,354	\$22,493	<b>\$23,840</b>
3	15.0	\$2,707	\$44,986	<b>\$47,690</b>
4	25.0	\$4,230	\$70,290	<b>\$74,520</b>
6	50.0	\$8,460	\$140,580	<b>\$149,040</b>
8	80.0	\$13,536	\$224,928	<b>\$238,460</b>
10	115.0	\$19,458	\$323,334	<b>\$342,790</b>
12	215.0	\$36,378	\$604,494	<b>\$640,870</b>

<sup>1</sup> Based on 360-GPD use for a 5/8” residential connection.



## 7. APPLICATION OF SYSTEM DEVELOPMENT FEES

According to Article 8 (System Development Fees) of the NC General Statutes<sup>14</sup>, SDFs are collected for subdivisions of land at the time of plat recording, or when the unit of local government commits water or sewer service for the new development. For un-subdivided land, the SDF applies when the individual customer applies to connect to the system. Additional guidance for fee collection was released in the spring of 2021.

A projection of water and sewer customer connections in the five-year SDF planning period (2023 to 2027) is provided in **Table 15**. Note the existing Town metered residential, commercial, institutional, and industrial connections were projected with annual growth rates of 3.0%, 0.5%, 0.5%, and 0.5%, respectively. This projection is based on the projected population and developments in Section 5.2 as well as **Table 6**.

**Table 15. Projected Cumulative Water and Sewer Customers, 2027**

Year	WATER				SEWER			
	Residential	Commercial	Institutional	Industrial	Residential	Commercial	Institutional	Industrial
2020	1,600	293	15	3	1,429	256	15	3
2021	1,648	294	15	3	1,472	257	15	3
2022	1,697	296	15	3	1,516	259	15	3
2023	1,748	297	15	3	1,562	260	15	3
2024	1,801	299	15	3	1,608	261	15	3
2025	1,855	300	15	3	1,657	262	15	3
2026	1,910	302	15	3	1,706	264	15	3
2027	1,968	303	16	3	1,757	265	16	3

Capacity costs per connection in **Table 14** multiplied by the annual customer growth projections in **Table 15** result in the estimated annual revenues – that is, revenue projections from water and sewer SDFs – for the five-year planning period as shown in **Tables 16 and 17**. Revenues assume that the typical residential customer will have a 5/8” water meter, commercial customers a 1-1/2” water meter, institutional customers a 4 compound water meter, and industrial customers a 1-1/2” water meter. The full revenue calculations, which are summarized in **Tables 16 and 17**, are presented in **Appendix 4**.

Estimated SDF water revenues for the next five-year planning period are approximately \$51,600 from new residential and non-residential growth while estimated SDF sewer revenues total \$747,900

<sup>14</sup> NCGS. Chapter 162A. *Water and Sewer Systems*. <https://www.ncleg.net/gascripts/Statutes/StatutesTOC.pl>



during the same timeframe. *If the Town elects to charge SDFs on a per gallon basis instead of an equivalent meter basis, the projected SDFs will likely be less than what it shown in **Tables 16 and 17.***

**Table 16. Estimated Water Revenues, 2027**

Year	Residential (5/8")	Commercial (1.5")	Institutional (4 compound)	Industrial (1.5")	TOTAL WATER SDF REVENUE
2023	\$8,629	\$846	\$0	\$0	\$9,475
2024	\$8,798	\$846	\$0	\$0	\$9,644
2025	\$9,137	\$846	\$0	\$0	\$9,983
2026	\$9,475	\$1,692	\$0	\$0	\$11,167
2027	\$9,644	\$1,692	\$0	\$0	\$11,336
<b>TOTAL</b>	<b>\$45,684</b>	<b>\$5,922</b>	<b>\$0</b>	<b>\$0</b>	<b>\$51,606</b>

**Table 17. Estimated Sewer Revenues, 2027**

Year	Residential (5/8")	Commercial (1.5")	Institutional (4 compound)	Industrial (1.5")	TOTAL SEWER SDF REVENUE
2023	\$126,522	\$14,058	\$0	\$0	\$140,580
2024	\$132,145	\$14,058	\$0	\$0	\$146,203
2025	\$134,957	\$14,058	\$0	\$0	\$149,015
2026	\$140,580	\$14,058	\$0	\$0	\$154,638
2027	\$143,392	\$14,058	\$0	\$0	\$157,450
<b>TOTAL</b>	<b>\$677,596</b>	<b>\$70,290</b>	<b>\$0</b>	<b>\$0</b>	<b>\$747,886</b>

The foregoing revenue projections intend to provide a gauge of anticipated income based on the assessment of the maximum allowable SDFs. The projections are highly dependent on the Town’s assigned land uses and zoning, which will influence the future development type and associated water and sewer demands. After projects in the CIP are better defined and planning costs refined, the revenue projections may be re-evaluated and adjusted accordingly.



## 8. CONCLUSIONS & RECOMMENDATIONS

The Wooten Company has calculated maximum allowable water and sewer System Development Fees (SDFs) on a ‘per gallon’ basis and ‘per connection’ basis for new development within the Town of Benson service area. These fees may be assessed by Benson at a lower rate but cannot exceed the calculated figures for a five-year SDF analysis period. The calculated combined water cost is \$0.47 per gallon capacity and combined sewer cost is \$7.81 per gallon capacity, for a total of \$8.28 per gallon.

Benson has existing water and sewer assets with available capacity and useful life to serve both existing and new customers, as well as major water and sewer capacity expansion needs on the horizon. Therefore, the SDFs are based on the Combined Cost methodology, a combination of Buy-In (Equity) and Incremental (Marginal) Cost methodologies. Application of the ‘rational nexus test’ to the calculated SDFs for Benson demonstrates that:

- There is a direct and reasonable connection between the impact of the new development and need of new or expanded infrastructure, as existing water and sewer treatment capacities for the Town are not adequate to handle the projected population increase;
- Furthermore, the capacities dictated in the water contracts with the City of Dunn and Johnston County will require revision in order to provide utility services to the 17 proposed developments that will occur in the near future;
- The total cost of the new infrastructure to support the new development is estimated to be \$54.2 million; \$799,500 may be collected in the next five years through adoption of SDFs; and
- Appropriation of capital funds necessary to support that growth can be achieved through collection of SDFs using a combined cost approach so that new development customers are afforded the same level of service as existing utilities customers.

Based on the calculated capacity costs per gallon and per connection, **Table 18** summarizes the maximum allowable SDFs for the connection of new water and sewer customers using meter size to determine the equivalent ratio for non-residential customers.



**Table 18. Maximum Allowable System Development Fees**

Meter Size, inches	Equivalent Ratio	Water Capacity Cost, \$/gallon	Sewer Capacity Cost, \$/gallon	Total Capacity Cost, \$/gallon	Total Capacity Cost, \$/connection <sup>1</sup>
5/8	1.0	\$0.47	\$7.81	\$8.28	\$2,980
1	2.5				\$7,450
1-1/2	5.0				\$14,900
2	8.0				\$23,840
3	16.0				\$47,690
4	25.0				\$74,520
6	50.0				\$149,040
8	80.0				\$238,460
10	115.0				\$342,790
12	215.0				\$640,870

<sup>1</sup> Based on 360-GPD use for a 5/8" residential connection.

It is expected that the SDFs will generate approximately \$51,600 for water improvements (refer to **Table 16**) and \$747,900 for sewer improvements (refer to **Table 17**) over the next five years to support necessary rehabilitation and upgrades. In accordance with HB 436/SL 2018-34, this analysis provides information to the public and Benson policymakers to assign system development fees to customers, with re-evaluation occurring at least every five years.



## **APPENDIX 1**

**Benson Water System Map**

**Benson Sewer System Map**



# Water System Town of Benson, NC

September 2022

### Legend

- Existing Valves
- Existing Hydrants
- Existing Elevated Tank
- Existing BPS

### Town Water Lines by Diameter

- Existing 2" Water Line
- Existing 3" Water Line
- Existing 4" Water Line
- Existing 6" Water Line
- Existing 8" Water Line
- Existing 10" Water Line
- Existing 12" Water Line
- Existing 16" Water Line

### County Water Lines by Diameter

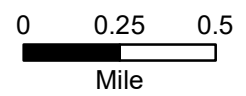
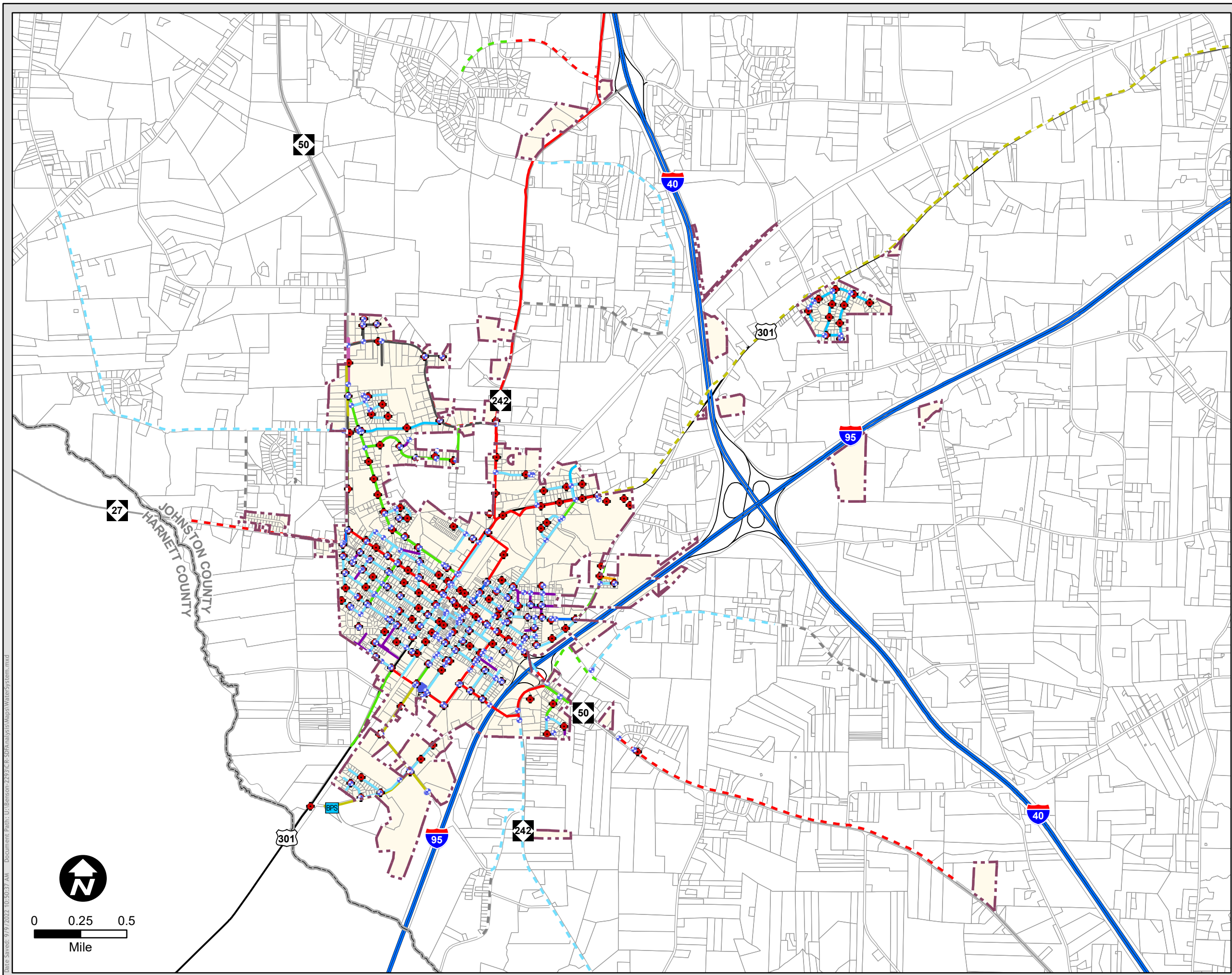
- Unknown
- Existing 4" Water Line
- Existing 6" Water Line
- Existing 8" Water Line
- Existing 12" Water Line
- Existing 16" Water Line

- Interstate
- US Route
- NC Route
- Ramp
- Rest Area

- Parcel
- Municipal Boundary
- County Boundary

# Wooten

The Wooten Company makes every effort to produce and publish GIS maps using the most current and accurate information possible, however the maps are strictly for planning purposes only. The maps are compiled from recorded deeds, plats, and other public and private records and data. Users of the maps are hereby notified that the aforementioned public primary information sources should be consulted for verification of the information on this map. The Wooten Company assumes NO responsibility for the information contained on the maps unless the map is signed and sealed by a licensed Professional Land Surveyor. Please contact the GIS Group at (919) 828-0531 or toohan@thewootencompany.com for data source information.



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# Wastewater System Town of Benson, NC

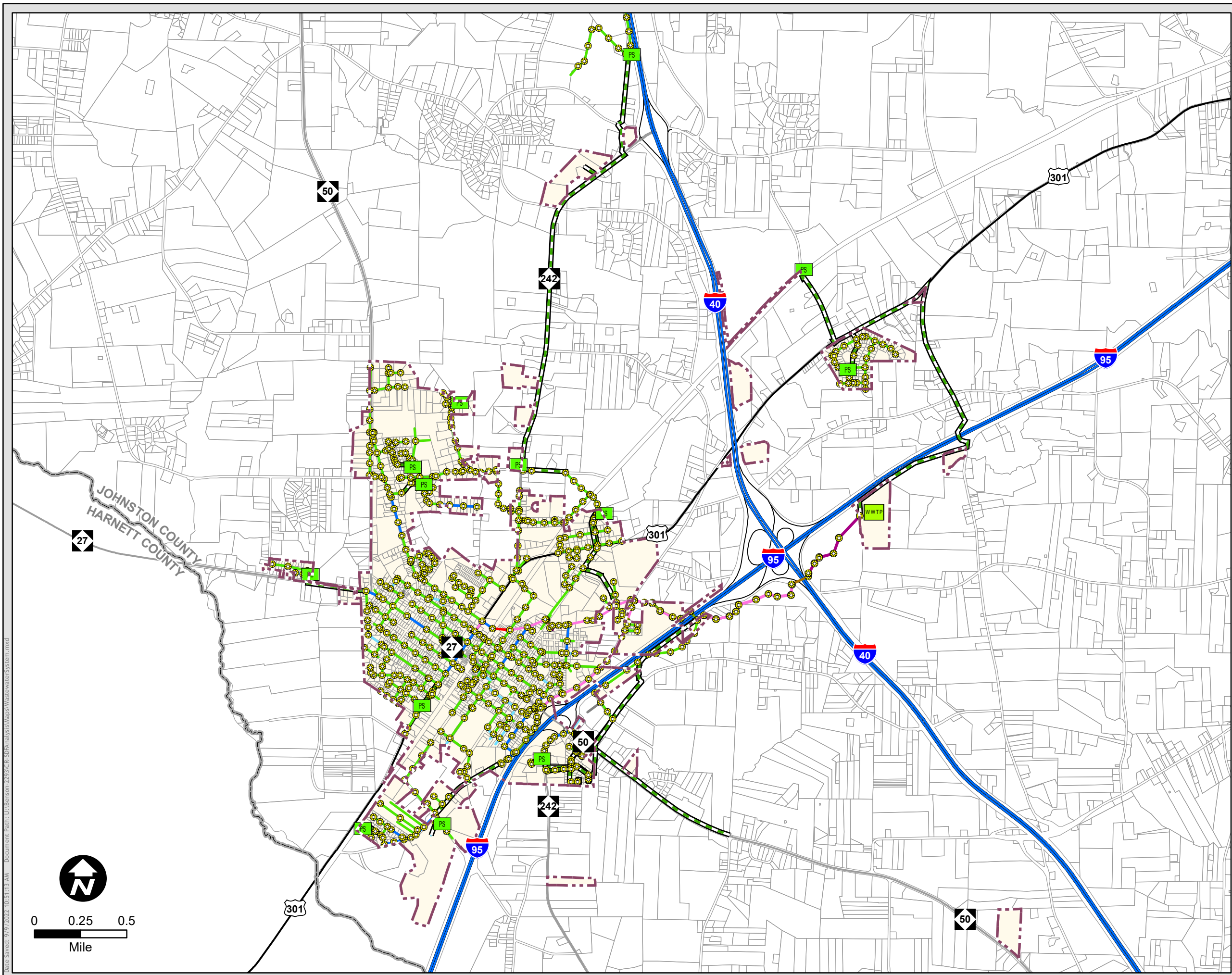
September 2022

## Legend

- Pump Station
- Manhole
- Forcemain
- 2 in. Gravity Main
- 3 in. Gravity Main
- 4 in. Gravity Main
- 6 in. Gravity Main
- 8 in. Gravity Main
- 10 in. Gravity Main
- 12 in. Gravity Main
- 15 in. Gravity Main
- 16 in. Gravity Main
- 18 in. Gravity Main
- 24 in. Gravity Main
- Unknown Diameter
- Interstate
- US Route
- NC Route
- Ramp
- Rest Area
- Parcel
- Municipal Boundary
- County Boundary

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**APPENDIX 2**

**2020 Water & Sewer Billing Summary**

**2015-2020 Town of Benson Local Water Supply Plans**

**2020 Water Billings Summary**

Type	# of Connections*	Metered Average Usage	
		(MGD)*	(gpd/connection)
Residential	1,600	0.195	122
Commercial	293	0.103	352
Institutional	15	0.008	533
Industrial	3	0.426	142,000
<b>Total</b>	<b>1,911</b>	<b>0.732</b>	<b>143,007</b>

*\*Taken from Benson's 2020 Local Water Supply Plan.*

**2020 Sewer Billings Summary**

Type	# of Connections	Metered Average Usage	
		(gpd)	(gpd/connection)
Residential	1,429	172,379	121
Commercial	256	197,188	770
Institutional	15	8,071	538
Industrial	3	299,660	99,887
<b>Total</b>	<b>1,703</b>	<b>677,298</b>	<b>101,316</b>

*\*Provided by the Town of Benson.*

# Benson

2015 ▾

The Division of Water Resources (DWR) provides the data contained within this Local Water Supply Plan (LWSP) as a courtesy and service to our customers. DWR staff does not field verify data. Neither DWR, nor any other party involved in the preparation of this LWSP attests that the data is completely free of errors and omissions. Furthermore, data users are cautioned that LWSPs labeled **PROVISIONAL** have yet to be reviewed by DWR staff. Subsequent review may result in significant revision. Questions regarding the accuracy or limitations of usage of this data should be directed to the water system and/or DWR.

