

Rate Study Guidance Document

For Local Government Units Designated as Distressed and/or Completing a Rate Study with Funding from the Division of Water Infrastructure

(Last updated: March 2025)

Introduction: The purpose of this guidance document is to assist Local Government Units (LGUs) designated “distressed” with the process of conducting a rate study. It provides a general background for those that do not have experience with rate studies, and it establishes the minimum requirements for a rate study funded by the Division of Water Infrastructure (Division).

The guidance document is broken into four main sections. The first explains why and when an LGU is required to have a recently adopted rate study. The second section provides basics about rate studies, and things to consider in a rate study to best accomplish the goals and priorities of the LGU. The third section discusses the minimum requirements of a rate study funded by the Division, and the fourth section describes the submittal and review process.

Throughout this document, the words “utility” and “LGU” are used interchangeably. Example calculation tables are utilized to provide clarity, however, this does not prescribe a particular format of presentation.

For questions related to this guidance document or rate study creation, submission, or approvals, please contact staff within the Division’s Viable Utilities Unit.

<https://www.deq.nc.gov/about/divisions/water-infrastructure/water-infrastructure-contacts>

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1. Background

1.1. What is a viable utility?

[North Carolina's Statewide Water and Wastewater Infrastructure Master Plan: The Road to Viability \(2017\)](#) defines a *viable utility* as “...one that functions as a long-term, self-sufficient business enterprise, establishes organizational excellence, and provides appropriate levels of infrastructure maintenance, operation, and reinvestment that allow the utility to provide reliable water services now and in the future” (p. 14).

1.2. What is the Viable Utility (VU) program?

On July 1, 2020, [Session Law 2020-79](#) was enacted to foster the viability of water and wastewater utilities across North Carolina. This session law created a process for identifying “distressed” local government units (LGUs), defined the requirements each distressed LGU must complete, and established the Viable Utility Reserve (VUR) to provide funding to distressed LGUs for planning and construction projects that will move the LGU toward financial, technical, and operational viability. The regulations governing the VU program can be found in North Carolina General Statutes (NCGS) [§ 159G-45](#).

1.3. Why is my organization designated as a distressed unit?

A *distressed unit*, as defined by NCGS [§ 159G](#), is a “public water system or wastewater system operated by a local government unit exhibiting signs of failure to identify or address those financial or operating needs necessary to enable that system to become or to remain a local government unit generating sufficient revenues to adequately fund management and operations, personnel, appropriate levels of maintenance, and reinvestment that facilitate the provision of reliable water or wastewater services” ([NCGS § 159G-20.\(4a\)](#)).

An LGU can be designated as distressed in four different ways (D1-D4). The State Water Infrastructure Authority ([SWIA](#)) and the Local Government Commission ([LGC](#)) use the following Identification Criteria for distressed designations ([Viable Utilities | NC DEQ](#)):

- [Identification Criterion 1 \(“D1”\)](#): A unit whose fiscal affairs are under the control of the Commission pursuant to its authority granted by NCGS § 159-181 (“under Commission fiscal control”), or
- [Identification Criterion 2 \(“D2”\)](#): A unit that has not submitted its annual audits for the last two (2) fiscal years to the Commission as required by NCGS § 159-34, or
- [Identification Criterion 3 \(“D3”\)](#): A unit with a Total Assessment Criteria Score that equals or exceeds 9, or
- [Identification Criterion 4 \(“D4”\)](#): A unit for which other information is available to or known by SWIA or LGC that reflects and is consistent with, but does not expressly

appear in, the Assessment Criteria to account for situations in which the Assessment Criteria score does not wholly or accurately reflect a system's level of risk due to the limitations of available data.

1.4. What is required of a distressed unit?

The statutory requirements for distressed local government units are as follows ([NCGS § 159G-45\(b\)](#)), with the requirements addressed by this guidance marked in **bold** font:

- 1) **Conduct an asset assessment and rate study, as directed and approved by the Authority and the Local Government Commission.**
- 2) Participate in a training and educational program approved by the Authority and the Local Government Commission for that distressed unit. Attendance shall be mandatory for any governing board members and staff whose participation is required by the Authority and Local Government Commission. The scope of training and education, and its method of delivery, shall be at the discretion of the Authority and Local Government Commission.
- 3) Develop an action plan, taking into consideration all of the following:
 - a) A short-term and a long-term plan for infrastructure repair, maintenance, and management.
 - b) Continuing education of the governing board and system operating staff.
 - c) Long-term financial management to ensure the public water system or wastewater system will generate sufficient revenue to adequately fund management and operations, personnel, appropriate levels of maintenance, and reinvestment that facilitate the provision of reliable water or wastewater services.
 - d) Any other matters identified by the Authority or the Local Government Commission.