## 1. System Information

### Contact Information

Water System Name: Benson PWSID: 03-51-025  
 Mailing Address: P.O. Box 69 Benson, NC 27504 Ownership: Municipality  
 Contact Person: Tim Robbins Title: Public Works Director  
 Phone: 919-894-3553 Cell/Mobile: --  
 Secondary Contact: Dennis Ray Adams Phone: 919-894-3553  
 Mailing Address: PO Box 69 Benson, NC 27504 Cell/Mobile: --

**Complete**

### Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	4-8	9.00 %
Cast Iron	6-12	15.00 %
Ductile Iron	6-16	35.00 %
Galvanized Iron	1-2	15.00 %
Polyvinyl Chloride	2-6	21.00 %
Polyvinyl Chloride	8	5.00 %

What are the estimated total miles of distribution system lines? **37 Miles**

How many feet of distribution lines were replaced during 2015? **4,530 Feet**

How many feet of new water mains were added during 2015? **0 Feet**

How many meters were replaced in 2015? **1,840**

How old are the oldest meters in this system? **31 Year(s)**

How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **23**

What is this system's finished water storage capacity? **0.3000 Million Gallons**

Has water pressure been inadequate in any part of the system since last update? *Line breaks that were repaired quickly should not be included.* **Yes**

**NOTE** Main line break. A boil water Advisory was issued.

### Programs

Does this system have a program to work or flush hydrants? **Yes, Weekly**

Does this system have a valve exercise program? **Yes, Semi-Annually**

Does this system have a cross-connection program? **Yes**

Does this system have a program to replace meters? **Yes**

Does this system have a plumbing retrofit program? **Yes**

Does this system have an active water conservation public education program? **Yes**

Does this system have a leak detection program? **Yes****NOTE** As employees ride through out system they are looking for leaks.**Water Conservation**What type of rate structure is used? **Flat/Fixed**How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **1**Does this system have an interconnection with another system capable of providing water in an emergency? **Yes****2. Water Use Information****Service Area**

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Cape Fear River (02-3)	97 %	Johnston	100 %
Neuse River (10-1)	3 %		

What was the year-round population served in 2015? **4,731**Has this system acquired another system since last report? **No****Water Use by Type**

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,431	0.3380	0	0.0000
Commercial	342	0.1160	0	0.0000
Industrial	40	0.1400	0	0.0000
Institutional	5	0.0520	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? **0.0500 MGD****Water Sales**

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Johnston County	03-51-070	0.0020	365	0.0100	2026	Yes	Yes	12	Regular

**3. Water Supply Sources****Monthly Withdrawals & Purchases**

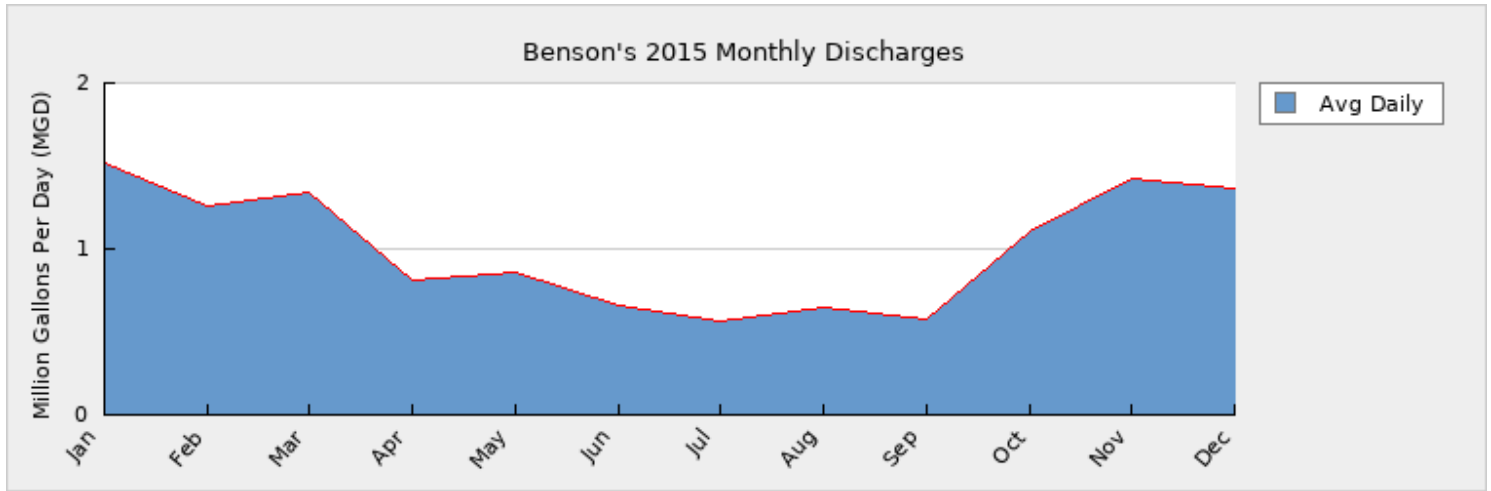
	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.7920	1.4370	May	0.8150	1.2610	Sep	0.8270	0.9980
Feb	0.7960	1.1610	Jun	0.8330	1.6810	Oct	0.8260	1.0580
Mar	0.8410	1.0470	Jul	0.8350	1.9320	Nov	0.8570	1.0880
Apr	0.7800	1.3140	Aug	0.9030	1.2360	Dec	0.7940	1.3430

**Water Purchases From Other Systems**

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Dunn	03-43-010	0.7610	365	0.9500	2021	Yes	Yes	16	Regular
Johnston County	03-51-070	0.0640	365	0.0900	2026	Yes	Yes	12	Regular

**4. Wastewater Information****Monthly Discharges**

	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	1.5150	May	0.8570	Sep	0.5740
Feb	1.2580	Jun	0.6620	Oct	1.1110
Mar	1.3370	Jul	0.5660	Nov	1.4200
Apr	0.8060	Aug	0.6440	Dec	1.3670



How many sewer connections does this system have? 1,640

How many water service connections with septic systems does this system have? 130

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Wastewater Permits						
Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0020389	1.9000	2.1000	1.0100		Hannah Creek	Neuse River (10-1)

Wastewater Interconnections					
Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Johnston County	03-51-070	Receiving	0.1540	365	0.1920

## 5. Planning

Projections						
	2015	2020	2030	2040	2050	2060
Year-Round Population	4,731	4,755	4,795	4,853	4,897	4,955
Seasonal Population	0	0	0	0	0	0
Residential	0.3380	0.3510	0.3570	0.3630	0.3730	0.3800
Commercial	0.1160	0.1150	0.1180	0.1200	0.1210	0.1220
Industrial	0.1400	0.1450	0.1470	0.1500	0.1550	0.1650
Institutional	0.0520	0.0500	0.0600	0.0600	0.0700	0.0700
System Process	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500
Unaccounted-for	0.1270	0.1440	0.1490	0.1510	0.1560	0.1600

**NOTE** The Town of Benson is going to approach the City of Dunn and Johnston County to renegotiate their contracts to 250 GPD. They are also trying to cut down on flushing. They have added automatic flusher to some sections of town.

Future Supply Sources						

Source Name	PWSID	Source Type	Additional Supply	Year Online	Year Offline	Type
City of Dunn	03-43-010	Purchase	0.2500	2018		Regular

#### Demand v/s Percent of Supply

	2015	2020	2030	2040	2050	2060
Surface Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
Future Supplies		0.2500	0.2500	0.2500	0.2500	0.2500
Total Available Supply (MGD)	1.0400	1.2900	1.2900	1.2900	1.2900	1.2900
Service Area Demand	0.8230	0.8550	0.8810	0.8940	0.9250	0.9470
Sales	0.0020	0.0100	0.0100	0.0100	0.0100	0.0100
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	0.8250	0.8650	0.8910	0.9040	0.9350	0.9570
Demand as Percent of Supply	79%	67%	69%	70%	72%	74%



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is **71** gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs? **The Town of Benson is going to approach the City of Dunn and Johnston County to renegotiate their contracts to 250 GPD. They are also trying to cut down on flushing. They have added automatic flusher to some sections of town. We are installing new AMI meters to monitor for usage and losses in a more efficient manner.**

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs? **We can access additional supplies from Dunn up to 1,000,000 GPD as necessary by amending our purchase contract.**

How does the water system intend to implement the demand management and supply planning components above? **The Town of Benson is going to approach the City of Dunn and Johnston County to renegotiate their contracts to 250 GPD. They are also trying to cut down on flushing. They have added automatic flusher to some sections of town. We utilize PWS, UNC Institute of Government, Triangle J Council of Government, The Wooten Company, and NC Rural Water.**

#### Additional Information

Has this system participated in regional water supply or water use planning? **Yes, Triangle J Council of Government**

What major water supply reports or studies were used for planning? **UNC Institute of Government**

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues: **None at this time.**

The Division of Water Resources (DWR) provides the data contained within this Local Water Supply Plan (LWSP) as a courtesy and service to our customers. DWR staff does not field verify data. Neither DWR, nor any other party involved in the preparation of this LWSP attests that the data is completely free of errors and omissions. Furthermore, data users are cautioned that LWSPs labeled **PROVISIONAL** have yet to be reviewed by DWR staff. Subsequent review may result in significant revision. Questions regarding the accuracy or limitations of usage of this data should be directed to the water system and/or DWR.

# Benson

2016 ▾

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## 1. System Information

### Contact Information

Water System Name: Benson PWSID: 03-51-025  
 Mailing Address: P.O. Box 69 Benson, NC 27504 Ownership: Municipality  
 Contact Person: Tim Robbins Title: Public Works Director  
 Phone: 919-894-3553 Cell/Mobile: --  
 Secondary Contact: Dennis Ray Adams Phone: 919-894-3553  
 Mailing Address: PO Box 69 Benson, NC 27504 Cell/Mobile: --

**Complete**

### Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	4-8	9.00 %
Cast Iron	6-12	15.00 %
Ductile Iron	6-16	35.00 %
Galvanized Iron	1-2	15.00 %
Polyvinyl Chloride	2-6	21.00 %
Polyvinyl Chloride	8	5.00 %

What are the estimated total miles of distribution system lines? **37 Miles**

How many feet of distribution lines were replaced during 2016? **0 Feet**

How many feet of new water mains were added during 2016? **0 Feet**

How many meters were replaced in 2016? **12**

How old are the oldest meters in this system? **1 Year(s)**

How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **23**

What is this system's finished water storage capacity? **0.3000 Million Gallons**

Has water pressure been inadequate in any part of the system since last update? *Line breaks that were repaired quickly should not be included.* **Yes**

**NOTE** Our incident of low pressure was temporary. Inadequate pressure was a result of a main leak. Pressure was restored to normal as soon as the leak was repaired.

### Programs

Does this system have a program to work or flush hydrants? **Yes, Weekly**

Does this system have a valve exercise program? **Yes, Semi-Annually**

Does this system have a cross-connection program? **Yes**

Does this system have a program to replace meters? **Yes**

Does this system have a plumbing retrofit program? **Yes**

Does this system have an active water conservation public education program? **Yes**Does this system have a leak detection program? **Yes****NOTE** As employees ride through out system they are looking for leaks.**Water Conservation**What type of rate structure is used? **Flat/Fixed**How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**Does this system have an interconnection with another system capable of providing water in an emergency? **Yes****2. Water Use Information****Service Area**

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Cape Fear River (02-3)	97 %	Johnston	100 %
Neuse River (10-1)	3 %		

What was the year-round population served in 2016? **3,435**Has this system acquired another system since last report? **No****Water Use by Type**

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,431	0.1910	0	0.0000
Commercial	342	0.0880	0	0.0000
Industrial	40	0.3850	0	0.0000
Institutional	7	0.0110	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? **0.0150 MGD****Water Sales**

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Johnston County	03-51-070	0.0030	366	0.0100	2026	Yes	Yes	12	Regular

**3. Water Supply Sources****Monthly Withdrawals & Purchases**

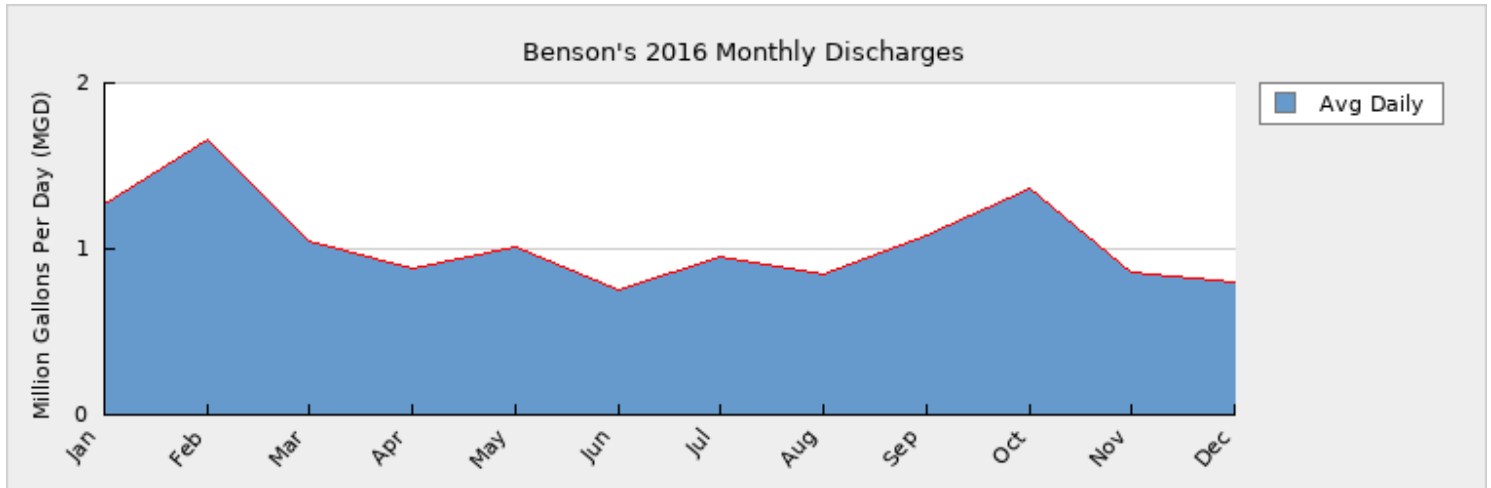
	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.8420	1.2060	May	0.8810	1.2070	Sep	0.9700	1.2070
Feb	0.8920	1.3300	Jun	0.9190	1.3300	Oct	0.9580	1.3010
Mar	0.8780	1.1790	Jul	0.9510	1.3220	Nov	0.9490	1.3290
Apr	0.8680	1.4610	Aug	0.9250	1.2170	Dec	0.9560	1.2430

**Water Purchases From Other Systems**

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Dunn	03-43-010	0.8360	366	0.9500	2021	Yes	Yes	16	Regular
Johnston County	03-51-070	0.0830	366	0.0900	2026	Yes	Yes	12	Regular

**4. Wastewater Information**

Monthly Discharges					
	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	1.2690	May	1.0140	Sep	1.0880
Feb	1.6620	Jun	0.7580	Oct	1.3670
Mar	1.0480	Jul	0.9550	Nov	0.8570
Apr	0.8840	Aug	0.8450	Dec	0.8000



How many sewer connections does this system have? 1,640

How many water service connections with septic systems does this system have? 130

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Wastewater Permits						
Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0020389	1.9000	2.1000	1.0460		Hannah Creek	Neuse River (10-1)

Wastewater Interconnections					
Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Johnston County	03-51-070	Receiving	0.1340	366	0.1920

## 5. Planning

Projections						
	2016	2020	2030	2040	2050	2060
Year-Round Population	3,435	4,755	4,795	4,853	4,897	4,955
Seasonal Population	0	0	0	0	0	0
Residential	0.1910	0.3420	0.3480	0.3530	0.3570	0.3600
Commercial	0.0880	0.1150	0.1180	0.1200	0.1210	0.1220
Industrial	0.3850	0.1450	0.1470	0.1500	0.1550	0.1650
Institutional	0.0110	0.0500	0.0520	0.0540	0.0580	0.0600
System Process	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150
Unaccounted-for	0.2260	0.0950	0.0950	0.1000	0.1000	0.1000

**NOTE** Benson had a water leak that started in 2015 and was fixed in January, 2017 this should account for there high water loss.

Future Supply Sources						
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Source Name	PWSID	Source Type	Additional Supply	Year Online	Year Offline	Type
City of Dunn	03-43-010	Purchase	0.2500	2018		Regular

Demand v/s Percent of Supply						
	2016	2020	2030	2040	2050	2060
Surface Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
Future Supplies		0.2500	0.2500	0.2500	0.2500	0.2500
Total Available Supply (MGD)	1.0400	1.2900	1.2900	1.2900	1.2900	1.2900
Service Area Demand	0.9160	0.7620	0.7750	0.7920	0.8060	0.8220
Sales	0.0030	0.0100	0.0100	0.0100	0.0100	0.0100
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	0.9190	0.7720	0.7850	0.8020	0.8160	0.8320
Demand as Percent of Supply	<b>88%</b>	60%	61%	62%	63%	64%



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is **56** gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs? **Benson is growing and needs more water.**

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs? **Benson is working with the City of Dunn to renegotiate the contract to 0.250 MGD.**

How does the water system intend to implement the demand management and supply planning components above? **None**

### Additional Information

Has this system participated in regional water supply or water use planning? **No**

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues: **None at this time.**

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# Benson

2017 ▾

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## 1. System Information

### Contact Information

Water System Name: Benson PWSID: 03-51-025  
 Mailing Address: P.O. Box 69 Benson, NC 27504 Ownership: Municipality  
 Contact Person: Tim Robbins Title: Public Works Director  
 Phone: 919-894-3553 Cell/Mobile: --  
 Secondary Contact: Dennis Ray Adams Phone: 919-894-3553  
 Mailing Address: PO Box 69 Benson, NC 27504 Cell/Mobile: --

**Complete**

### Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	4-16	9.00 %
Cast Iron	6-12	15.00 %
Ductile Iron	6-16	35.00 %
Galvanized Iron	1-2	15.00 %
Polyvinyl Chloride	2-8	26.00 %

What are the estimated total miles of distribution system lines? 37 Miles

How many feet of distribution lines were replaced during 2017? 800 Feet

How many feet of new water mains were added during 2017? 0 Feet

How many meters were replaced in 2017? 10

How old are the oldest meters in this system? 2 Year(s)

How many meters for outdoor water use, such as irrigation, are not billed for sewer services? 27

What is this system's finished water storage capacity? 0.3000 Million Gallons

Has water pressure been inadequate in any part of the system since last update? *Line breaks that were repaired quickly should not be included.* No

### Programs

Does this system have a program to work or flush hydrants? Yes, Weekly

Does this system have a valve exercise program? Yes, Annually

Does this system have a cross-connection program? Yes

Does this system have a program to replace meters? Yes

Does this system have a plumbing retrofit program? Yes

Does this system have an active water conservation public education program? Yes

Does this system have a leak detection program? Yes

**NOTE** Public Works employees have been instructed to observe the known locations of water mains for possible leaks as they are traveling around town during the work day. Additionally, our town utilizes the assistance of NC Rural Water to conduct leak detection surveys on occasion.

## Water Conservation

What type of rate structure is used? **Flat/Fixed**

How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**

Does this system have an interconnection with another system capable of providing water in an emergency? **Yes**

## 2. Water Use Information

### Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Cape Fear River (02-3)	97 %	Johnston	100 %
Neuse River (10-1)	3 %		

What was the year-round population served in 2017? **3,710**

Has this system acquired another system since last report? **No**

### Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,484	0.1580	0	0.0000
Commercial	280	0.0930	0	0.0000
Industrial	15	0.3460	0	0.0000
Institutional	7	0.0090	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? **0.0500 MGD**

### Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Johnston County	03-51-070	0.0020	365	0.0100	2026	Yes	Yes	12	Regular

## 3. Water Supply Sources

### Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.8260	1.2200	May	0.7750	0.9170	Sep	0.8410	0.9700
Feb	0.7550	0.8550	Jun	0.8060	1.0770	Oct	0.8110	0.9500
Mar	0.7790	1.0100	Jul	0.7720	0.9620	Nov	0.8090	1.0220
Apr	0.7410	0.9200	Aug	0.8140	1.0520	Dec	0.8350	1.0820



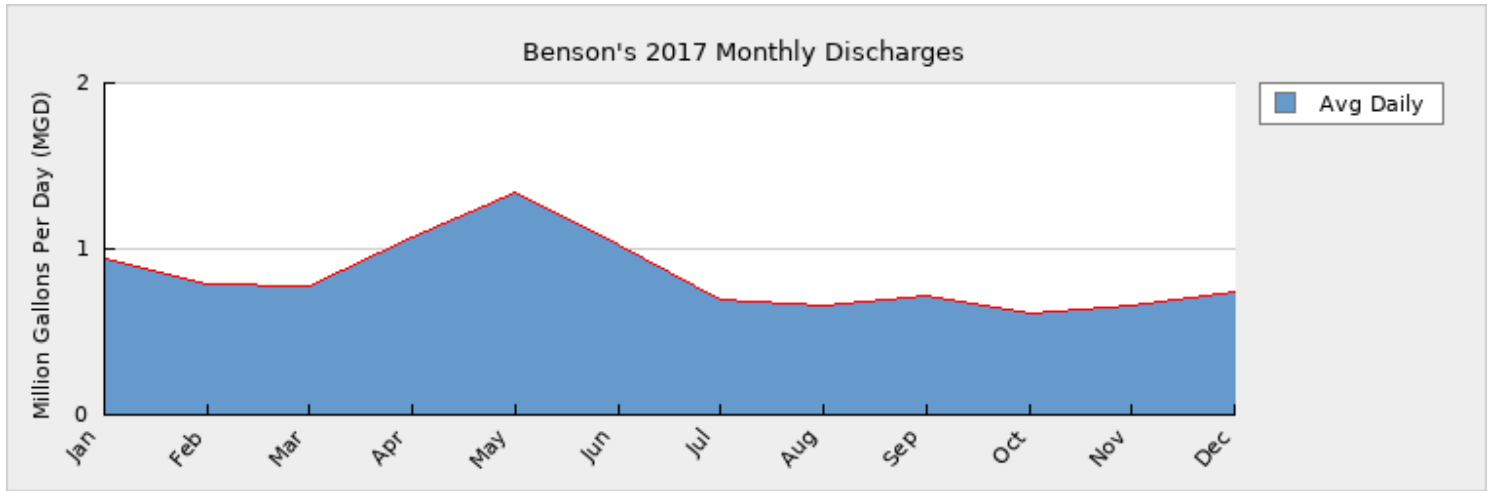
### Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Dunn	03-43-010	0.7250	365	1.2000	2027	Yes	Yes	16	Regular
Johnston County	03-51-070	0.0730	365	0.0900	2026	Yes	Yes	12	Regular

## 4. Wastewater Information

### Monthly Discharges

	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	0.9470	May	1.3380	Sep	0.7180
Feb	0.7890	Jun	1.0200	Oct	0.6170
Mar	0.7710	Jul	0.6980	Nov	0.6560
Apr	1.0680	Aug	0.6540	Dec	0.7360



How many sewer connections does this system have? 1,665

How many water service connections with septic systems does this system have? 130

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Wastewater Permits						
Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0020389	1.9000	2.1000	0.8340		Hannah Creek	Neuse River (10-1)

Wastewater Interconnections						
Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)	
			MGD	Days Used		
Johnston County	03-51-070	Receiving	0.1090	365	0.1920	

## 5. Planning

Projections							
	2017	2020	2030	2040	2050	2060	
Year-Round Population	3,710	4,755	4,795	4,853	4,897	4,955	
Seasonal Population	0	0	0	0	0	0	
Residential	0.1580	0.3420	0.3480	0.3530	0.3570	0.3600	
Commercial	0.0930	0.1150	0.1180	0.1200	0.1210	0.1220	
Industrial	0.3460	0.1450	0.1470	0.1500	0.1550	0.1650	
Institutional	0.0090	0.0500	0.0520	0.0540	0.0580	0.0600	
System Process	0.0500	0.0150	0.0150	0.0150	0.0150	0.0150	
Unaccounted-for	0.1400	0.0950	0.0950	0.1000	0.1000	0.1000	

Demand v/s Percent of Supply							
	2017	2020	2030	2040	2050	2060	
Surface Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

Purchases	1.2900	1.2900	1.2900	1.2900	1.2900	1.2900
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	1.2900	1.2900	1.2900	1.2900	1.2900	1.2900
Service Area Demand	0.7960	0.7620	0.7750	0.7920	0.8060	0.8220
Sales	0.0020	0.0100	0.0100	0.0100	0.0100	0.0100
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	0.7980	0.7720	0.7850	0.8020	0.8160	0.8320
Demand as Percent of Supply	62%	60%	61%	62%	63%	64%



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is **43** gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

#### Additional Information

Has this system participated in regional water supply or water use planning?

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

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# Benson

2018 ▾

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## 1. System Information

### Contact Information

Water System Name: Benson PWSID: 03-51-025  
 Mailing Address: P.O. Box 69 Benson, NC 27504 Ownership: Municipality  
 Contact Person: Tim Robbins Title: Public Works Director  
 Phone: 919-894-3553 Cell/Mobile: --  
 Secondary Contact: Dennis Ray Adams Phone: 919-894-3553  
 Mailing Address: PO Box 69 Benson, NC 27504 Cell/Mobile: --

**Complete**

### Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	4-16	9.00 %
Cast Iron	6-12	15.00 %
Ductile Iron	6-16	35.00 %
Galvanized Iron	1-2	15.00 %
Polyvinyl Chloride	2-8	26.00 %

What are the estimated total miles of distribution system lines? **37 Miles**

How many feet of distribution lines were replaced during 2018? **60 Feet**

How many feet of new water mains were added during 2018? **0 Feet**

How many meters were replaced in 2018? **7**

How old are the oldest meters in this system? **3 Year(s)**

How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **27**

What is this system's finished water storage capacity? **0.3000 Million Gallons**

Has water pressure been inadequate in any part of the system since last update? *Line breaks that were repaired quickly should not be included.* **No**

### Programs

Does this system have a program to work or flush hydrants? **Yes, Weekly**

Does this system have a valve exercise program? **Yes, Annually**

Does this system have a cross-connection program? **Yes**

Does this system have a program to replace meters? **Yes**

Does this system have a plumbing retrofit program? **Yes**

Does this system have an active water conservation public education program? **Yes**

Does this system have a leak detection program? **Yes**

**NOTE** Our town has implemented automatic metering infrastructure (AMI) to our water system. We are currently utilizing the leak detection alert capability that the AMI system contains to find and report leaks to our customers. The town is looking to further utilize the capability of the AMI system to detect leaks within the distribution system main lines. Main line leak detection is currently reported by the public works staff who are constantly monitoring the distribution system while traveling to work assignments. Additionally, the town requests assistance on occasion from the NCRWA to help locate leaks within our distribution system.

## Water Conservation

What type of rate structure is used? **Flat/Fixed**

How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**

Does this system have an interconnection with another system capable of providing water in an emergency? **Yes**

## 2. Water Use Information

### Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Cape Fear River (02-3)	97 %	Johnston	100 %
Neuse River (10-1)	3 %		

What was the year-round population served in 2018? **3,965**

Has this system acquired another system since last report? **No**

### Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,554	0.1670	0	0.0000
Commercial	286	0.0970	0	0.0000
Industrial	7	0.1390	0	0.0000
Institutional	16	0.2380	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? **0.0480 MGD**

**NOTE** The industrial and institutional connections and usage data was incorrectly documented prior to mid 2018. Industrial data was recorded as institutional and institutional data was recorded as industrial. The issue was corrected upon discovery and the data entered in this local water supply plan reflects the corrected data.

### Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Johnston County	03-51-070	0.0019	365	0.0100	2026	Yes	Yes	12	Regular

## 3. Water Supply Sources

### Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.7650	0.9350	May	0.8790	1.0030	Sep	0.7550	0.8930
Feb	0.8000	0.9950	Jun	0.8940	1.0250	Oct	0.8910	1.0390
Mar	0.8350	0.9770	Jul	0.9090	1.0740	Nov	0.8120	0.9140
Apr	0.8110	0.9350	Aug	0.9000	1.0410	Dec	0.8140	1.0110



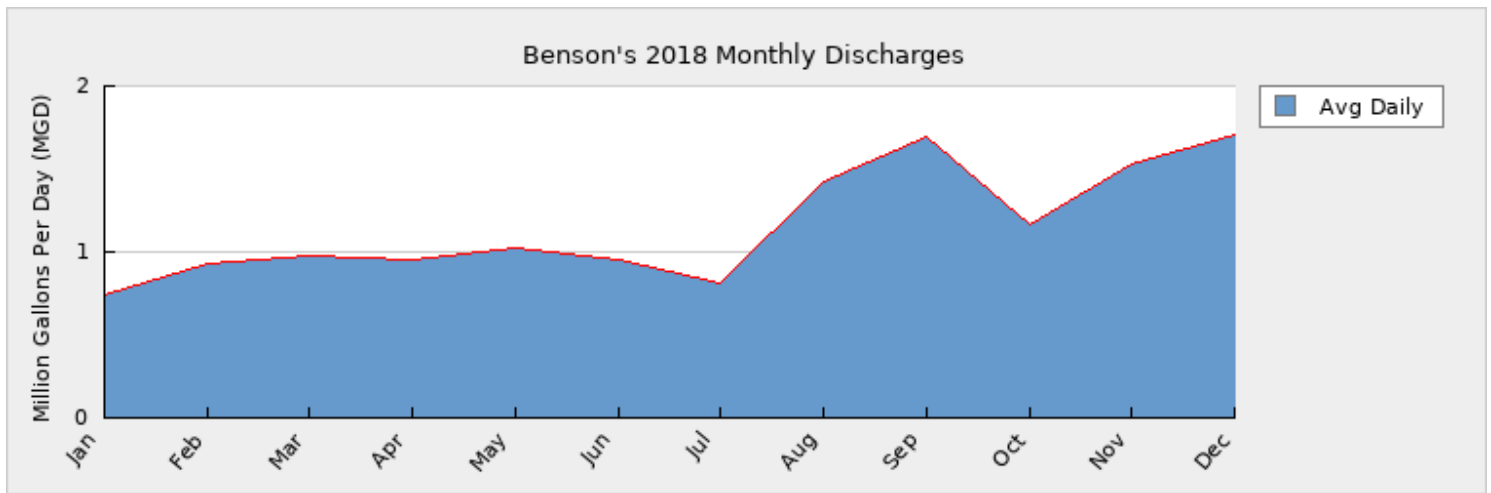
### Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			

Dunn	03-43-010	0.7500	365	1.2000	2027	Yes	Yes	16	Regular
Johnston County	03-51-070	0.0890	365	0.0900	2026	Yes	Yes	12	Regular

### 4. Wastewater Information

Monthly Discharges					
	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	0.7450	May	1.0260	Sep	1.6990
Feb	0.9280	Jun	0.9550	Oct	1.1670
Mar	0.9750	Jul	0.8100	Nov	1.5340
Apr	0.9490	Aug	1.4250	Dec	1.7040



How many sewer connections does this system have? 1,704

How many water service connections with septic systems does this system have? 130

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Wastewater Permits						
Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0020389	1.9000	2.1000	1.1600		Hannah Creek	Neuse River (10-1)

Wastewater Interconnections					
Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Johnston County	03-51-070	Receiving	0.1340	365	0.1920

### 5. Planning

Projections						
	2018	2020	2030	2040	2050	2060
Year-Round Population	3,965	4,190	4,665	5,190	5,200	5,210
Seasonal Population	0	0	0	0	0	0
Residential	0.1670	0.1690	0.1700	0.1710	0.1790	0.1820
Commercial	0.0970	0.0990	0.1080	0.1100	0.1210	0.1220
Industrial	0.1390	0.1400	0.1450	0.1500	0.1550	0.1600
Institutional	0.2380	0.2385	0.2400	0.2410	0.2420	0.2430
System Process	0.0480	0.0480	0.0450	0.0400	0.0350	0.0300
Unaccounted-for	0.1481	0.1493	0.1522	0.1530	0.1573	0.1584

Demand v/s Percent of Supply						
	2018	2020	2030	2040	2050	2060
Surface Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	1.2900	1.2900	1.2900	1.2900	1.2900	1.2900
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	1.2900	1.2900	1.2900	1.2900	1.2900	1.2900
Service Area Demand	0.8371	0.8438	0.8602	0.8650	0.8893	0.8954
Sales	0.0019	0.0100	0.0100	0.0100	0.0100	0.0100
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	0.8390	0.8538	0.8702	0.8750	0.8993	0.9054
Demand as Percent of Supply	65%	66%	67%	68%	70%	70%



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 42 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

#### Additional Information

Has this system participated in regional water supply or water use planning? No

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues: The Town of Benson is participating in a year-long water loss program through Cavanaugh Solutions, the NC Water Resources Research Institute, and the NC Division of Water Infrastructure. The program will include technical assistance to the town in completing a validated water audit and water loss profile, help to identify the gap between current water loss and optimum water loss levels and present recommendations to the town for the next steps in water loss control. Completion of the program will assist the town in meeting the present and future water needs of its customers.

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# Benson

2019 ▾

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## 1. System Information

### Contact Information

Water System Name: Benson PWSID: 03-51-025  
 Mailing Address: P.O. Box 69 Benson, NC 27504 Ownership: Municipality  
 Contact Person: Tim Robbins Title: Public Works Director  
 Phone: 919-894-3553 Cell/Mobile: --  
 Secondary Contact: Dennis Ray Adams Phone: 919-894-3553  
 Mailing Address: PO Box 69 Benson, NC 27504 Cell/Mobile: --

**Complete**

### Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6-16	9.90 %
Cast Iron	6-10	19.30 %
Ductile Iron	6-16	19.50 %
Galvanized Iron	2	5.20 %
Polyvinyl Chloride	2-12	46.10 %

What are the estimated total miles of distribution system lines? **36 Miles**

How many feet of distribution lines were replaced during 2019? **1,130 Feet**

How many feet of new water mains were added during 2019? **1,290 Feet**

How many meters were replaced in 2019? **8**

How old are the oldest meters in this system? **4 Year(s)**

How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **27**

What is this system's finished water storage capacity? **0.3000 Million Gallons**

Has water pressure been inadequate in any part of the system since last update? *Line breaks that were repaired quickly should not be included.* **No**

### Programs

Does this system have a program to work or flush hydrants? **Yes, Weekly**

Does this system have a valve exercise program? **Yes, Annually**

Does this system have a cross-connection program? **Yes**

Does this system have a program to replace meters? **Yes**

Does this system have a plumbing retrofit program? **Yes**

Does this system have an active water conservation public education program? **Yes**

Does this system have a leak detection program? **Yes**

**NOTE** Benson utilizes the capabilities of its automatic metering infrastructure (AMI), which monitors customer usage and alerts town staff of potential leaks. Additionally, public works employees are constantly monitoring distribution main lines for leaks. Benson occasionally calls upon the NC Rural Water Association for assistance in leak detection.

## Water Conservation

What type of rate structure is used? **Flat/Fixed**

How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**

Does this system have an interconnection with another system capable of providing water in an emergency? **Yes**

## 2. Water Use Information

### Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Cape Fear River (02-3)	97 %	Johnston	100 %
Neuse River (10-1)	3 %		

What was the year-round population served in 2019? **4,000**

Has this system acquired another system since last report? **No**

### Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,568	0.1860	0	0.0000
Commercial	295	0.1010	0	0.0000
Industrial	3	0.3700	0	0.0000
Institutional	18	0.0120	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? **0.0680 MGD**

**NOTE** The metered average use for industrial and institutional use types are correct, although the numbers reflect a large percentage of increase for industrial use and a large decrease in institutional use. Our billing department had previously categorized some of the industrial customers as institutional and some institutional customers as industrial. This issue has been corrected.

### Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Johnston County	03-51-070	0.0020	365	0.0100	2026	Yes	Yes	12	Regular

## 3. Water Supply Sources

### Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.7730	0.8970	May	0.8240	1.0180	Sep	0.8940	1.0460
Feb	0.7330	0.8630	Jun	0.8210	0.9560	Oct	0.8990	1.0210
Mar	0.7330	0.9820	Jul	0.7680	0.9790	Nov	0.8400	0.9980
Apr	0.7370	0.9860	Aug	0.8390	0.9830	Dec	0.8820	1.0520



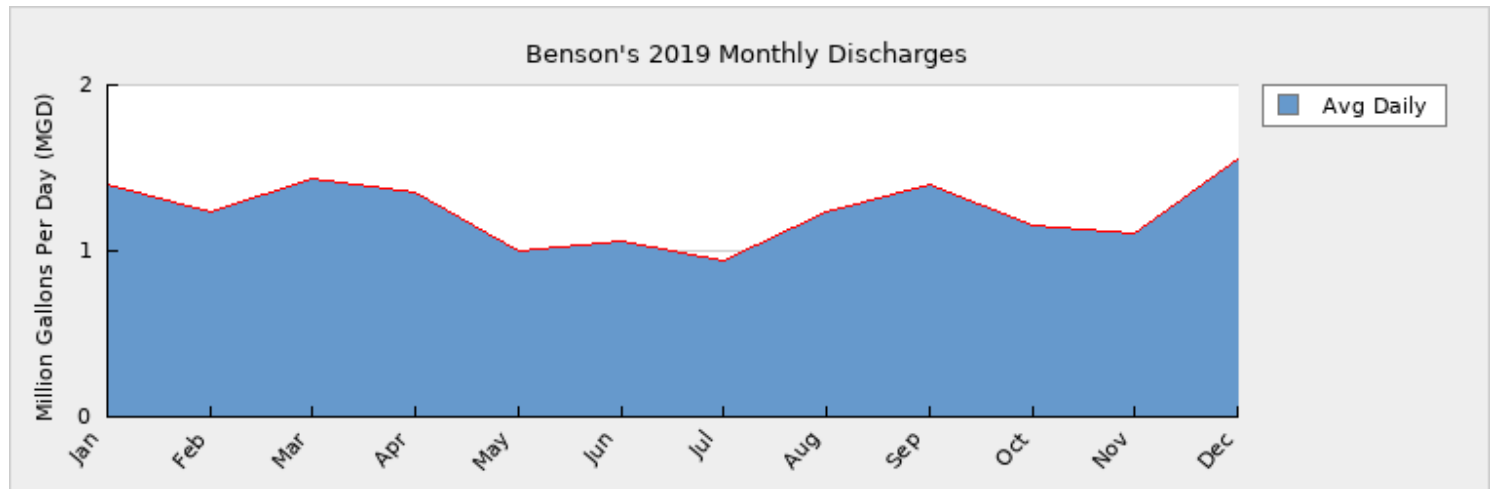
### Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Dunn	03-43-010	0.7240	365	1.2000	2027	Yes	Yes	16	Regular

Johnston County	03-51-070	0.0890	365	0.0900	2026	Yes	Yes	12	Regular
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## 4. Wastewater Information

Monthly Discharges					
	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	1.4000	May	1.0040	Sep	1.3980
Feb	1.2360	Jun	1.0580	Oct	1.1570
Mar	1.4390	Jul	0.9390	Nov	1.1110
Apr	1.3530	Aug	1.2360	Dec	1.5540



How many sewer connections does this system have? 1,715

How many water service connections with septic systems does this system have? 129

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Wastewater Permits						
Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0020389	1.9000	2.1000	1.2380		Hannah Creek	Neuse River (10-1)

Wastewater Interconnections					
Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Johnston County	03-51-070	Receiving	0.1050	365	0.1920

## 5. Planning

Projections						
	2019	2020	2030	2040	2050	2060
Year-Round Population	4,000	4,050	4,550	5,150	5,650	6,150
Seasonal Population	0	0	0	0	0	0
Residential	0.1860	0.2050	0.2100	0.2200	0.2300	0.2350
Commercial	0.1010	0.1030	0.1050	0.1070	0.1210	0.1220
Industrial	0.3700	0.3700	0.3700	0.3700	0.3700	0.3700
Institutional	0.0120	0.0140	0.0160	0.0160	0.0160	0.0160
System Process	0.0680	0.0650	0.0600	0.0550	0.0500	0.0450
Unaccounted-for	0.0740	0.0697	0.0711	0.0715	0.0735	0.0740

Demand v/s Percent of Supply						
	2019	2020	2030	2040	2050	2060
Surface Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	1.2900	1.2900	1.2900	1.2900	1.2900	1.2900
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	1.2900	1.2900	1.2900	1.2900	1.2900	1.2900
Service Area Demand	0.8110	0.8267	0.8321	0.8395	0.8605	0.8620
Sales	0.0020	0.0100	0.0100	0.0100	0.0100	0.0100
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	0.8130	0.8367	0.8421	0.8495	0.8705	0.8720
Demand as Percent of Supply	63%	65%	65%	66%	67%	68%



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 47 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs? We currently utilize automatic metering infrastructure to monitor for service line leaks. We hope to expand this benefit to include main line monitoring in the near future. This would help to greatly reduce our unaccounted for water percentage.