The intent of these requirements is to promote and support viability and the transition of LGUs from their current distressed designation. The goal of SWIA and the Division of Water Infrastructure (Division) is for individual local governments and utility providers to move forward in achieving viability through three focus areas, which are explained in detail in [North Carolina's Statewide Water and Wastewater Infrastructure Master Plan: The Road to Viability \(2017\)](#): infrastructure management (Master Plan Section 5), organizational management (Section 6), and financial management (Section 7).

1.5. Why am I required to complete a rate study?

The development of a rate study is a statutory requirement when an LGU has been designated as a distressed unit. The purpose of the rate study is to develop a rate and fee structure that allows your utility to have the financial stability to attain water and wastewater utility viability and to remain viable for the long term.

In general, a rate study is an analysis to determine if your projected revenues are adequate to pay for the projected expenses of delivering safe and reliable water and wastewater services to your customers. If they aren't, the rate study will determine what they need to be to accomplish that goal, and how best to get there. Projected revenues and expenses include not only the daily operation and maintenance (O&M) of the utility, but also the replacement of capital assets, acquisition of new assets to meet changing regulations and customer demand, and establishing an adequate cash position and financial reserves to be able to handle emergencies and changes in revenue.

1.6. What other documents are related to the rate study process?

Conducting a rate study is not an isolated endeavor and requires input from many sources. Some of the documents necessary for a proper rate study are requirements of the VU program, while others are useful studies and documents that may improve utility finances on a daily basis and could, therefore, affect the rates that you need to charge.

1.6.1. Which documents are required?

The VU program requires several documents (refer to bulleted list below). Most of these plans and documents contain output(s) that feed into other plans and documents, so it can be beneficial to complete them sequentially as listed below. Depending on the utility's circumstances, however, it is possible that an LGU will fulfill these requirements in a different order.

Please note that although many of these documents are very technical and data-driven in nature, there is no requirement that proprietary software be purchased for producing any of the following documents. Most can be completed with a simple spreadsheet. (GIS may be an exception, but low-cost systems and programs with monthly or annual subscriptions exist.)

- *Asset Inventory and Assessment (AIA) leading to an Asset Management Plan (AMP)*: The process of developing an AIA that leads to an AMP produces several related documents and systems that provide information necessary to improve operation and decision making for the utility. It may take several years and individual projects to fully complete. Typically, a complete AIA/AMP will include:
 - An inventory, conditional assessment, and criticality determination for all assets
 - An Operations and Maintenance (O&M) program for all critical utility infrastructure, including O&M cost estimate projections

- Repair and replacement (R&R) cost estimate projections
- Geolocation-based mapping of the utility's vertical (above ground) and horizontal (underground) assets
- Capital Improvement Plan (CIP): The output of the AIA/AMP is used to develop a minimum 10-year CIP for adoption by the LGU. The CIP should at least identify each major capital project (or purchase) needing to be completed, which year it is planned to be constructed (or purchased), and an engineering cost estimate for each item.
- Rate Study: As described in this guidance document, the rate study will utilize the CIP, O&M and R&R cost estimates developed as listed above, along with information from many other sources, to determine the utility rate and fee schedule necessary to recover the full costs of delivering the utility services over the long term.
- Short-Term Action Plan (STAP): The STAP is created through regular meetings between the Division and LGU staff, referred to as status report meetings. In these meetings, Division and LGU staff work together to complete (update) a status report to assess the progress of an LGU as it works towards completing the requirements of the VU program and prioritizing next steps. Based on the discussion, each status report meeting will result in the output of an STAP letter listing the next steps to be taken by the LGU.
- Long-Term Viability Plan (LTVP): This document requirement is still being developed by the Division, however, to satisfy [NCGS § 159G-45.\(b\)\(3\)G](#), the LGU will likely need to develop an LTVP that will serve as their guidebook to maintaining viability into the future and will typically be one of the final documents created by an LGU to satisfy the VU program requirements. The LTVP will likely house or reference all the utility policies and procedures related to management, infrastructure, and financial operations. These policies will contain targets, key performance indicators, financial metrics, and other means of measuring the health of their utility. It will also likely contain or reference the most recent versions of the important documents listed above (GIS system, AIA/AMP, CIP, rate study, etc.). The intent is that the LTVP will be a living document, updated as policies and associated documents are updated.