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

#### Additional Information

Has this system participated in regional water supply or water use planning? No

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues: Our town is fortunate to have implemented automatic metering infrastructure into our water distribution system. The system provides numerous functions that help us to better manage costs and continually improve our efficiency and accountability. The system has additional capabilities not yet utilized that will enhance our management of present and future water needs.

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# Benson

2020 ▾

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## 1. System Information

### Contact Information

Water System Name: Benson PWSID: 03-51-025  
 Mailing Address: P.O. Box 69 Benson, NC 27504 Ownership: Municipality  
 Contact Person: Tim Robbins Title: Public Works Director  
 Phone: 919-894-3553 Cell/Mobile: --  
 Secondary Contact: Dennis Ray Adams Phone: 919-894-3553  
 Mailing Address: PO Box 69 Benson, NC 27504 Cell/Mobile: --

**Complete**

### Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6-16	9.90 %
Cast Iron	6-10	19.30 %
Ductile Iron	6-16	19.50 %
Galvanized Iron	2	5.20 %
Polyvinyl Chloride	2-12	46.10 %

What are the estimated total miles of distribution system lines? 36 Miles

How many feet of distribution lines were replaced during 2020? 750 Feet

How many feet of new water mains were added during 2020? 1,200 Feet

How many meters were replaced in 2020? 6

How old are the oldest meters in this system? 5 Year(s)

How many meters for outdoor water use, such as irrigation, are not billed for sewer services? 27

What is this system's finished water storage capacity? 0.3000 Million Gallons

Has water pressure been inadequate in any part of the system since last update? *Line breaks that were repaired quickly should not be included.* No

### Programs

Does this system have a program to work or flush hydrants? Yes, Weekly

Does this system have a valve exercise program? Yes, Annually

Does this system have a cross-connection program? Yes

Does this system have a program to replace meters? Yes

Does this system have a plumbing retrofit program? Yes

Does this system have an active water conservation public education program? Yes

Does this system have a leak detection program? Yes

**NOTE** The leak detection program consists of the town's AMI system, which monitors customer water usage in real time to detect possible leaks and alerts town staff. The town also owns leak detection equipment which is utilized regularly to locate leaks, and the town also calls upon NCRWA on occasion to conduct leak detection surveys. Additionally, public works staff are instructed to observe and report water leaks as they travel during their shift.

## Water Conservation

What type of rate structure is used? **Flat/Fixed**

How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**

Does this system have an interconnection with another system capable of providing water in an emergency? **Yes**

## 2. Water Use Information

### Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Cape Fear River (02-3)	97 %	Johnston	100 %
Neuse River (10-1)	3 %		

What was the year-round population served in 2020? **4,080**

Has this system acquired another system since last report? **No**

### Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,600	0.1950	0	0.0000
Commercial	293	0.1030	0	0.0000
Industrial	3	0.4260	0	0.0000
Institutional	15	0.0080	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? **0.0612 MGD**

### Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Johnston County	03-51-070	0.0020	366	0.0100	2026	Yes	Yes	12	Regular

## 3. Water Supply Sources

### Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.8700	0.9670	May	0.8930	1.0450	Sep	0.9070	1.0120
Feb	0.7590	0.8310	Jun	0.8900	0.9920	Oct	0.9610	1.1110
Mar	0.7640	0.9840	Jul	0.9660	1.1150	Nov	0.9390	1.1020
Apr	0.8130	0.9850	Aug	0.8650	1.1330	Dec	0.8260	1.0190

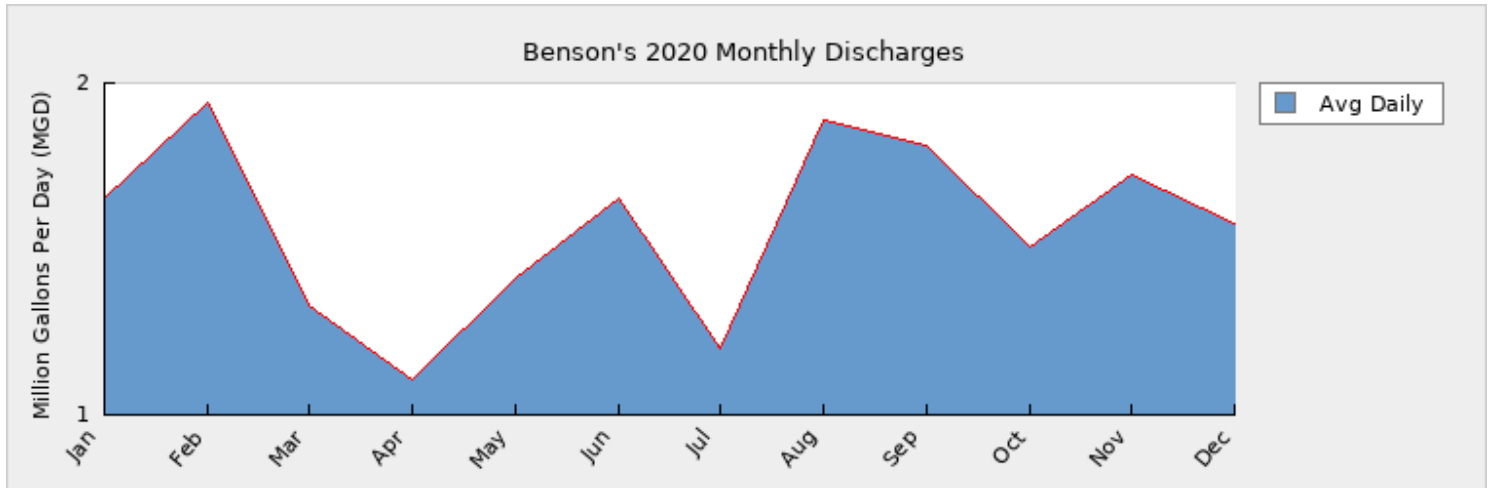


### Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Dunn	03-43-010	0.7920	366	1.2000	2027	Yes	Yes	16	Regular
Johnston County	03-51-070	0.0930	366	0.0900	2026	Yes	Yes	12	Regular

## 4. Wastewater Information

Monthly Discharges					
	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	1.6500	May	1.4130	Sep	1.8090
Feb	1.9400	Jun	1.6550	Oct	1.5060
Mar	1.3280	Jul	1.2020	Nov	1.7250
Apr	1.1050	Aug	1.8880	Dec	1.5790



How many sewer connections does this system have? 1,786

How many water service connections with septic systems does this system have? 129

Are there plans to build or expand wastewater treatment facilities in the next 10 years? Yes

**NOTE** We are currently pursuing engineering options to expand the wastewater treatment facility due to growth and development in our area. More details should be available by next years LWSP update.

Wastewater Permits						
Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0020389	1.9000	2.1000	1.5670		Hannah Creek	Neuse River (10-1)

Wastewater Interconnections					
Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Johnston County	03-51-070	Receiving	0.1020	366	0.1920

## 5. Planning

Projections						
	2020	2030	2040	2050	2060	2070
Year-Round Population	4,080	4,130	4,180	4,230	4,280	5,300
Seasonal Population	0	0	0	0	0	0
Residential	0.1950	0.2040	0.2130	0.2220	0.2310	0.2400
Commercial	0.1030	0.1050	0.1070	0.1090	0.1110	0.1130
Industrial	0.4260	0.5200	0.5300	0.5300	0.5300	0.5300
Institutional	0.0080	0.0085	0.0087	0.0089	0.0091	0.0093
System Process	0.0612	0.0600	0.0600	0.0600	0.0600	0.0600
Unaccounted-for	0.0898	0.0740	0.0745	0.0747	0.0749	0.0751

Demand v/s Percent of Supply						
	2020	2030	2040	2050	2060	2070
Surface Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	1.2900	1.2930	1.2930	1.2930	1.2930	1.2930
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	1.2900	1.2930	1.2930	1.2930	1.2930	1.2930
Service Area Demand	0.8830	0.9715	0.9932	1.0046	1.0160	1.0274
Sales	0.0020	0.0100	0.0100	0.0100	0.0100	0.0100
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	0.8850	0.9815	1.0032	1.0146	1.0260	1.0374
Demand as Percent of Supply	69%	76%	78%	78%	79%	80%



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 48 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

#### Additional Information

Has this system participated in regional water supply or water use planning? **Yes, We are currently participating in a merger regionalization study with the City of Dunn. Study initiated in February 2021**

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

The Division of Water Resources (DWR) provides the data contained within this Local Water Supply Plan (LWSP) as a courtesy and service to our customers. DWR staff does not field verify data. Neither DWR, nor any other party involved in the preparation of this LWSP attests that the data is completely free of errors and omissions. Furthermore, data users are cautioned that LWSPs labeled **PROVISIONAL** have yet to be reviewed by DWR staff. Subsequent review may result in significant revision. Questions regarding the accuracy or limitations of usage of this data should be directed to the water system and/or DWR.

**APPENDIX 3**

**2022 Depreciation Schedule**

**2017-2032 Water & Sewer Capital Improvements Plans**

**Book Asset Detail 7/01/20 - 6/30/21**

FYE: 6/30/2021

Asset	d t	Property Description	Date In Service	Book Cost	Book Sec 179 Exp c	Book Sal Value	Book Prior Depreciation	Book Current Depreciation	Book End Depr	Book Net Book Value	Book Method	Book Period	
<b>Group: BUILDING</b>													
41		Storage Building	12/31/62	5,000.00	0.00	0.00	5,000.00	0.00	5,000.00	0.00	S/L	50.00	
42		Lift Station Building	12/31/72	10,000.00	0.00	0.00	9,301.30	200.00	9,501.30	498.70	S/L	50.00	
43		Control Building	12/31/81	150,000.00	0.00	0.00	112,500.00	3,000.00	115,500.00	34,500.00	S/L	50.00	
44		Pumping Station	12/31/81	190,000.00	0.00	0.00	142,500.94	3,800.00	146,300.94	43,699.06	S/L	50.00	
45		Filter Building	12/31/81	250,000.00	0.00	0.00	187,500.94	5,000.00	192,500.94	57,499.06	S/L	50.00	
46		Chlorine Building	12/31/81	52,000.00	0.00	0.00	39,000.94	1,040.00	40,040.94	11,959.06	S/L	50.00	
47		Lime Storage Building	12/31/81	90,000.00	0.00	0.00	67,500.00	1,800.00	69,300.00	20,700.00	S/L	50.00	
48		Sewage Treatment Plant	12/31/81	1,229,090.01	0.00	0.00	825,538.94	24,581.80	850,120.74	378,969.27	S/L	50.00	
49		Expansion of Plant	4/14/98	3,063,000.00	0.00	0.00	857,640.00	61,260.00	918,900.00	2,144,100.00	S/L	50.00	
50		Renovation to Water Tower	9/14/04	76,000.00	0.00	0.00	35,213.26	1,520.00	36,733.26	39,266.74	S/L	50.00	
114		Renovations at WWTP	7/01/11	2,331,114.00	0.00	0.00	419,600.52	46,622.28	466,222.80	1,864,891.20	S/L	50.00	
193		Purchase of Building	12/14/17	189,794.37	0.00	0.00	9,806.05	3,795.89	13,601.94	176,192.43	S/L	50.00	
292		WWTP Pump Station (Fund 88)	6/30/21	2,793,305.00	0.00 c	0.00	0.00	0.00	0.00	2,793,305.00	S/L	50.00	
				<b>BUILDING</b>			<b>10,429,303.38</b>	<b>0.00</b> c		<b>2,711,102.89</b>	<b>152,619.97</b>	<b>2,863,722.86</b>	<b>7,565,580.52</b>

1.02

**Group: EQUIPMENT**

76		Fire Hydrant 18 Church Street	1/01/40	11,700.00	0.00	0.00	11,700.00	0.00	11,700.00	0.00	S/L	10.00
77		Water Tank	3/25/66	69,620.00	0.00	0.00	69,620.00	0.00	69,620.00	0.00	S/L	10.00
78		Lift Station Glenhaven	7/01/72	6,500.00	0.00	0.00	6,500.00	0.00	6,500.00	0.00	S/L	10.00
79		Lift Station Dutch Inn	7/01/74	6,500.00	0.00	0.00	6,500.00	0.00	6,500.00	0.00	S/L	10.00
80		Dunn Benson Pump Boost St	7/01/77	5,240.00	0.00	0.00	5,240.00	0.00	5,240.00	0.00	S/L	10.00
81		Pumping Station	3/03/81	16,500.00	0.00	0.00	16,500.00	0.00	16,500.00	0.00	S/L	10.00
82		Lift Station Johnson St	4/01/81	7,387.50	0.00	0.00	7,387.50	0.00	7,387.50	0.00	S/L	10.00
84		Upgrading Booster Pumps	7/01/96	55,000.00	0.00	0.00	55,000.00	0.00	55,000.00	0.00	S/L	10.00
85		Hydromatic Pump	2/20/97	10,726.14	0.00	0.00	10,726.14	0.00	10,726.14	0.00	S/L	10.00
86		Hydromatic Pump	2/20/97	10,726.14	0.00	0.00	10,726.14	0.00	10,726.14	0.00	S/L	10.00
87		125 KW Generator	7/01/97	45,000.00	0.00	0.00	45,000.00	0.00	45,000.00	0.00	S/L	10.00
88		Loader Backhoe JCB	9/25/98	51,656.00	0.00	0.00	51,656.00	0.00	51,656.00	0.00	S/L	10.00
89		Boardwalk Liftstation	9/01/99	60,000.00	0.00	0.00	60,000.00	0.00	60,000.00	0.00	S/L	10.00
90		6 B5443 T30 Frame Pump	12/31/01	5,920.00	0.00	0.00	5,920.00	0.00	5,920.00	0.00	S/L	10.00
91		Remote Telemetering Unit	2/12/02	21,955.00	0.00	0.00	21,955.00	0.00	21,955.00	0.00	S/L	10.00
92		Generator Plant	4/02/02	111,719.80	0.00	0.00	111,719.80	0.00	111,719.80	0.00	S/L	10.00
93		Generator 90KW	3/18/03	9,300.00	0.00	0.00	9,300.00	0.00	9,300.00	0.00	S/L	10.00
94		Generator 30KW	3/18/03	5,250.00	0.00	0.00	5,250.00	0.00	5,250.00	0.00	S/L	10.00

96	Generator 15KW	3/18/03	5,000.00	0.00	0.00	5,000.00	0.00	5,000.00	0.00	S/L	10.00
98	Generator 30KW	3/20/03	5,250.00	0.00	0.00	5,250.00	0.00	5,250.00	0.00	S/L	10.00
100	Lift Station Gilbert Road	6/17/03	17,930.00	0.00	0.00	17,930.00	0.00	17,930.00	0.00	S/L	10.00
101	Cub Cadet Mower	4/12/07	7,362.76	0.00	0.00	7,362.76	0.00	7,362.76	0.00	S/L	10.00
110	Willa Chase Pump Station	7/01/09	157,390.00	0.00	0.00	157,390.00	0.00	157,390.00	0.00	S/L	10.00
113	Data System Upgrade	4/09/12	15,965.00	0.00	0.00	13,171.13	1,596.50	14,767.63	1,197.37	S/L	10.00
116	350 Generate Parts	6/26/13	13,490.00	0.00	0.00	9,443.00	1,349.00	10,792.00	2,698.00	S/L	10.00
141	Northstar Billing Software	3/01/15	40,909.00	0.00	0.00	31,168.75	5,844.14	37,012.89	3,896.11	S/L	7.00
142	Northstar Billing Software	3/01/15	40,909.00	0.00	0.00	31,168.75	5,844.14	37,012.89	3,896.11	S/L	7.00
186	Ground Penetrating Camera	6/08/17	13,691.49	0.00	0.00	4,221.55	1,369.15	5,590.70	8,100.79	S/L	10.00
211	Generator 30KW	3/19/03	5,250.00	0.00	0.00	5,250.00	0.00	5,250.00	0.00	S/L	10.00
213	Upgrade SCADA System	4/23/14	30,143.00	0.00	0.00	18,588.18	3,014.30	21,602.48	8,540.52	S/L	10.00
214	2018 KAUFMAN TRAILER FOR	8/20/18	6,300.00	0.00	0.00	1,155.00	630.00	1,785.00	4,515.00	S/L	10.00
215	2018 HYUNDAI R55-9A EXCAV	8/02/18	70,759.95	0.00	0.00	12,972.66	7,076.00	20,048.66	50,711.29	S/L	10.00
289	Horizontal Brush Rotor	10/22/20	60,600.00	0.00	c	0.00	4,040.00	4,040.00	56,560.00	S/L	10.00
290	Horizontal Brush Rotor	5/20/21	53,900.00	0.00	c	0.00	449.17	449.17	53,450.83	S/L	10.00
<b>EQUIPMENT</b>			<b>1,055,550.78</b>	<b>0.00</b>	<b>c</b>	<b>0.00</b>	<b>830,772.36</b>	<b>31,212.40</b>	<b>861,984.76</b>	<b>193,566.02</b>	

I.02

**Group: INFRASTRUCTURE**

52	Water Line	1/01/76	37,440.00	0.00	0.00	26,968.98	748.80	27,717.78	9,722.22	S/L	50.00
53	Water Line	1/01/77	15,860.00	0.00	0.00	11,188.46	317.20	11,505.66	4,354.34	S/L	50.00
54	Sewer Lines 2 Manholes	1/01/78	7,500.00	0.00	0.00	5,178.90	150.00	5,328.90	2,171.10	S/L	50.00
55	Water Line	1/01/78	12,600.00	0.00	0.00	8,699.10	252.00	8,951.10	3,648.90	S/L	50.00
56	Sewer Lines 33 Manholes	1/01/81	159,256.40	0.00	0.00	82,835.34	3,185.13	86,020.47	73,235.93	S/L	50.00
57	Water Line	4/01/81	132,885.75	0.00	0.00	85,304.55	2,657.72	87,962.27	44,923.48	S/L	50.00
58	Sewer Line	1/01/84	213,329.68	0.00	0.00	128,189.99	4,266.59	132,456.58	80,873.10	S/L	50.00
59	Sewer line Golden Corral	6/30/85	43,192.75	0.00	0.00	24,449.63	863.86	25,313.49	17,879.26	S/L	50.00
60	I-40 Rest Area	6/30/86	12,400.00	0.00	0.00	5,015.00	248.00	5,263.00	7,137.00	S/L	50.00
61	Annex Sewer Lincoln	6/30/86	60,168.20	0.00	0.00	34,799.05	1,203.36	36,002.41	24,165.79	S/L	50.00
62	I-40 Rest Area	6/30/86	15,682.00	0.00	0.00	9,073.36	313.64	9,387.00	6,295.00	S/L	50.00
63	Sewer Line	7/01/86	60,168.20	0.00	0.00	33,910.57	1,203.36	35,113.93	25,054.27	S/L	50.00
64	8 Sewer Line	8/16/89	14,346.35	0.00	0.00	7,424.45	286.93	7,711.38	6,634.97	S/L	50.00
65	Underground Piercing	3/15/91	6,000.00	0.00	0.00	6,000.00	0.00	6,000.00	0.00	S/L	50.00
66	Sewer Line	1/01/94	114,474.22	0.00	0.00	51,701.17	2,289.48	53,990.65	60,483.57	S/L	50.00
67	Water Line	6/30/94	15,000.00	0.00	0.00	6,663.12	300.00	6,963.12	8,036.88	S/L	50.00
69	Sewer Lines 32 Manholes	1/01/96	78,832.50	0.00	0.00	33,250.80	1,576.65	34,827.45	44,005.05	S/L	50.00
70	US 301 to NC 27; 8 PVC Line from	7/01/96	320,000.00	0.00	0.00	137,361.20	6,400.00	143,761.20	176,238.80	S/L	50.00
71	Lines Main Across Pine Lincoln an	7/01/96	23,000.00	0.00	0.00	9,873.20	460.00	10,333.20	12,666.80	S/L	50.00
72	Water-Sewer Lines	7/01/96	16,000.00	0.00	0.00	6,868.00	320.00	7,188.00	8,812.00	S/L	50.00
73	Nitrogen Control Project; Sewer Lin	3/28/01	314,550.64	0.00	0.00	107,995.65	6,291.01	114,286.66	200,263.98	S/L	50.00
74	Sewer Lines	6/17/03	144,610.00	0.00	0.00	46,965.76	2,892.20	49,857.96	94,752.04	S/L	50.00
75	Reclaimed Water Systems	10/04/05	700,000.00	0.00	0.00	209,194.27	14,000.00	223,194.27	476,805.73	S/L	50.00
109	Willa Chase Sewer System	7/01/09	291,935.00	0.00	0.00	64,225.70	5,838.70	70,064.40	221,870.60	S/L	50.00
144	Water Lines	1/01/30	130,100.00	0.00	0.00	130,100.00	0.00	130,100.00	0.00	S/L	50.00

145	Sewer Lines 22 Manholes	1/01/32	83,475.00	0.00	0.00	83,475.00	0.00	83,475.00	0.00 S/L	50.00
146	Sewer Lines 6 Manholes	1/01/34	19,055.00	0.00	0.00	19,055.00	0.00	19,055.00	0.00 S/L	50.00
151	Sewer Lines 4 Manholes	1/01/47	8,500.00	0.00	0.00	8,500.00	0.00	8,500.00	0.00 S/L	50.00
152	Sewer Lines 9 Manholes	1/01/48	19,255.00	0.00	0.00	19,255.00	0.00	19,255.00	0.00 S/L	50.00
153	Water Lines	1/01/56	20,130.00	0.00	0.00	20,130.00	0.00	20,130.00	0.00 S/L	50.00
155	Water Line	1/01/57	34,800.00	0.00	0.00	34,800.00	0.00	34,800.00	0.00 S/L	50.00
156	Water Line	1/01/57	58,730.00	0.00	0.00	58,730.00	0.00	58,730.00	0.00 S/L	50.00
157	Sewer Line 1 Manhole	1/01/58	2,775.00	0.00	0.00	2,775.00	0.00	2,775.00	0.00 S/L	50.00
158	Water Lines	1/01/58	6,950.00	0.00	0.00	6,950.00	0.00	6,950.00	0.00 S/L	50.00
160	Sewer Lines 5 Manholes	1/01/62	11,080.00	0.00	0.00	10,295.56	221.60	10,517.16	562.84 S/L	50.00
161	Sewer Lines 57 Manholes	1/01/64	267,527.50	0.00	0.00	240,617.20	5,350.55	245,967.75	21,559.75 S/L	50.00
162	Water Lines	1/01/64	11,200.00	0.00	0.00	10,073.14	224.00	10,297.14	902.86 S/L	50.00
163	Water Lines	1/01/68	29,220.00	0.00	0.00	24,534.60	584.40	25,119.00	4,101.00 S/L	50.00
164	Water Lines	1/01/68	14,830.00	0.00	0.00	12,454.90	296.60	12,751.50	2,078.50 S/L	50.00
165	Water Lines	1/01/68	42,200.00	0.00	0.00	35,436.50	844.00	36,280.50	5,919.50 S/L	50.00
166	Water Line	1/01/69	49,210.00	0.00	0.00	40,588.78	984.20	41,572.98	7,637.02 S/L	50.00
167	Water Line	1/01/69	9,300.00	0.00	0.00	7,671.66	186.00	7,857.66	1,442.34 S/L	50.00
168	Sewer Lines 3 Manholes	1/01/70	6,375.00	0.00	0.00	5,163.18	127.50	5,290.68	1,084.32 S/L	50.00
169	Water Line	1/01/70	5,480.00	0.00	0.00	4,439.72	109.60	4,549.32	930.68 S/L	50.00
170	Water Line	1/01/71	15,300.00	0.00	0.00	12,162.42	306.00	12,468.42	2,831.58 S/L	50.00
171	Sewer Lines 15 Manholes	1/01/72	38,077.50	0.00	0.00	20,973.00	761.55	21,734.55	16,342.95 S/L	50.00
172	Water Line	1/01/73	16,830.00	0.00	0.00	12,875.10	336.60	13,211.70	3,618.30 S/L	50.00
173	Water Line	1/01/74	6,760.00	0.00	0.00	5,071.78	135.20	5,206.98	1,553.02 S/L	50.00
174	Water Line	1/01/74	14,220.00	0.00	0.00	10,668.42	284.40	10,952.82	3,267.18 S/L	50.00
175	Water Line	1/01/74	15,150.00	0.00	0.00	11,363.52	303.00	11,666.52	3,483.48 S/L	50.00
176	Sewer Lines 5 Manholes	1/01/75	7,375.00	0.00	0.00	5,421.22	147.50	5,568.72	1,806.28 S/L	50.00
177	Water Line	1/01/75	6,750.00	0.00	0.00	4,964.40	135.00	5,099.40	1,650.60 S/L	50.00
178	Water Line	1/01/75	15,440.00	0.00	0.00	11,350.40	308.80	11,659.20	3,780.80 S/L	50.00
179	Water Line	1/01/76	1,635.00	0.00	0.00	1,176.42	32.70	1,209.12	425.88 S/L	50.00
180	Pump Station	6/07/16	24,713.00	0.00	0.00	8,114.10	494.26	8,608.36	16,104.64 S/L	50.00
187	10 Badger Fire Service	1/05/17	42,397.00	0.00	0.00	11,447.19	847.94	12,295.13	30,101.87 S/L	50.00
188	Community Development Program	12/13/16	1,177,897.00	0.00	0.00	84,415.95	23,557.94	107,973.89	1,069,923.11 S/L	50.00
189	Improvements Capital Project	7/01/16	1,507,893.00	0.00	0.00	120,631.44	30,157.86	150,789.30	1,357,103.70 S/L	50.00
227	Sewer Lines 12 Manholes	6/01/61	61,510.00	0.00	0.00	57,691.30	1,230.20	58,921.50	2,588.50 S/L	50.00
228	Water Lines	1/01/64	21,190.00	0.00	0.00	19,055.50	423.80	19,479.30	1,710.70 S/L	50.00
229	Water Line	1/01/66	5,690.00	0.00	0.00	4,949.12	113.80	5,062.92	627.08 S/L	50.00
232	Water Line	1/01/76	17,400.00	0.00	0.00	12,532.56	348.00	12,880.56	4,519.44 S/L	50.00
234	Annexation Dogeys W&S Lines	7/01/12	964,452.00	0.00	0.00	154,312.32	19,289.04	173,601.36	790,850.64 S/L	50.00
235	Sewer Repair	7/01/14	420,803.00	0.00	0.00	50,496.36	8,416.06	58,912.42	361,890.58 S/L	50.00
236	Sewer Line 34 Manholes	1/01/30	146,040.00	0.00	0.00	146,040.00	0.00	146,040.00	0.00 S/L	50.00
237	Water Line	1/01/35	32,850.00	0.00	0.00	32,850.00	0.00	32,850.00	0.00 S/L	50.00
238	Water Lines	1/01/40	80,340.00	0.00	0.00	80,340.00	0.00	80,340.00	0.00 S/L	50.00
239	Water Lines	1/01/40	13,230.00	0.00	0.00	13,230.00	0.00	13,230.00	0.00 S/L	50.00
240	Water Lines	1/01/42	7,510.00	0.00	0.00	7,510.00	0.00	7,510.00	0.00 S/L	50.00
241	Water Line	1/01/56	18,560.00	0.00	0.00	18,560.00	0.00	18,560.00	0.00 S/L	50.00

242	Water Lines	1/01/59	10,240.00	0.00	0.00	9,976.12	204.80	10,180.92	59.08	S/L	50.00
<b>INFRASTRUCTURE</b>			<u>8,329,676.69</u>	<u>0.00</u>	<u>0.00</u>	<u>2,846,360.13</u>	<u>152,827.53</u>	<u>2,999,187.66</u>	<u>5,330,489.03</u>		

I.02

**Group: LAND**

250	South Side of Hannah's Creek	2/18/98	20,250.00	0.00	0.00	0.00	0.00	0.00	20,250.00	Land	0.00
251	Donated Wet Lands	11/01/04	8,620.00	0.00	0.00	0.00	0.00	0.00	8,620.00	Land	0.00
<b>LAND</b>			<u>28,870.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>28,870.00</u>		

I.02

**Group: VEHICLES**

181	Mahindra 5555 Tractor	8/06/15	36,760.00	0.00	0.00	18,073.67	3,676.00	21,749.67	15,010.33	S/L	10.00
182	2017 Ford F350 #92	10/24/16	31,258.00	0.00	0.00	11,461.27	3,125.80	14,587.07	16,670.93	S/L	10.00
183	1/2 2016 Chev 205 Silverado	11/30/16	16,501.00	0.00	0.00	5,912.86	1,650.10	7,562.96	8,938.04	S/L	10.00
184	2017 Ford F150 Reg Cab 4x4	5/24/17	23,469.82	0.00	0.00	7,236.52	2,346.98	9,583.50	13,886.32	S/L	10.00
185	2008 Ford F250 Utility tk	8/25/16	25,469.00	0.00	0.00	9,763.12	2,546.90	12,310.02	13,158.98	S/L	10.00
190	2018 Ford F150 Super Cab	8/31/17	30,221.75	0.00	0.00	8,562.84	3,022.18	11,585.02	18,636.73	S/L	10.00
191	2018 Ford F150 Super Cab	11/02/17	30,221.75	0.00	0.00	8,059.14	3,022.18	11,081.32	19,140.43	S/L	10.00
192	2017 F550 Chassis Dump Truck	11/22/17	52,210.00	0.00	0.00	13,487.58	5,221.00	18,708.58	33,501.42	S/L	10.00
273	2010 Ford Truck	8/12/10	17,208.12	0.00	0.00	17,064.70	143.42	17,208.12	0.00	S/L	10.00
274	Ford F-150 Truck	9/08/11	20,245.00	0.00	0.00	17,883.08	2,024.50	19,907.58	337.42	S/L	10.00
287	2019 F250	11/16/18	37,604.00	0.00	0.00	5,953.97	3,760.40	9,714.37	27,889.63	S/L	10.00
288	UV34 Gas Utility Vehicle	3/05/21	13,269.00	0.00	0.00	0.00	884.60	884.60	12,384.40	S/L	5.00
<b>VEHICLES</b>			<u>334,437.44</u>	<u>0.00</u>	<u>0.00</u>	<u>123,458.75</u>	<u>31,424.06</u>	<u>154,882.81</u>	<u>179,554.63</u>		

I.02

<b>Grand Total</b>	<u>20,595,521.29</u>	<u>0.00</u>	<u>0.00</u>	<u>6,511,694.13</u>	<u>368,083.96</u>	<u>6,879,778.09</u>	<u>13,715,743.20</u>
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I.02

I.02

15,845,360.00 leadseet

(2,129,616.80)

2,547,496.00 CIP

417,879.20

2017-2032 Water & Sewer Capital Improvements Plan

Town of Benson, NC

Utility	Project Name	Total Project Cost	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
Water	Water System Improvements - Phase 3	\$1,191,400								\$1,191,400									
	Water System Improvements - Phase 4	\$1,107,000												\$1,107,000					
	West Parrish Drive (6") Waterline Replacement	\$738,100								\$738,100									
	Elm Street (6") Waterline Replacement	\$345,500									\$345,500								
	West Woodall Street (6") Waterline Replacement	\$325,900									\$325,900								
	Chicopee Road Waterline Replacement	\$271,400									\$271,400								
	Replace Existing Asbestos Cement Pipes	\$5,864,700												\$1,104,600	\$1,137,800	\$1,171,900	\$1,207,100	\$1,243,300	
	Remove Existing 2" Galvanized Iron Pipes	\$327,000									\$327,000								
	Upsize Fire Protection Mains to 6-inch Pipes	\$84,900								\$84,900									
	Elevated Water Tank Improvements	\$500,000								\$500,000									
	Installation of New 0.3-MG Elevated Water Tank	\$5,143,200																\$2,533,600	\$2,609,600
	Rehabilitate Existing Water Tower Vault	\$52,000								\$52,000									
	12" Insert Valve for Water Tower Isolation	\$27,000								\$27,000									
Booster Station Rehabilitation	\$34,000												\$34,000						
Sewer	Manhole Rehabilitation and Repair	\$934,200		\$34,900	\$827,000	\$72,300													
	I-40 Pump Station #1 Rehabilitation	\$511,950					\$11,950				\$500,000								
	Carolyn Drive Pump Station #2	\$122,500	\$122,500																
	West Ridge Pump Station #3 Rehabilitation	\$26,250					\$26,250												
	Wall Street Pump Station #4 Rehabilitation	\$572,900			\$572,900														
	King Circle Pump Station #5 Rehabilitation	\$29,400					\$29,400												
	Chicopee Pump Station #6 Rehabilitation	\$55,000					\$55,000												
	South Walton Avenue Pump Station #7 Rehabilitation	\$125,000	\$125,000																
	Lake Shore Pump Station #8 Rehabilitation	\$6,700					\$6,700												
	Boardwalk Pump Station #9 Rehabilitation	\$7,300					\$7,300												
	Burris Pump Station #10 Rehabilitation	\$513,500					\$13,500				\$500,000								
	Willa Chase Pump Station #11 Rehabilitation	\$4,400					\$4,400												
	Projects from CCTV Inspection: N. Lee Street Area	\$300,800			\$300,800														
	Projects from CCTV Inspection: S. Lee Street Area	\$172,150			\$172,150														
	Projects from CCTV Inspection: Parrish Drive Area	\$329,400				\$329,400													
	Benson WWTP Improvements	\$3,533,000								\$3,533,000									
	Benson WWTP Expansion to 3.75 MGD	\$35,300,000								\$35,300,000									
	Catherine St. Area - Hydraulic Modeling Results	\$830,000								\$830,000									
	N. Lincoln St. / W. Martin St. Sewer Improvements	\$2,060,000											\$2,060,000						
	Smoke Testing and Cleaning Sewers	\$857,000								\$58,000	\$62,000	\$66,000	\$69,000	\$122,000	\$158,000	\$322,000			
	Find-and-Fix Capital Repairs	\$2,788,000							\$500,000			\$547,000	\$563,000	\$580,000	\$598,000				
	Long Range Sewer Line Master Plan	\$47,000								\$47,000									
	Abandon Lake Shore & Boardwalk Pump Stations	\$1,570,000												\$1,570,000					
Abandon King Circle & Chicopee Pump Stations	\$1,570,000												\$1,570,000						
Rehabilitate Sewer Lines from Manholes A088 to A084	\$68,000											\$68,000							
	<b>\$52,334,450</b>	<b>\$247,500</b>	<b>\$34,900</b>	<b>\$1,872,850</b>	<b>\$401,700</b>	<b>\$154,500</b>	<b>\$500,000</b>	<b>\$5,104,900</b>	<b>\$37,318,500</b>	<b>\$2,882,200</b>	<b>\$3,901,000</b>	<b>\$4,946,600</b>	<b>\$1,893,800</b>	<b>\$1,493,900</b>	<b>\$1,207,100</b>	<b>\$3,776,900</b>	<b>\$2,609,600</b>		

# Exhibit 3 Proposed Phase 3 Improvements

## Water Distribution System Capital Improvements Plan

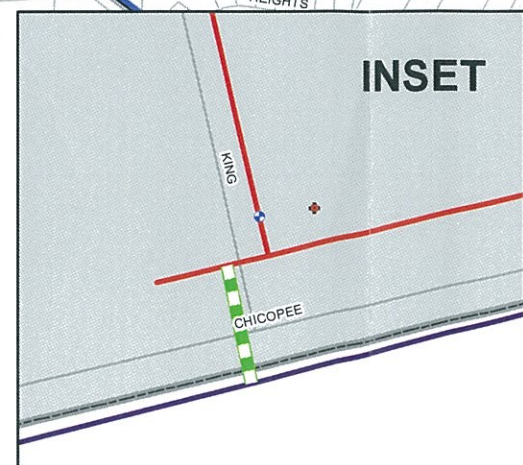
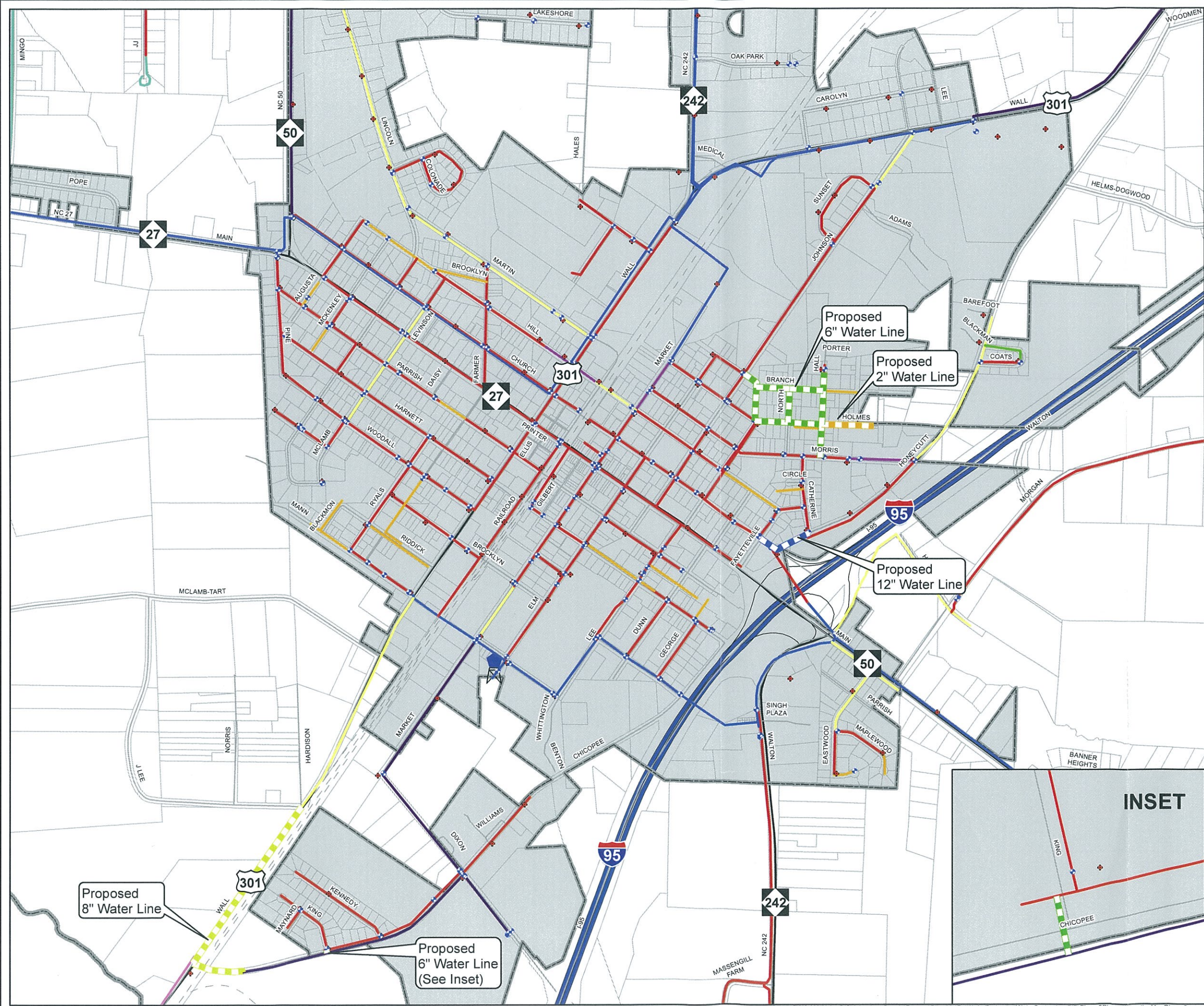
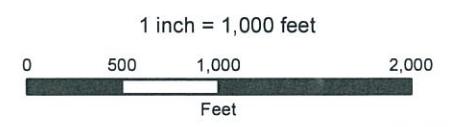
Town of Benson