1.6.2. What additional studies, documents, and policies can be helpful?

The items below are mostly related to efficiency aspects of utility operations but can have a significant impact on the finances of the system as well. They are often done as stand-alone studies. These can be performed by utility staff with proper training, but often they are completed with the assistance of private consulting firms and resource agencies (see Section 5.2).

- Water Audits: Water audits are performed to identify non-revenue water throughout the system (water produced or bulk purchased vs. billed water). Non-revenue water can include leaks, meter inaccuracies, unmetered uses, recycle consumption at treatment plants, fire hydrant use, etc. This type of study can simply look at gross flow numbers and identify unmetered users and old meters (reduced reading accuracy usually results

in a higher percentage of non-revenue water), or it can be comprehensive and conducted in tandem with leak detection efforts throughout the distribution system. Increasing water efficiency can reduce production costs, increase revenue, and possibly postpone the need to expand production, storage, and transmission facilities.

- *Inflow and Infiltration (I&I) Study*: An I&I (a.k.a. I/I) study determines how much rainwater, groundwater, and other non-wastewater flow is entering the sanitary sewer collection system and being treated. Inflow directly enters the system through manhole lids, cross connections, etc. Infiltration enters the system through leaky manhole structures, cracked pipes, poorly constructed taps and joints, etc. This type of study can simply utilize general flow numbers (water sold vs. wastewater treated at the plant) and visual identification of inflow sources, or be more comprehensive including studies with smoke testing, televising sewer lines, and flow monitoring of individual pipes or basins. These studies can also be specifically focused on sections of the collection system with known I&I problems. Decreasing I&I can dramatically reduce treatment expenses, regulatory issues (overflows), and possibly postpone treatment facility expansion and/or alleviate sewer moratoriums based on the reduced flow volume at the treatment facility.
- *Collection Efficiency Rate*: The collection efficiency rate (a.k.a. collection efficiency index) is the percentage of bills that are paid versus not paid, or the percentage of account receivables that are collected, in a given period. Policies can be developed that set a target efficiency rate and provide strategies and procedures to increase or maintain high collection efficiency.
- *Billing Efficiency and Accuracy*: All customers should be metered and billed. This includes staff and facilities of the LGU (fire and police staff, town hall, recreation centers, libraries, fire department buildings, etc.). Meter readings should be scheduled and punctual. Bills should be sent out in a timely manner. Collections and late payment policies should be clear, effective, and consistently enforced. Automated meter reading (AMR) and/or advanced metering infrastructure (AMI) systems can assist not only in billing efficiency but also in quickly identifying issues such as water leaks in customer lines. The AMR/AMI systems can be installed incrementally and targeted in locations with older meters as part of the utility's regular meter replacement program.
- *Banking policy*: Collections should be deposited daily according to [NCGS § 159-32](#), and you should shop around for the best banking fees and interest rates.

- Energy Efficiency: Energy is one of the largest expenses for many utilities, particularly for wastewater systems/treatment plants, which are more energy-intensive than drinking water systems/treatment plants. There are many self-directed energy audit programs with tools and calculators to assist utilities. In addition, there are higher-level energy audits that can be done by professionals. Sometimes electrical utilities will help perform energy audits. Free audits are also provided through the State Energy Office:
 - <https://www.deq.nc.gov/energy-climate/state-energy-office/utility-savings-initiative>

Possible solutions to reduce energy demand include: installing energy efficient assets; negotiating a better electric rate; performing off-peak operation and maintenance tasks (such as filling tanks); generating your own electricity (solar panels, wind turbines, etc.); and, reducing consumption, non-revenue water, and I&I flow.

2. Rate study basics

Section 2 provides background information on the process and considerations for a proper rate study. In general, the process for conducting a rate study is as follows:

- Learn about rates and rate-setting
- Determine characteristics of your utility/community, and the goals and priorities of your utility rates
- Determine the most appropriate rate structure
- Develop rates using projected revenues and expenses based on historical revenues and expenses
- Re-evaluate rate structure features after analyzing projected customer bills and make any adjustments to ensure they meet your utility's objectives

Just as an LGU with multiple utilities should have separate books and accounts for each utility, the rate study should also analyze each utility separately. In addition, rates should be developed to support each utility independently without the need to transfer funds between different utilities' accounts. In effect, the water system should not subsidize the wastewater system, and vice versa.