December 2012



- Proposed Improvements
- Proposed 2 in. Water Line
  - Proposed 6 in. Water Line
  - Proposed 8 in. Water Line
  - Proposed 12 in. Water Line

- Existing Hydrants
- Existing Valves
- Elevated Tank
- Existing 2" Water Line
- Existing 3" Water Line
- Existing 4" Water Line
- Existing 6" Water Line
- Existing 8" Water Line
- Existing 10" Water Line
- Existing 12" Water Line
- Existing 16" Water Line
- Interstate
- US Route
- NC Route
- Ramp
- Rail
- Parcels
- Benson Town Limit



# Exhibit 4 Proposed Phase 4 Improvements

## Water Distribution System Capital Improvements Plan

Town of Benson

December 2012



### Proposed Improvements

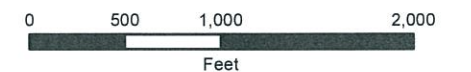
- Proposed 2 in. Water Line
- Proposed 6 in. Water Line
- Proposed 8 in. Water Line
- Proposed 12 in. Water Line

- Existing Hydrants
- Existing Valves
- Elevated Tank

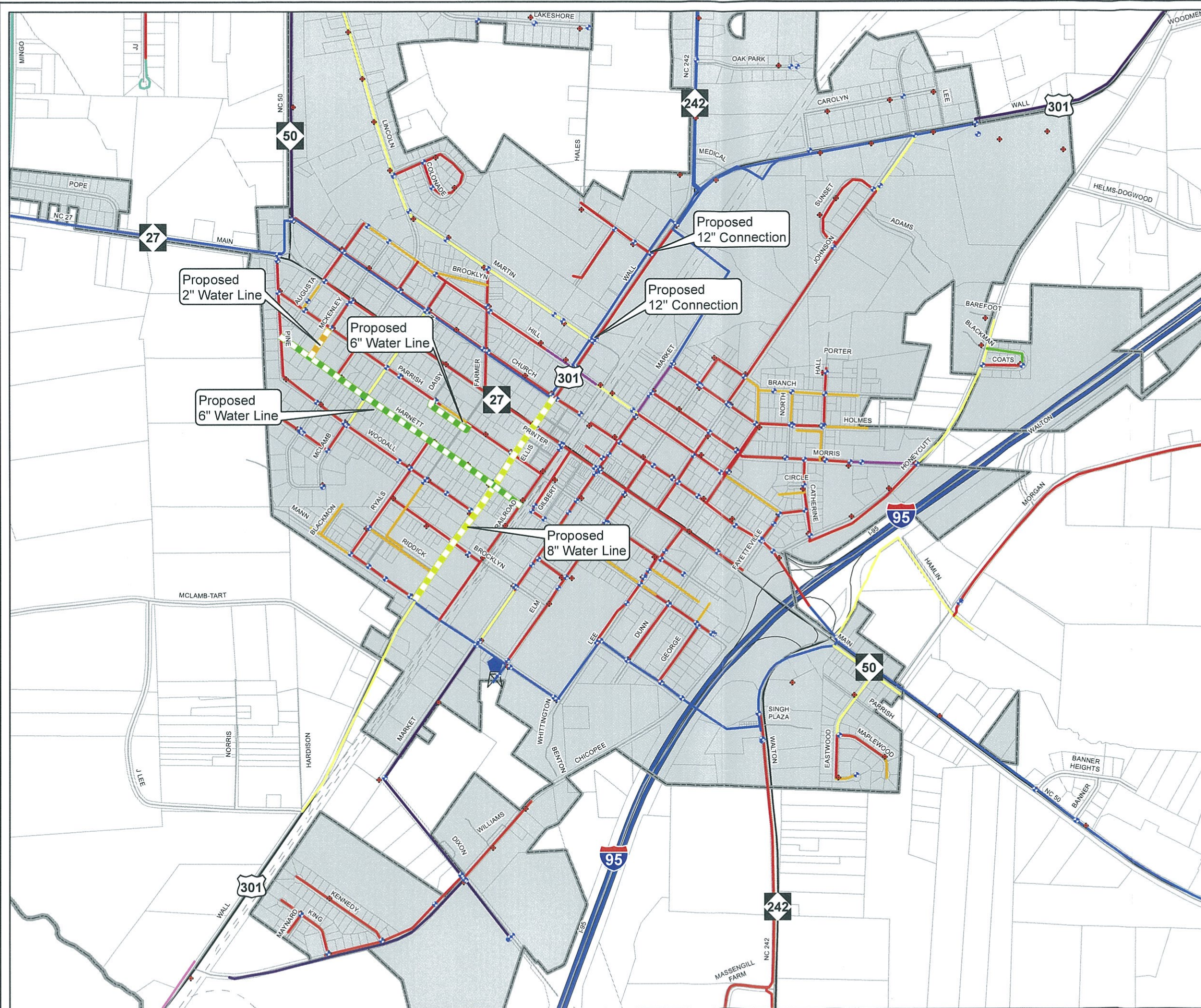
- Existing 2" Water Line
- Existing 3" Water Line
- Existing 4" Water Line
- Existing 6" Water Line
- Existing 8" Water Line
- Existing 10" Water Line
- Existing 12" Water Line
- Existing 16" Water Line
- Interstate
- US Route
- NC Route
- Ramp
- Rail
- Parcels
- Benson Town Limit



1 inch = 1,000 feet



THE WOOTEN COMPANY  
ENGINEERS, PLANNERS, ARCHITECTS



## **APPENDIX 4**

### **System Development Fee Worksheets**

**System Development Fees  
Summary Worksheet**

Client: Town of Benson

Accounting Methodology:

Buy-In Cost

Pay proportional share of past and current investments (for existing utilities/facilities to support existing/new growth)

Incremental Cost

Pay increase in total costs resulting from increase in production (for new utilities/facilities to support new growth only)

Combined Cost

Combination of Buy-In and Incremental Costs

enter as positive values and subtract from total costs

Asset ID/Ref.	Asset Description	Asset Group	Project Costs				Project Credits				Net Total Cost per				Comments				
			Construction Cost	Survey & Engineering Fees	Land Acquisition Cost	Debt Principal and Interest Pmts	Total Costs	Accumulated Depreciation	Debt Credits	Principal Forgiveness / Grants	Total Credits	Net Total Cost	Design Capacity, MGD	Gal Capacity, \$/GPD		% SDF Eligible	% Water System Affiliation	% Sewer System Affiliation	% Sewer System Affiliation
<b>WATER</b>																			
52	Water Line (6")	Water - Distribution	\$ 37,440				\$ 37,440	\$ 27,718		\$ 27,718	\$ 9,722	0.950	\$ 0.01	0%	100%				Ineligible - 6" water mains are too small
53	Water Line (2")	Water - Distribution	\$ 15,860				\$ 15,860	\$ 11,506		\$ 11,506	\$ 4,354	0.950	\$ -	0%	100%				Ineligible - 6" water mains and smaller are too small
55	Water Line (2")	Water - Distribution	\$ 12,600				\$ 12,600	\$ 8,951		\$ 8,951	\$ 3,649	0.950	\$ -	0%	100%				Ineligible - 6" water mains and smaller are too small
57	Water Line (2")	Water - Distribution	\$ 132,886				\$ 132,886	\$ 87,962		\$ 87,962	\$ 44,923	0.950	\$ -	0%	100%				Ineligible - 6" water mains and smaller are too small
67	Water Line (3")	Water - Distribution	\$ 15,000				\$ 15,000	\$ 6,963		\$ 6,963	\$ 8,037	0.950	\$ -	0%	100%				Ineligible - 6" water mains and smaller are too small
<b>70-A</b>	<b>US 301 to NC 27; 8" PVC Water Line</b>	<b>Water - Distribution</b>	<b>\$ 80,000</b>				<b>\$ 80,000</b>	<b>\$ 35,940</b>		<b>\$ 35,940</b>	<b>\$ 44,060</b>	<b>1.010</b>	<b>\$ 0.04</b>	<b>40%</b>	<b>100%</b>	<b>\$ 0.02</b>	<b>\$ 0.05</b>		Assumed 60% of capacity is utilized by existing customers.
<b>70-B</b>	<b>US 301 to NC 27; 12" PVC Water Line</b>	<b>Water - Distribution</b>	<b>\$ 240,000</b>				<b>\$ 240,000</b>	<b>\$ 107,821</b>		<b>\$ 107,821</b>	<b>\$ 132,179</b>	<b>2.450</b>	<b>\$ 0.05</b>	<b>25%</b>	<b>100%</b>	<b>\$ 0.01</b>	<b>\$ 0.05</b>		Assumed 72% of capacity is utilized by existing customers.
162	Water Lines (6")	Water - Distribution	\$ 11,200				\$ 11,200	\$ 10,297		\$ 10,297	\$ 903	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
163	Water Lines (6")	Water - Distribution	\$ 29,220				\$ 29,220	\$ 25,119		\$ 25,119	\$ 4,101	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
164	Water Lines (6")	Water - Distribution	\$ 14,830				\$ 14,830	\$ 12,752		\$ 12,752	\$ 2,079	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
165	Water Lines	Water - Distribution	\$ 42,200				\$ 42,200	\$ 36,281		\$ 36,281	\$ 5,920	0.950	\$ -	0%	100%				Ineligible - unknown
166	Water Line (8")	Water - Distribution	\$ 49,210				\$ 49,210	\$ 41,573		\$ 41,573	\$ 7,637	1.010	\$ 0.01	25%	100%				Service area is heavily developed. Assume 75% of capacity is utilized by existing customers.
167	Water Line (6")	Water - Distribution	\$ 9,300				\$ 9,300	\$ 7,858		\$ 7,858	\$ 1,442	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
169	Water Line (6")	Water - Distribution	\$ 5,480				\$ 5,480	\$ 4,549		\$ 4,549	\$ 931	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
170	Water Line (6")	Water - Distribution	\$ 15,300				\$ 15,300	\$ 12,468		\$ 12,468	\$ 2,832	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
172	Water Line (6")	Water - Distribution	\$ 16,830				\$ 16,830	\$ 13,212		\$ 13,212	\$ 3,618	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
173	Water Line (6")	Water - Distribution	\$ 6,760				\$ 6,760	\$ 5,207		\$ 5,207	\$ 1,553	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
174	Water Line (6")	Water - Distribution	\$ 14,220				\$ 14,220	\$ 10,953		\$ 10,953	\$ 3,267	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
175	Water Line (12")	Water - Distribution	\$ 15,150				\$ 15,150	\$ 11,667		\$ 11,667	\$ 3,483	2.450	\$ 0.00	25%	100%				Service area is heavily developed. Assume 75% of capacity is utilized by existing customers.
177	Water Line (6")	Water - Distribution	\$ 6,750				\$ 6,750	\$ 5,099		\$ 5,099	\$ 1,651	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
178	Water Line	Water - Distribution	\$ 15,440				\$ 15,440	\$ 11,659		\$ 11,659	\$ 3,781	0.950	\$ -	0%	100%				Ineligible - unknown
179	Water Line (8")	Water - Distribution	\$ 1,635				\$ 1,635	\$ 1,209		\$ 1,209	\$ 426	1.010	\$ 0.00	25%	100%				Service area is heavily developed. Assume 75% of capacity is utilized by existing customers.
187	10 Badger Fire Service	Water - Distribution	\$ 42,397				\$ 42,397	\$ 12,295		\$ 12,295	\$ 30,102	0.950	\$ -	0%	100%				Ineligible - only serves a small portion of the Town
228	Water Lines (16")	Water - Distribution	\$ 21,190				\$ 21,190	\$ 19,479		\$ 19,479	\$ 1,711	4.460	\$ 0.00	79%	100%				2022 runtimes for the Booster PS and the a large fire service meter indicate the 16" water main currently receives 0.948 MGD.
229	Water Line (16")	Water - Distribution	\$ 5,690				\$ 5,690	\$ 5,063		\$ 5,063	\$ 627	4.460	\$ 0.00	94%	100%				The large fire service meter indicates this 16" water main receive 101,317,990 gallons in 2022 (i.e., 0.278 MGD).
232	Water Line (6")	Water - Distribution	\$ 17,400				\$ 17,400	\$ 12,881		\$ 12,881	\$ 4,519	0.950	\$ 0.00	0%	100%				Ineligible - 6" water mains are too small
242	Water Lines (12")	Water - Distribution	\$ 10,240				\$ 10,240	\$ 10,181		\$ 10,181	\$ 59	2.450	\$ 0.00	97%	100%				2022 Pump Runtimes for the S. Walton PS indicate the area produces 0.058 MGD in sewer. Assume water produced ~0.064 MGD.
<b>SEWER</b>																			
54	Sewer Lines 2 Manholes	Sewer - Collection	\$ 7,500				\$ 7,500	\$ 5,329		\$ 5,329	\$ 2,171	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
56	Sewer Lines 33 Manholes	Sewer - Collection	\$ 159,256				\$ 159,256	\$ 86,020		\$ 86,020	\$ 73,236	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
58	Sewer Line	Sewer - Collection	\$ 213,330				\$ 213,330	\$ 132,457		\$ 132,457	\$ 80,873	0.950	\$ -	0%	0%				Ineligible - unknown
59	Sewer Line Golden Corral (10")	Sewer - Collection	\$ 43,193				\$ 43,193	\$ 25,313		\$ 25,313	\$ 17,879	0.308	\$ 0.06	81%	0%				0.05 2022 Pump Runtimes for the S. Walton PS indicate the force main currently receives 0.058 MGD of sewer.
61	Annex Sewer Lincoln (8")	Sewer - Collection	\$ 60,168				\$ 60,168	\$ 36,002		\$ 36,002	\$ 24,166	0.203	\$ 0.12	0%	0%				Ineligible - 8" gravity sewers are too small
63	Sewer Line	Sewer - Collection	\$ 60,168				\$ 60,168	\$ 35,114		\$ 35,114	\$ 25,054	0.950	\$ -	0%	0%				Ineligible - unknown
64	8" Sewer Line	Sewer - Collection	\$ 14,346				\$ 14,346	\$ 7,711		\$ 7,711	\$ 6,635	0.203	\$ 0.03	0%	0%				Ineligible - 8" gravity sewers are too small
66	Sewer Line	Sewer - Collection	\$ 114,474				\$ 114,474	\$ 53,991		\$ 53,991	\$ 60,484	0.950	\$ -	0%	0%				Ineligible - unknown
69	Sewer Lines 32 Manholes	Sewer - Collection	\$ 78,833				\$ 78,833	\$ 34,827		\$ 34,827	\$ 44,005	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
73	Nitrogen Control Project, Sewer Lin	Sewer - Collection	\$ 314,551				\$ 314,551	\$ 114,287		\$ 114,287	\$ 200,264	1.500	\$ 0.13	0%	0%				Ineligible - 1.5-MGD WWTP. No capacity left to give to new developers.
74	Sewer Lines	Sewer - Collection	\$ 144,610				\$ 144,610	\$ 49,858		\$ 49,858	\$ 94,752	0.950	\$ -	0%	0%				Ineligible - unknown
75	Reclaimed Water Systems	Sewer - Collection	\$ 700,000				\$ 700,000	\$ 223,194		\$ 223,194	\$ 476,806	0.950	\$ -	0%	0%				Ineligible - spray irrigation system at the WWTP
109	Willa Chase Sewer System	Sewer - Collection	\$ 291,935				\$ 291,935	\$ 70,064		\$ 70,064	\$ 221,871	0.950	\$ -	0%	0%				Ineligible - only serves a small portion of the Town
160	Sewer Lines 5 Manholes	Sewer - Collection	\$ 11,080				\$ 11,080	\$ 10,517		\$ 10,517	\$ 563	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
161	Sewer Lines 57 Manholes	Sewer - Collection	\$ 267,528				\$ 267,528	\$ 245,968		\$ 245,968	\$ 21,560	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
168	Sewer Lines 3 Manholes	Sewer - Collection	\$ 6,375				\$ 6,375	\$ 5,291		\$ 5,291	\$ 1,084	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
171	Sewer Lines 15 Manholes	Sewer - Collection	\$ 38,078				\$ 38,078	\$ 21,735		\$ 21,735	\$ 16,343	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
176	Sewer Lines 5 Manholes	Sewer - Collection	\$ 7,375				\$ 7,375	\$ 5,569		\$ 5,569	\$ 1,806	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
180	I-40 Pump Station #1 Rehabilitation	Sewer - Collection	\$ 24,713				\$ 24,713	\$ 8,608		\$ 8,608	\$ 16,105	0.950	\$ -	0%	0%				Ineligible - cost for backup pump at a pump station (i.e., equipment only)
189-A	Improvements Capital Project - Carolyn Dr. PS 8" Force Main	Sewer - Collection	\$ 376,973				\$ 376,973	\$ 37,697		\$ 37,697	\$ 339,276	0.720	\$ 0.47	96%	0%				0.45 2022 Pump Runtimes for the Carolyn PS indicate the force main currently receives 0.032 MGD of sewer.
189-B	Improvements Capital Project - S. Walton Ave. PS 8" Force Main	Sewer - Collection	\$ 678,552				\$ 678,552	\$ 67,855		\$ 67,855	\$ 610,697	0.461	\$ 1.32	87%	0%				1.15 2022 Pump Runtimes for the S. Walton PS indicate the force main currently receives 0.058 MGD of sewer.
189-C	Improvements Capital Project - 8" Gravity Sewer	Sewer - Collection	\$ 452,368				\$ 452,368	\$ 45,237		\$ 45,237	\$ 407,131	0.203	\$ 2.01	0%	0%				Ineligible - 8" gravity sewers is too small
227	Sewer Lines 12 Manholes	Sewer - Collection	\$ 61,510				\$ 61,510	\$ 58,922		\$ 58,922	\$ 2,589	0.950	\$ -	0%	0%				Ineligible - manhole improvements only
235	Sewer Repair (18" outfall)	Sewer - Collection	\$ 420,803				\$ 420,803	\$ 58,912		\$ 58,912	\$ 361,891	0.967	\$ 0.37	0%	0%				Ineligible - line repairs
<b>CIP-51</b>	<b>Carolyn Drive Pump Station #2</b>	<b>Sewer - Collection</b>	<b>\$ 122,500</b>				<b>\$ 122,500</b>	<b>\$ 30,625</b>		<b>\$ 30,625</b>	<b>\$ 91,875</b>	<b>0.720</b>	<b>\$ 0.13</b>	<b>96%</b>	<b>0%</b>				0.12 2022 Pump Runtimes indicate station is currently pumping 0.032 MGD.
CIP-52	West Ridge Pump Station #3 Rehabilitation	Sewer - Collection	\$ 14,950	\$ 11,300			\$ 26,250	\$ 1,213		\$ 1,213	\$ 24,938	0.950	\$ -	0%	0%				Ineligible - operation and maintenance
CIP-53	Wall Street Pump Station #4 Rehabilitation	Sewer - Collection	\$ 460,000	\$ 112,900			\$ 572,900	\$ 85,935		\$ 85,935	\$ 486,965	0.950	\$ -	0%	0%				Ineligible - only serves a small portion of the Town
CIP-54	King Circle Pump Station #5 Rehabilitation	Sewer - Collection	\$ 20,100	\$ 9,300			\$ 29,400	\$ 1,470		\$ 1,470	\$ 27,930	0.950	\$ -	0%	0%				Ineligible - operation and maintenance
CIP-55	Chicopee Pump Station #6 Rehabilitation	Sewer - Collection	\$ 44,100	\$ 10,900			\$ 55,000	\$ 2,750		\$ 2,750	\$ 52,250	0.950	\$ -	0%	0%				Ineligible - operation and maintenance
CIP-56	South Walton Avenue Pump Station #7	Sewer - Collection	\$ 125,000				\$ 125,000	\$ 31,250		\$ 31,250	\$ 93,750	0.461	\$ 0.20	87%	0%				0.18 2022 Pump Runtimes indicate station is currently pumping 0.058 MGD.
CIP-57	Lake Shore Pump Station #8 Rehabilitation	Sewer - Collection	\$ 1,200	\$ 5,500			\$ 6,700	\$ 335		\$ 335	\$ 6,365	0.950	\$ -	0%	0%				Ineligible - operation and maintenance
CIP-58	Boardwalk Pump Station #9 Rehabilitation	Sewer - Collection	\$ 1,200	\$ 6,100			\$ 7,300	\$ 365		\$									

System Development Fees  
Depreciation Worksheet

Client: Town of Benson

BUY-IN METHOD Evaluation Year 2022

Straight Line Method

Project No.	Project Description	Year Installation	Approximate Age	Actual Cost	CCI Number	Estimated Replacement Value	Service Life	Assumed Percent Salvage Value	Estimated Salvage Value	Estimated Annual Depreciation	Accumulated Depreciation to Date	Estimated Remaining Service Life	Estimated Remaining Asset Depreciation	Remaining Asset Value (inc. Salvage)
<b>WATER</b>														
52	Water Line (6")	1976	46	\$ 37,440	15.8	\$ 236,962	40	5%			\$ 27,718			
53	Water Line (2")	1977	45	\$ 15,860	15.8	\$ 100,380	40	5%			\$ 11,506			
55	Water Line (2")	1978	44	\$ 12,600	15.8	\$ 79,747	40	5%			\$ 8,951			
57	Water Line (2")	1981	41	\$ 132,886	21.9	\$ 606,784	40	5%			\$ 87,962			
67	Water Line (3")	1994	28	\$ 15,000	33.7	\$ 44,510	40	5%			\$ 6,963			
70-A	US 301 to NC 27; 8" PVC Water Line	1996	26	\$ 80,000	33.7	\$ 237,389	40	5%			\$ 35,940			
70-B	US 301 to NC 27; 12" PVC Water Line	1996	26	\$ 240,000	33.7	\$ 712,166	40	5%			\$ 107,821			
162	Water Lines (6")	1964	58	\$ 11,200			40	5%			\$ 10,297			
163	Water Lines (6")	1968	54	\$ 29,220			40	5%			\$ 25,119			
164	Water Lines (6")	1968	54	\$ 14,830			40	5%			\$ 12,752			
165	Water Lines	1968	54	\$ 42,200			40	5%			\$ 36,281			
166	Water Line (8")	1969	53	\$ 49,210			40	5%			\$ 41,573			
167	Water Line (6")	1969	53	\$ 9,300			40	5%			\$ 7,858			
169	Water Line (6")	1970	52	\$ 5,480	10.0	\$ 54,800	40	5%			\$ 4,549			
170	Water Line (6")	1971	51	\$ 15,300	10.0	\$ 153,000	40	5%			\$ 12,468			
172	Water Line (6")	1973	49	\$ 16,830	10.0	\$ 168,300	40	5%			\$ 13,212			
173	Water Line (6")	1974	48	\$ 6,760	10.0	\$ 67,600	40	5%			\$ 5,207			
174	Water Line (6")	1974	48	\$ 14,220	10.0	\$ 142,200	40	5%			\$ 10,953			
175	Water Line (12")	1974	48	\$ 15,150	10.0	\$ 151,500	40	5%			\$ 11,667			
177	Water Line (6")	1975	47	\$ 6,750	15.8	\$ 42,722	40	5%			\$ 5,099			
178	Water Line	1975	47	\$ 15,440	15.8	\$ 97,722	40	5%			\$ 11,659			
179	Water Line (8")	1976	46	\$ 1,635	15.8	\$ 10,348	40	5%			\$ 1,209			
187	10 Badger Fire Service	2017	5	\$ 42,397	75.6	\$ 56,081	40	5%			\$ 12,295			
228	Water Lines (16")	1964	58	\$ 21,190			40	5%			\$ 19,479			
229	Water Line (16")	1966	56	\$ 5,690			40	5%			\$ 5,063			
232	Water Line (6")	1976	46	\$ 17,400	15.8	\$ 110,127	40	5%			\$ 12,881			
242	Water Lines (12")	1959	63	\$ 10,240			40	5%			\$ 10,181			
<b>SEWER</b>														
54	Sewer Lines 2 Manholes	1978	44	\$ 7,500	15.8	\$ 47,468	40	5%			\$ 5,329			
56	Sewer Lines 33 Manholes	1981	41	\$ 159,256	21.9	\$ 727,198	40	5%			\$ 86,020			
58	Sewer Line	1984	38	\$ 213,330	21.9	\$ 974,108	40	5%			\$ 132,457			
59	Sewer line Golden Corral (10")	1985	37	\$ 43,193	29.5	\$ 146,416	40	5%			\$ 25,313			
61	Annex Sewer Lincoln (8")	1986	36	\$ 60,168	29.5	\$ 203,960	40	5%			\$ 36,002			
63	Sewer Line	1986	36	\$ 60,168	29.5	\$ 203,960	40	5%			\$ 35,114			
64	8" Sewer Line	1989	33	\$ 14,346	29.5	\$ 48,632	40	5%			\$ 7,711			
66	Sewer Line	1994	28	\$ 114,474	33.7	\$ 339,686	40	5%			\$ 53,991			
69	Sewer Lines 32 Manholes	1996	26	\$ 78,833	33.7	\$ 233,924	40	5%			\$ 34,827			
73	Nitrogen Control Project; Sewer Lin	2001	21	\$ 314,551	44.1	\$ 713,267	40	5%			\$ 114,287			
74	Sewer Lines	2003	19	\$ 144,610	46.8	\$ 308,996	40	5%			\$ 49,858			
75	Reclaimed Water Systems	2005	17	\$ 700,000	53.0	\$ 1,320,755	40	5%			\$ 223,194			
109	Willa Chase Sewer System	2009	13	\$ 291,935	65.9	\$ 442,997	40	5%			\$ 70,064			
160	Sewer Lines 5 Manholes	1962	60	\$ 11,080			40	5%			\$ 10,517			
161	Sewer Lines 57 Manholes	1964	58	\$ 267,528			40	5%			\$ 245,968			
168	Sewer Lines 3 Manholes	1970	52	\$ 6,375	10.0	\$ 63,750	40	5%			\$ 5,291			
171	Sewer Lines 15 Manholes	1972	50	\$ 38,078	10.0	\$ 380,775	40	5%			\$ 21,735			
176	Sewer Lines 5 Manholes	1975	47	\$ 7,375	15.8	\$ 46,677	40	5%			\$ 5,569			
180	I-40 Pump Station #1 Rehabilitation	2016	6	\$ 24,713	75.0	\$ 32,951	20	5%			\$ 8,608			
189-A	Improvements Capital Project - Carolyn Dr. PS 8" Force Main	2016	6	\$ 376,973	75.0	\$ 502,631	40	5%			\$ 37,697			
189-B	Improvements Capital Project - S. Walton Ave. PS 8" Force Main	2016	6	\$ 678,552	75.0	\$ 904,736	40	5%			\$ 67,855			
189-C	Improvements Capital Project - 8" Gravity Sewer	2016	6	\$ 452,368	75.0	\$ 603,157	40	5%			\$ 45,237			
227	Sewer Lines 12 Manholes	1961	61	\$ 61,510			40	5%			\$ 58,922			
235	Sewer Repair (18" outfall)	2014	8	\$ 420,803	73.3	\$ 574,083	40	5%			\$ 58,912			
CIP-S1	Carolyn Drive Pump Station #2	2017	5	\$ 122,500	75.6	\$ 162,037	20	5%	\$ 6,125	\$ 6,125	\$ 30,625	\$ 15	\$ 91,875	\$ 98,000
CIP-S2	West Ridge Pump Station #3 Rehabilitation	2021	1	\$ 26,250	86.1	\$ 30,488	20	5%	\$ 1,313	\$ 1,313	\$ 1,313	\$ 19	\$ 24,938	\$ 26,250
CIP-S3	Wall Street Pump Station #4 Rehabilitation	2019	3	\$ 572,900	82.1	\$ 697,808	20	5%	\$ 28,645	\$ 28,645	\$ 85,935	\$ 17	\$ 486,965	\$ 515,610
CIP-S4	King Circle Pump Station #5 Rehabilitation	2021	1	\$ 29,400	86.1	\$ 34,146	20	5%	\$ 1,470	\$ 1,470	\$ 1,470	\$ 19	\$ 27,930	\$ 29,400

CIP-S5	Chicopee Pump Station #6 Rehabilitation	2021	1	\$ 55,000	86.1 \$	63,879	20	5%	\$ 2,750	\$ 2,750	\$ 2,750	19 \$	52,250 \$	55,000
<b>CIP-S6</b>	<b>South Walton Avenue Pump Station #7</b>	<b>2017</b>	<b>5</b>	<b>\$ 125,000</b>	<b>75.6 \$</b>	<b>165,344</b>	<b>20</b>	<b>5%</b>	<b>\$ 6,250</b>	<b>\$ 6,250</b>	<b>\$ 31,250</b>	<b>15 \$</b>	<b>93,750 \$</b>	<b>100,000</b>
CIP-S7	Lake Shore Pump Station #8 Rehabilitation	2021	1	\$ 6,700	86.1 \$	7,782	20	5%	\$ 335	\$ 335	\$ 335	19 \$	6,365 \$	6,700
CIP-S8	Boardwalk Pump Station #9 Rehabilitation	2021	1	\$ 7,300	86.1 \$	8,479	20	5%	\$ 365	\$ 365	\$ 365	19 \$	6,935 \$	7,300
CIP-S9	Burriss Pump Station #10 Rehabilitation	2021	1	\$ 13,500	86.1 \$	15,679	20	5%	\$ 675	\$ 675	\$ 675	19 \$	12,825 \$	13,500
CIP-S10	Willa Chase Pump Station #11 Rehabilitation	2021	1	\$ 4,400	86.1 \$	5,110	20	5%	\$ 220	\$ 220	\$ 220	19 \$	4,180 \$	4,400
CIP-S11	Projects from CCTV Inspection: N. Lee Street Area	2019	3	\$ 300,800	82.1 \$	366,382	40	5%	\$ 15,040	\$ 7,520	\$ 22,560	37 \$	278,240 \$	293,280
CIP-S12	Projects from CCTV Inspection: S. Lee Street Area	2019	3	\$ 172,150	82.1 \$	209,683	40	5%	\$ 8,608	\$ 4,304	\$ 12,911	37 \$	159,239 \$	167,846
CIP-S13	Projects from CCTV Inspection: Parrish Drive Area	2020	2	\$ 329,400	84.6 \$	389,362	40	5%	\$ 16,470	\$ 8,235	\$ 16,470	38 \$	312,930 \$	329,400
<b>OTHER</b>														
60	I-40 Rest Area	1986	36	\$ 12,400	29.5 \$	42,034	40	5%	\$ 620	\$ 310	\$ 5,263			
62	I-40 Rest Area	1986	36	\$ 15,682	29.5 \$	53,159	40	5%	\$ 784	\$ 392	\$ 9,387			
71	Lines Main Across Pine Lincoln an	1996	26	\$ 23,000	33.7 \$	68,249	40	5%	\$ 1,150	\$ 575	\$ 10,333			
72	Water-Sewer Lines	1996	26	\$ 16,000	33.7 \$	47,478	40	5%	\$ 800	\$ 400	\$ 7,188			
188	Community Development Program	2016	6	\$ 1,177,897	75.0 \$	1,570,529	40	5%	\$ 58,895	\$ 29,447	\$ 107,974			
234	Annexation Dogeeye W&S Lines	2012	10	\$ 964,452	70.1 \$	1,375,823	40	5%	\$ 48,223	\$ 24,111	\$ 173,601			
<b>TOTAL</b>				<b>\$ 9,406,677</b>		<b>\$ 17,205,916</b>			<b>\$ 198,737</b>	<b>\$ 123,442</b>	<b>\$ 2,517,766</b>		<b>\$ 1,558,421</b>	<b>\$ 1,646,686</b>

**System Development Fees**

**CCI Worksheet**

**Client:** **Town of Benson**

<b>Year</b>	<b>Historical CCI</b>	<b>Current CCI</b>
1970	27.8	10.0
1975	43.7	15.8
1980	60.7	21.9
1985	81.8	29.5
1990	93.2	33.7
2000	118.9	42.9
2001	122.2	44.1
2002	126.7	45.8
2003	129.7	46.8
2004	132.8	48.0
2005	146.7	53.0
2006	156.2	56.4
2007	165.0	59.6
2008	171.0	61.8
2009	182.5	65.9
2010	181.6	65.6
2011	185.7	67.1
2012	194.0	70.1
2013	196.9	71.1
2014	203.0	73.3
2015	204.0	73.7
2016	207.7	75.0
2017	209.4	75.6
2018	217.7	78.6
2019	227.3	82.1
2020	234.3	84.6
2021	238.3	86.1
2022	276.9	100.0

**System Development Fees**

**Summary Worksheet**

Client: Town of Benson

Accounting Methodology:

Buy-In Cost      Pay proportional share of past and current investments (for existing utilities/facilities to support existing/new growth)  
 Incremental Cost      Pay increase in total costs resulting from increase in production (for new utilities/facilities to support new growth only)  
 Combined Cost      Combination of Buy-In and Incremental Costs

enter as positive values and subtract from total costs

		Anticipated Project Costs						Anticipated Project Credits															
Asset/Project ID	CIP Asset/Project Description	Asset Group	Construction Cost	Survey & Engineering Fees	Land Acquisition Cost	Debt Principal and Interest Pmts	SDF Professional Fees	Total Costs	Principal Forgiveness / Grants	Debt Credits	Total Credits	Net Total Cost	Design Capacity, MGD	Net Total Cost per Gal Capacity, \$/GPD	% Minimum Credit <sup>1</sup>	% SDF Eligible	% Water System Affiliation	\$ Water System Affiliation	% Sewer System Affiliation	\$ Sewer System Affiliation	SDF (\$/gallon)	Comment	
<b>WATER</b>																							
W-1	Water System Improvements - Phase 3 (6" and smaller)	Water - Distribution	\$ 655,270					\$ 655,270			\$ -	\$ 655,270		\$ -	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - 6" water mains and smaller are too small
W-2	Water System Improvements - Phase 3 (8")	Water - Distribution	\$ 416,990					\$ 416,990			\$ -	\$ 416,990	1.010	\$ 0.41	25%	50%	100%	\$ 0.15	0.00%	\$ -	\$ -	0.15	Assume 50% capacity utilized for future customers.
W-3	Water System Improvements - Phase 3 (12")	Water - Distribution	\$ 119,140					\$ 119,140			\$ -	\$ 119,140	2.450	\$ 0.05	25%	25%	100%	\$ 0.01	0.00%	\$ -	\$ -	0.01	Assume 25% capacity utilized for future customers.
W-4	Water System Improvements - Phase 4 (6" and smaller)	Water - Distribution	\$ 664,200					\$ 664,200			\$ -	\$ 664,200		\$ -	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - 6" water mains and smaller are too small
W-5	Water System Improvements - Phase 4 (8")	Water - Distribution	\$ 442,800					\$ 442,800			\$ -	\$ 442,800	1.010	\$ 0.44	25%	25%	100%	\$ 0.08	0.00%	\$ -	\$ -	0.08	Assume 25% capacity utilized for future customers.
W-6	West Parrish Drive (6") Waterline Replacement	Water - Distribution	\$ 738,100					\$ 738,100			\$ -	\$ 738,100	0.950	\$ 0.78	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - 6" water mains are too small
W-7	Elm Street (6") Waterline Replacement	Water - Distribution	\$ 345,500					\$ 345,500			\$ -	\$ 345,500	0.950	\$ 0.36	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - 6" water mains are too small
W-8	West Woodall Street (6") Waterline Replacement	Water - Distribution	\$ 325,300					\$ 325,300			\$ -	\$ 325,300	0.950	\$ 0.34	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - 6" water mains are too small
W-9	Chicopee Road Waterline Replacement	Water - Distribution	\$ 271,400					\$ 271,400			\$ -	\$ 271,400	4.460	\$ 0.06	25%	85%	100%	\$ 0.04	0.00%	\$ -	\$ -	0.04	2022 Pump Runtimes for the Booster PS indicate the 16" water main currently receives 0.671 MGD of water.
W-10	Replace Existing Asbestos Cement Pipes (6")	Water - Distribution	\$ 309,288					\$ 309,288			\$ -	\$ 309,288	0.950	\$ 0.33	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - 6" water mains are too small
W-11	Replace Existing Asbestos Cement Pipes (8")	Water - Distribution	\$ 121,506					\$ 121,506			\$ -	\$ 121,506	1.010	\$ 0.12	25%	25%	100%	\$ 0.02	0.00%	\$ -	\$ -	0.02	Only includes costs incurred during 2027. Assume 25% capacity utilized for future customers.
W-12	Replace Existing Asbestos Cement Pipes (12")	Water - Distribution	\$ 154,644					\$ 154,644			\$ -	\$ 154,644	2.450	\$ 0.06	25%	25%	100%	\$ 0.01	0.00%	\$ -	\$ -	0.01	Only includes costs incurred during 2027. Assume 25% capacity utilized for future customers.
W-13	Replace Existing Asbestos Cement Pipes (16")	Water - Distribution	\$ 519,162					\$ 519,162			\$ -	\$ 519,162	4.460	\$ 0.12	25%	50%	100%	\$ 0.04	0.00%	\$ -	\$ -	0.04	Only includes costs incurred during 2027. Assume 50% capacity utilized for future customers.
W-14	Remove Existing 2" Galvanized Iron Pipes	Water - Distribution	\$ 327,000					\$ 327,000			\$ -	\$ 327,000		\$ -	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - 6" water mains and smaller are too small
W-15	Upsize Fire Protection Mains to 6-inch Pipes	Water - Distribution	\$ 84,900					\$ 84,900			\$ -	\$ 84,900	0.950	\$ 0.09	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - 6" water mains are too small
W-16	Elevated Water Tank Improvements	Water - Storage	\$ 500,000					\$ 500,000			\$ -	\$ 500,000	2.450	\$ 0.20	25%	54%	100%	\$ 0.08	0.00%	\$ -	\$ -	0.08	Tank discharges to 12" main
W-17	Rehabilitate Existing Water Tower Vault	Water - Storage	\$ 52,000					\$ 52,000			\$ -	\$ 52,000		\$ -	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - maintenance
W-18	12" Insert Valve for Water Tower Isolation	Water - Storage	\$ 27,000					\$ 27,000			\$ -	\$ 27,000		\$ -	25%	0%	100%	\$ -	0.00%	\$ -	\$ -	-	Ineligible - maintenance
W-19	Booster Station Rehabilitation	Water - Distribution	\$ 34,000					\$ 34,000			\$ -	\$ 34,000	1.250	\$ 0.03	25%	46%	100%	\$ 0.01	0.00%	\$ -	\$ -	0.01	2022 Pump Runtimes indicate station is currently pumping 0.671 MGD.
<b>SEWER</b>																							
S-1	Benson WWTP Improvements	Sewer - Treatment	\$ 3,533,000					\$ 3,533,000			\$ -	\$ 3,533,000	1.900	\$ 1.86	25%	33%	0%	\$ -	100.00%	\$ 0.46	\$ -	0.46	
S-2	Benson WWTP Expansion to 3.75 MGD	Sewer - Treatment	\$ 33,000,000	\$ 2,300,000				\$ 35,300,000			\$ -	\$ 35,300,000	3.750	\$ 9.41	25%	66%	0%	\$ -	100.00%	\$ 4.66	\$ -	4.66	
S-3	Catherine St. Area - Hydraulic Modeling Results	Sewer - Collection	\$ 830,000					\$ 830,000			\$ -	\$ 830,000	0.308	\$ 2.69	25%	34%	0%	\$ -	100.00%	\$ 0.69	\$ -	0.69	Replace 8" gravity sewer with a 10" gravity sewer. Existing line was nearing its full capacity in 2018.
S-4	N. Lincoln St. / W. Martin St. Sewer Improvements	Sewer - Collection	\$ 2,060,000					\$ 2,060,000	\$ 2,060,000	\$ 2,060,000	\$ -	\$ -		\$ -	25%		0%	\$ -	100.00%	\$ -	\$ -	-	Fully grant funded by CDBG.
S-5	I-40 Pump Station #1 Rehabilitation	Sewer - Collection	\$ 500,000					\$ 500,000			\$ -	\$ 500,000		\$ -	25%	0%	0%	\$ -	100.00%	\$ -	\$ -	-	Ineligible - serves only a small portion of the Town
S-6	Burris Pump Station #10 Rehabilitation	Sewer - Collection	\$ 500,000					\$ 500,000			\$ -	\$ 500,000		\$ -	25%	0%	0%	\$ -	100.00%	\$ -	\$ -	-	Ineligible - serves only a small portion of the Town
S-7	Smoke Testing and Cleaning Sewers	Sewer - Collection	\$ 377,000					\$ 377,000			\$ -	\$ 377,000		\$ -	25%	0%	0%	\$ -	100.00%	\$ -	\$ -	-	Ineligible - operation and maintenance
S-8	Find-and-Fix Capital Repairs	Sewer - Collection	\$ 1,690,000					\$ 1,690,000			\$ -	\$ 1,690,000		\$ -	25%	0%	0%	\$ -	100.00%	\$ -	\$ -	-	Ineligible - line repairs
S-9	Long Range Sewer Line Master Plan	Sewer - Collection	\$ 47,000					\$ 47,000			\$ -	\$ 47,000		\$ -	25%	0%	0%	\$ -	100.00%	\$ -	\$ -	-	Ineligible - study
S-10	Abandon Lake Shore & Boardwalk Pump Stations	Sewer - Collection	\$ 1,570,000					\$ 1,570,000			\$ -	\$ 1,570,000		\$ -	25%	0%	0%	\$ -	100.00%	\$ -	\$ -	-	Ineligible - serves only a small portion of the Town
S-11	Abandon King Circle & Chicopee Pump Stations	Sewer - Collection	\$ 1,570,000					\$ 1,570,000			\$ -	\$ 1,570,000		\$ -	25%	0%	0%	\$ -	100.00%	\$ -	\$ -	-	Ineligible - serves only a small portion of the Town
S-12	Rehabilitate Sewer Lines from Manholes A088 to A084 (16")	Sewer - Collection	\$ 13,600					\$ 13,600			\$ -	\$ 13,600	0.763	\$ 0.02	25%	66%	0%	\$ -	100.00%	\$ 0.01	\$ -	0.01	Berry Global discharges ~0.256 MGD (2019-2020).
S-13	Rehabilitate Sewer Lines from Manholes A088 to A084 (15")	Sewer - Collection	\$ 54,400					\$ 54,400			\$ -	\$ 54,400	0.665	\$ 0.08	25%	62%	0%	\$ -	100.00%	\$ 0.04	\$ -	0.04	Berry Global discharges ~0.256 MGD (2019-2020).
<b>TOTAL</b>			\$ 51,853,200	\$ 2,300,000	\$ -	\$ -	\$ -	\$ 54,153,200	\$ 2,060,000	\$ -	\$ 2,060,000	\$ 52,093,200		\$ 17.46		\$ 25,982,723	\$ 0.44	\$ -	\$ 5.86				