The data sources used in the study, as well as the data outputs, need to be validated. The outputs from the calculations should make sense looking back at the actual financials of the utility (revenues, expenses, etc.).

The LGU may choose to hire a consultant to complete the rate study, or engage resource agencies such as North Carolina Rural Water Association (NCRWA), the Southeast Rural Community Assistance Project (SERCAP), the University of North Carolina Environmental Finance Center (UNC EFC), and some Councils of Government (COGs), who can assist the LGU with preparation of the rate study. Utilities should discuss the cost of the study, the availability of grant funding, and these minimum requirements when considering which third party to hire/engage. Additionally, Division staff are available to answer rate study questions related to the guidance document or submittal and approval process.

2.1. What rules apply to the rate setting process?

There are several North Carolina General Statute (NCGS) requirements pertaining to setting and enforcing rates and fees for utility operations. This guidance document attempts to provide statutory references throughout where possible, but the UNC School of Government and the LGC are excellent sources of information to answer any specific questions related to the legality of rate setting and policies related to utility finances. Two basic references covering the overall authority to fix and enforce rates for cities and counties can be found in NCGS [§ 160A-314](#) and [§ 153A-277](#).

2.2. How are our rates and our utility finances related?

Your utility's rates and fees schedule establishes what your system revenue will be, based on the volume of water (and/or wastewater) used by your customers, and their interactions with your utility policies (billing, new user fees, etc.). That revenue then pays for all the expenses, including daily O&M, debt service, unexpected expenses, as well as building up a cash position and reserves for future capital projects. All those items make up the data for your fiscal year audited financial documents that are submitted to the LGC annually. The LGC analyzes your audits against several financial metrics to help determine the health of your system's finances, and whether the utility is placed on the Unit Assistance List. Several of these financial metrics are also used by the Division to assess if a utility should be recommended for classification as a distressed utility.

There are many financial metrics (sometimes called financial indicators or key performance indicators (KPIs)) that can give you an understanding of the financial health of your utility. A short list of common ones is provided below. These can often be easily calculated using your audited financial documents or on-going utility financial data. The UNC EFC online Financial Health Check-Up Tool (located at the link below) automatically calculates several common financial metrics utilizing uploaded information from annual financial data for NC utilities.

- <https://efc.sog.unc.edu/resource/financial-health-checkup-water-utilities/>

The utility should adopt a policy to review chosen financial indicators on a regular basis. Additional detail on financial indicators will be provided in the LTVP guidance document that should be available during calendar year 2025.

- Operating Ratio (OR) / Operating Margin: A measure of whether revenues are covering expenses. The calculations should include depreciation and reserve contribution, and the operating ratio should be above 1.0, or the operating margin greater than 0 (break-even).
- Debt Service Ratio (DSR) / Surplus (Deficit) With Debt: Calculates if net operating profit (or loss) is enough to cover existing debt payments (principal and interest). Set the ratio above 1.0 or the surplus greater than 0.
- Outstanding Debt to Net Plant Assets: How much you owe against your fixed assets. Above 50% suggests a relatively high level of leverage.
- Percent Depreciated / Condition of Assets: Determines how much of the average service life of the entire system infrastructure is used up. Typically, this should be below 50%.
- Quick Ratio / Current Ratio: Indicates whether a system can meet short-term financial obligations with cash or easily accessible funds by comparing current assets to liabilities. This ratio should typically be set above 1.0.
- Receivables Ratio / Collections Ratio: Measures how well the system is collecting money from customers. The ratio should be above 90%, but preferably above 95%.

- *Days Cash on Hand / Unrestricted Cash Ratio*: How long the system could pay expenses from cash with no new revenue coming in. This target varies greatly by utility, from a few months to several hundred days.

Many of these financial indicators should be checked as part of your annual budget process, as spelled out in detail in [NCGS § 159-8 to 159-15](#).

A rate study is also a perfect time to review existing financial policies and determine if modifications or additions are needed. The policies provide a foundation for consistent rate decisions and documentation of management philosophies, as well as targets and procedures that feed into calculations for the rates needed to produce revenue capable of covering current and future expenses necessary to run a viable utility for years to come. A utility's financial policies can cover many items, including:

- *Reserve Accounts*: purpose, how they function, and funding targets
- *Financial Metrics*: which ones, how to calculate, and monitoring frequency
- *Budget*: required line-items and frequency of discussions with the governing board
- *Rates*: guidelines on goals and priorities, process for calculations, and review frequency
- *Capital Funding*: how much will be self-funded vs. debt-funded
- *Billing and Collection Procedures*: when bills are sent and due, late fees and penalties

2.3. What is a rate study vs. a rate checkup?

Utility rates should be reviewed and analyzed on at least an annual basis.