<sup>1</sup> Minimum 25% credit for extension or new infrastructure projects, per N.C. General Statute section 162A-207(b).

CURRENT YEAR - 2020	WATER					SEWER								
	Residential	Commercial	Institutional	Industrial	Total	Ex. Population	Customer Ratio	Residential	Commercial	Institutional	Industrial	Total	Ex. Population	Customer Ratio
No. of Existing Connections	1,600	293	15	3	1,911	3,972	2.08	1,429	256	15	3	1,703	3,972	2.33
Percent of Total Connections	83.7%	15.3%	0.8%	0.2%				74.8%	13.4%	0.8%	0.2%			
Volumetric Use per Connection, gpd	150	350	530	142,000				135	770	540	99,900			
Total Existing Volumetric Use, gpd	240,000	102,550	7,950	426,000	776,500			192,915	197,120	8,100	299,700	697,835		
Percent of Total Use	31%	13%	1%	55%				25%	25%	1%	39%			

Meter Size - per GALLON Basis	Equivalent Ratio	Water	Sewer	Total
5/8	1.0	\$0.44	\$5.86	\$6.30
1	2.5	\$1.10	\$14.65	\$15.75
1-1/2	5.0	\$2.20	\$29.30	\$31.50
2	8.0	\$3.52	\$46.88	\$50.40
3 compound	16.0	\$7.04	\$93.76	\$100.80
4 compound	25.0	\$11.00	\$146.50	\$157.50
6 compound	50.0	\$22.00	\$293.00	\$315.00
8 compound	80.0	\$35.20	\$468.80	\$504.00
10 compound	115.0	\$50.60	\$673.90	\$724.50
12 compound	215.0	\$94.60	\$1,259.90	\$1,354.50

5/8" Residential connection: 360 gpd

Meter Size - per CONNECTION basis	Equivalent Ratio	Water	Sewer	Total
5/8	1.0	\$158	\$2,110	\$2,268
1	2.5	\$396	\$5,274	\$5,670
1-1/2	5.0	\$792	\$10,548	\$11,340
2	8.0	\$1,267	\$16,877	\$18,144
3 compound	16.0	\$2,534	\$33,754	\$36,288
4 compound	25.0	\$3,960	\$52,740	\$56,700
6 compound	50.0	\$7,920	\$105,480	\$113,400
8 compound	80.0	\$12,672	\$168,768	\$181,440
10 compound	115.0	\$18,216	\$242,604	\$260,820
12 compound	215.0	\$34,056	\$453,564	\$487,620

System Development Fees

Summary Worksheet

Client:

Town of Benson

Meter Size - per GALLON Basis	Equivalent Ratio	WATER			SEWER			Combined Total
		Buy In	Incremental	Combined	Buy In	Incremental	Combined	
5/8	1.0	\$0.03	\$0.44	<b>\$0.47</b>	\$1.95	\$5.86	<b>\$7.81</b>	<b>\$8.28</b>
1	2.5	\$0.08	\$1.10	<b>\$1.18</b>	\$4.88	\$14.65	<b>\$19.53</b>	<b>\$20.70</b>
1-1/2	5.0	\$0.15	\$2.20	<b>\$2.35</b>	\$9.75	\$29.30	<b>\$39.05</b>	<b>\$41.40</b>
2	8.0	\$0.24	\$3.52	<b>\$3.76</b>	\$15.60	\$46.88	<b>\$62.48</b>	<b>\$66.24</b>
3 compound	16.0	\$0.48	\$7.04	<b>\$7.52</b>	\$31.20	\$93.76	<b>\$124.96</b>	<b>\$132.48</b>
4 compound	25.0	\$0.75	\$11.00	<b>\$11.75</b>	\$48.75	\$146.50	<b>\$195.25</b>	<b>\$207.00</b>
6 compound	50.0	\$1.50	\$22.00	<b>\$23.50</b>	\$97.50	\$293.00	<b>\$390.50</b>	<b>\$414.00</b>
8 compound	80.0	\$2.40	\$35.20	<b>\$37.60</b>	\$156.00	\$468.80	<b>\$624.80</b>	<b>\$662.40</b>
10 compound	115.0	\$3.45	\$50.60	<b>\$54.05</b>	\$224.25	\$673.90	<b>\$898.15</b>	<b>\$952.20</b>
12 compound	215.0	\$6.45	\$94.60	<b>\$101.05</b>	\$419.25	\$1,259.90	<b>\$1,679.15</b>	<b>\$1,780.20</b>

Meter Size - per CONNECTION basis	Equivalent Ratio	WATER			SEWER			Combined Total
		Buy In	Incremental	Combined	Buy In	Incremental	Combined	
5/8	1.0	\$11	\$158	<b>\$169</b>	\$702	\$2,110	<b>\$2,812</b>	<b>\$2,980</b>
1	2.5	\$27	\$396	<b>\$423</b>	\$1,755	\$5,274	<b>\$7,029</b>	<b>\$7,450</b>
1-1/2	5.0	\$54	\$792	<b>\$846</b>	\$3,510	\$10,548	<b>\$14,058</b>	<b>\$14,900</b>
2	8.0	\$86	\$1,267	<b>\$1,354</b>	\$5,616	\$16,877	<b>\$22,493</b>	<b>\$23,840</b>
3 compound	16.0	\$173	\$2,534	<b>\$2,707</b>	\$11,232	\$33,754	<b>\$44,986</b>	<b>\$47,690</b>
4 compound	25.0	\$270	\$3,960	<b>\$4,230</b>	\$17,550	\$52,740	<b>\$70,290</b>	<b>\$74,520</b>
6 compound	50.0	\$540	\$7,920	<b>\$8,460</b>	\$35,100	\$105,480	<b>\$140,580</b>	<b>\$149,040</b>
8 compound	80.0	\$864	\$12,672	<b>\$13,536</b>	\$56,160	\$168,768	<b>\$224,928</b>	<b>\$238,460</b>
10 compound	115.0	\$1,242	\$18,216	<b>\$19,458</b>	\$80,730	\$242,604	<b>\$323,334</b>	<b>\$342,790</b>
12 compound	215.0	\$2,322	\$34,056	<b>\$36,378</b>	\$150,930	\$453,564	<b>\$604,494</b>	<b>\$640,870</b>

**System Development Fees**

**Future Developments List**

Client:

**Town of Benson**

<b>Proposed Developments</b>			
<b>Code Name</b>	<b># of New Connections</b>	<b>Meter Type</b>	<b>Year Installed</b>
Residential 1	176	Residential	2024
Residential 2	25	Residential	2024
Commercial 3	1	Commercial	2023
Commercial 4	1	Commercial	2022
Commercial 5	1	Commercial	2023
Commercial 6	1	Commercial	2023
Commercial 7	3	Commercial	2027
Residential 8	5	Residential	2023
Residential 9	11	Residential	2023
Commercial 10	1	Commercial	2023
Residential 11	48	Residential	2023
Residential 12	2	Residential	2023
Residential 13	5	Residential	2023
Residential 14	5	Residential	2023
Commercial 15	1	Commercial	2027
Residential 16	30	Residential	2027
Residential 17	79	Residential	2024

System Development Fees  
 Projected Growth Estimates Worksheet  
 Client: **Town of Benson**

Percent Annual Growth

Year	# New Water Connections due to Proposed Developments			
	Residential	Commercial	Institutional	Industrial
2020	0	0	0	0
2021	0	0	0	0
2022	0	1	0	0
2023	76	4	0	0
2024	280	0	0	0
2025	0	0	0	0
2026	0	0	0	0
2027	30	4	0	0

Year	# New Sewer Connections due to Proposed Developments			
	Residential	Commercial	Institutional	Industrial
2020	0	0	0	0
2021	0	0	0	0
2022	0	1	0	0
2023	76	4	0	0
2024	280	0	0	0
2025	0	0	0	0
2026	0	0	0	0
2027	30	4	0	0

**PROPOSED DEVELOPMENTS GROWTH**

	Total Water Connections							
	Residential		Commercial		Institutional		Industrial	
	1,600	-	293	-	15	-	3	-
	1,600	0.00%	293	0.00%	15	0.00%	3	0.00%
	1,600	0.00%	294	0.34%	15	0.00%	3	0.00%
	1,676	4.75%	298	1.36%	15	0.00%	3	0.00%
	1,956	16.71%	298	0.00%	15	0.00%	3	0.00%
	1,956	0.00%	298	0.00%	15	0.00%	3	0.00%
	1,956	0.00%	298	0.00%	15	0.00%	3	0.00%
	1,956	0.00%	298	0.00%	15	0.00%	3	0.00%
	1,986	1.53%	302	1.34%	15	0.00%	3	0.00%
<b>Average</b>		<b>3.28%</b>		<b>0.43%</b>		<b>0.00%</b>		<b>0.00%</b>

	Total Sewer Connections							
	Residential		Commercial		Institutional		Industrial	
	1,429	-	256	-	15	-	3	-
	1,429	0.00%	256	0.00%	15	0.00%	3	0.00%
	1,429	0.00%	257	0.39%	15	0.00%	3	0.00%
	1,505	5.32%	261	1.56%	15	0.00%	3	0.00%
	1,785	18.60%	261	0.00%	15	0.00%	3	0.00%
	1,785	0.00%	261	0.00%	15	0.00%	3	0.00%
	1,785	0.00%	261	0.00%	15	0.00%	3	0.00%
	1,785	0.00%	261	0.00%	15	0.00%	3	0.00%
	1,815	1.68%	265	1.53%	15	0.00%	3	0.00%
<b>Average</b>		<b>3.66%</b>		<b>0.50%</b>		<b>0.00%</b>		<b>0.00%</b>

**System Development Fees  
Growth Projections Worksheet**

Client: **Town of Benson**

**CONNECTION GROWTH**

<i>Percent Annual Growth</i>	3.00%	0.50%	0.50%	0.50%
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<b>Total Water Connections</b>				
<b>Year</b>	<b>Residential</b>	<b>Commercial</b>	<b>Institutional</b>	<b>Industrial</b>
2020	1,600	293	15	3
2021	1,648	294	15	3
2022	1,697	296	15	3
2023	1,748	297	15	3
2024	1,801	299	15	3
2025	1,855	300	15	3
2026	1,910	302	15	3
2027	1,968	303	16	3

<b>Total Sewer Connections</b>				
<b>Year</b>	<b>Residential</b>	<b>Commercial</b>	<b>Institutional</b>	<b>Industrial</b>
2020	1,429	256	15	3
2021	1,472	257	15	3
2022	1,516	259	15	3
2023	1,562	260	15	3
2024	1,608	261	15	3
2025	1,657	262	15	3
2026	1,706	264	15	3
2027	1,757	265	16	3

System Development Fees  
Revenues Projection Worksheet  
Client:

Town of Benson

Percent Annual Growth	3.00%	0.50%	0.50%	0.50%
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Meter Size	Buy-in Method		Incremental Method	
	Water	Sewer	Water	Sewer
5/8"	\$ 11	\$ 702	\$ 158	\$ 2,110
1.5"	\$ 54	\$ 3,510	\$ 792	\$ 10,548
4" compound	\$ 270	\$ 17,550	\$ 3,960	\$ 52,740

Year	Total Water Connections			
	Residential	Commercial	Institutional	Industrial
2020	1,600	293	15	3
2021	1,648	294	15	3
2022	1,697	296	15	3
2023	1,748	297	15	3
2024	1,801	299	15	3
2025	1,855	300	15	3
2026	1,910	302	15	3
2027	1,968	303	16	3
<b>TOTAL</b>				

Water Revenues from Buy-In Cost Method				
Residential (5/8")	Commercial (1.5")	Institutional (4 compound)	Industrial (1.5")	TOTAL
\$ 551	\$ 54	\$ -	\$ -	\$ 605
\$ 562	\$ 54	\$ -	\$ -	\$ 616
\$ 583	\$ 54	\$ -	\$ -	\$ 637
\$ 605	\$ 108	\$ -	\$ -	\$ 713
\$ 616	\$ 108	\$ -	\$ -	\$ 724
<b>\$ 2,916</b>	<b>\$ 378</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 3,294</b>

Water Revenues from Incremental Cost Method				
Residential (5/8")	Commercial (1.5")	Institutional (4 compound)	Industrial (1.5")	TOTAL
\$ 8,078	\$ 792	\$ -	\$ -	\$ 8,870
\$ 8,237	\$ 792	\$ -	\$ -	\$ 9,029
\$ 8,554	\$ 792	\$ -	\$ -	\$ 9,346
\$ 8,870	\$ 1,584	\$ -	\$ -	\$ 10,454
\$ 9,029	\$ 1,584	\$ -	\$ -	\$ 10,613
<b>\$ 42,768</b>	<b>\$ 5,544</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 48,312</b>

Water Revenues from Combined Cost Method				
Residential (5/8")	Commercial (1.5")	Institutional (4 compound)	Industrial (1.5")	TOTAL
\$ 8,629	\$ 846	\$ -	\$ -	\$ 9,475
\$ 8,798	\$ 846	\$ -	\$ -	\$ 9,644
\$ 9,137	\$ 846	\$ -	\$ -	\$ 9,983
\$ 9,475	\$ 1,692	\$ -	\$ -	\$ 11,167
\$ 9,644	\$ 1,692	\$ -	\$ -	\$ 11,336
<b>\$ 45,684</b>	<b>\$ 5,922</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 51,606</b>

Year	Total Sewer Connections			
	Residential	Commercial	Institutional	Industrial
2020	1,429	256	15	3
2021	1,472	257	15	3
2022	1,516	259	15	3
2023	1,562	260	15	3
2024	1,608	261	15	3
2025	1,657	262	15	3
2026	1,706	264	15	3
2027	1,757	265	16	3
<b>TOTAL</b>				

Sewer Revenues from Buy-In Cost Method				
Residential (5/8")	Commercial (1.5")	Institutional (4 compound)	Industrial (1.5")	TOTAL
\$ 31,590	\$ 3,510	\$ -	\$ -	\$ 35,100
\$ 32,994	\$ 3,510	\$ -	\$ -	\$ 36,504
\$ 33,696	\$ 3,510	\$ -	\$ -	\$ 37,206
\$ 35,100	\$ 3,510	\$ -	\$ -	\$ 38,610
\$ 35,802	\$ 3,510	\$ -	\$ -	\$ 39,312
<b>\$ 169,182</b>	<b>\$ 17,550</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 186,732</b>

Sewer Revenues from Incremental Cost Method				
Residential (5/8")	Commercial (1.5")	Institutional (4 compound)	Industrial (1.5")	TOTAL
\$ 94,932	\$ 10,548	\$ -	\$ -	\$ 105,480
\$ 99,151	\$ 10,548	\$ -	\$ -	\$ 109,699
\$ 101,261	\$ 10,548	\$ -	\$ -	\$ 111,809
\$ 105,480	\$ 10,548	\$ -	\$ -	\$ 116,028
\$ 107,590	\$ 10,548	\$ -	\$ -	\$ 118,138
<b>\$ 508,414</b>	<b>\$ 52,740</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 561,154</b>

Sewer Revenues from Combined Cost Method				
Residential (5/8")	Commercial (1.5")	Institutional (4 compound)	Industrial (1.5")	TOTAL
\$ 126,522	\$ 14,058	\$ -	\$ -	\$ 140,580
\$ 132,145	\$ 14,058	\$ -	\$ -	\$ 146,203
\$ 134,957	\$ 14,058	\$ -	\$ -	\$ 149,015
\$ 140,580	\$ 14,058	\$ -	\$ -	\$ 154,638
\$ 143,392	\$ 14,058	\$ -	\$ -	\$ 157,450
<b>\$ 677,596</b>	<b>\$ 70,290</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 747,886</b>