Utility rates should be discussed on at least an annual basis with your governing board. At a minimum, the rates discussion may involve a rate checkup, or you may decide a full rate study is needed. The decision of which level of rates analysis is required depends on each utility's financial circumstances in the given year.

A rate checkup consists of reviewing the previous rate study's projections and determining if the assumptions used and values calculated are still accurate, or if minor adjustments are needed due to decreases in customer consumption, increases in expenses, or newly identified capital projects. A rate checkup may result in the decision that no modifications need to be made and the rates can be adjusted according to the previous rate study conclusions. Similarly, a few simple calculations can be made and documented that lead to an alternative rate adjustment for the current year.

There is a publicly available tool from the UNC EFC to assist in making annual rate checkups, titled the Water and Wastewater Rates Analysis Model. This model (link below) enables analysis and projections based on entering information that is readily available to the utility (existing rate sheets, consumption data, most recent audited financials, etc.).

- <https://efc.sog.unc.edu/resource/water-and-wastewater-rates-analysis-model/>

A full rate study, on the other hand, includes revisiting the utility's level of service goals and priorities, gathering new historical data, making new projections, and possibly even reconsidering the rate structure, to determine an appropriate rate and adjustment schedule for the coming years. In general, a full rate study should be done every three to five years, depending on how much has changed within the finances and operation of the utility over that period. During the years between full rate studies, the governing board can ask questions like the ones discussed in Section 2.5.1 to help determine if another full rate study is needed, or if a simple rate checkup can be done.

This guidance document focuses on the requirements for a full rate study.

2.4. What is full-cost pricing?

Full-cost pricing takes into consideration not only the annual O&M costs and existing debt service, but also the long-term upgrades and R&R costs necessary to preserve the ability of the infrastructure to deliver safe, reliable water and wastewater service to the customers, well into the future, without relying on grant funding. All elements of the system of equipment to treat, store, distribute, and collect water and wastewater have useful life expectancies, including tanks, pumps, meters, pipes, valves, manholes, etc. Money needs to be set aside to repair, rehabilitate, or replace these items by the end of their expected life through reserve accounts, or financial planning should be performed to account for rehabilitation and replacement projects that require the utility to incur debt.

Full-cost pricing, with no reliance on recurring grant funding, is necessary for utility viability.

Many factors go into properly constructing an accurate full-cost pricing rate structure, including:

- Existing debt schedules
- O&M cost projections from recent budgets
- R&R cost projections from the AMP
- Adopted CIP with dates and costs for projects
- Calculated future debt service requirements for CIP projects that will be debt-funded
- Reserve account balance targets

The sooner a utility's rates reflect full-cost pricing, the sooner it will be on the path toward financial stability. Having adequate reserves to make upgrades and do necessary R&R work will reduce the frequency of unplanned system failures, which are typically costlier than planned work. Additionally, once a utility is following full-cost pricing practices, sudden, drastic rate increases should become a thing of the past, replaced by smaller, annual, gradual, planned increases, which are much easier for customers to accommodate and accept.

2.5. What is the purpose of a rate study?

2.5.1. When is a rate study needed?

There are many factors that can indicate whether or not it is time for your utility to re-evaluate your rates and rate structure. Answering "yes" to the common questions below may suggest it is time to conduct a rate study:

- Were your utility's expenses higher than revenues for any of the last 3 years?
- Did your utility fail to make any scheduled debt payments in the last 3 years?
- Are your reserve accounts insufficiently funded (sufficient cash on hand, funds for equipment replacement, etc.)?
- Has the operation of your system shifted from proactive to reactive?
- Has inflation outpaced rate increases in the last few years?
- Has consumption changed over the years?
- Has there been a loss of a large user(s), or a decline in population?
- Are there known capital projects on the horizon with insufficient money set aside?
- Has it been 3-5 years or more since your last rate study?

It is important to avoid maintaining low rates at the expense of your utility's financial health. Artificially low rates either lead to a sudden, massive rate increase in the future, which may cause your customers "rate shock", or to failing systems and endangered public health. By properly documenting the financial needs of your system and educating customers, they will typically be more accepting and understanding of the need to increase rates for the financial health of the utility.

2.5.2. What are the goals of rate-setting?

When setting rates, the primary goal is to achieve full-cost pricing for delivering the water or wastewater services to your customers. But there are several other factors to consider, as noted below.

Rates should be set to generate enough revenue to cover the full cost of delivering water and wastewater services to the customer.

Know your customer base:

- Does your system serve mostly residential customers, or are there a large number of commercial users and/or large industrial or institutional customers?
- Are households primarily large families or single residents?
- Is there seasonal population, or high or low irrigation demands?
- Does your utility serve residents of your community that may require some additional considerations, such as low/fixed-income customers or foreign language speakers?

Know your priorities for utility rates and fees:

- Is revenue consistent enough, and are the financial policies and procedures designed properly, to maintain financial stability?
- Do you want your rates to vary by customer classification (defined in Section 2.6.2 below)? For example, do you want your rates to project a focus on business-friendly pricing, or are residential services your focus?
- Do you want to encourage water conservation?
- Do you need to consider affordability and ability to pay for certain segments of ratepayers?
- Is cost being shared equitably by the different types of users of the system?
- Are you meeting all laws and regulations, as well as your own policies?
- Are you funding renewal and replacement expenses, both current and future?
- Is the rate schedule easy to understand and administer?

Prices can send and reinforce strategic messages to current and potential customers of the utility. Rate and fee policies should be transparent and applied consistently among all customers within the same rate classification. Rates for different rate classifications must be tied to cost of service, not characteristics of the customer.

2.5.3. What are the benefits of a rate study?

A properly conducted rate study can provide several benefits for your utility, including:

- Defensible basis for the cost of service your utility provides to your customers
- Fair and equitable rate charges to customers
- Increased financial stability, sustainability, and/or viability
- Conformance to legal requirements
- An outside perspective that lends credibility and objectivity to rates

2.6. Elements of a rate study

2.6.1. What are fixed vs. variable expenses and base vs. volumetric rates?

All utilities have what are called fixed expenses and variable expenses. Fixed expenses are those that need to be paid regardless of how much volume the system produces or treats. They include items such as debt service, base salaries and benefits, insurance, etc. Variable expenses are items that do change depending on the volume produced or treated. These include items such as electricity, chemicals, bulk purchased water, overtime, etc.

The base rate in customer utility bills is a flat amount that is paid regardless of the flow to or from the customer. A certain amount of flow may be included in that base rate with no volume charge (say a 2,000-gallon consumption allowance), or it may include no flow at all. There may be different base rates depending on the customer classification or size of meter. The volumetric rate is an amount that is billed based on the number of gallons (or cubic feet) consumed by the customer. There may be different volumetric rates depending on the customer classification or how much flow is consumed. Additional detail is provided in Sections 2.6.2 and 2.6.3.

Each LGU decides how best to cover fixed and variable expenses through a combination of base rate and volumetric rate. You could choose to have a base rate that covers most of the fixed expenses. Taking this approach, when usage is down (due to drought restrictions, a particularly wet season, or some other drop in usage), you have confidence in the ability to pay the required fixed expenses. Likewise, most of the variable expenses can be recovered or paid through volumetric rate charges. This approach covers increased expenses when production is especially high, like irrigation season or when seasonal population increases.

If you are a smaller utility, you may wish to have higher base charges to help provide consistent income, and because you may have higher fixed expenses per gallon produced/treated. If you choose a high base charge to stabilize income, you may want to keep the consumption allowance low (or none at all), however you may want to include a lifeline amount (e.g., 1,000 gal) for those in need of affordability. If you choose a low base charge, you may not want to include any consumption allowance. The main point is to pick a base rate and volumetric rate that meet the stated goals and priorities of your utility and align with your revenues and expenses.

2.6.2. What are classifications and blocks?

Customer classifications refer to the different types of customers. Some utilities may only utilize a single classification of customer, while others may break their rate structure into several different classifications, such as residential, commercial, industrial, institutional, irrigation, and in-town vs. out-of-town, etc. There may be different rates for different users within a classification, such as different base and volumetric rates for different size meters or usage volume, but they must be applied based on the cost of service to that customer classification, not specific customer characteristics (please refer to NCGS [§ 160A-314](#) and [§ 153A-277](#)).

Unlike uniform volumetric rates, blocks use different groupings of volumetric usage within a classification, typically with different rates per block. For instance:

- 1-5,000 gallons = \$3.50 per 1000 gal
- 5,001 to 8,000 gallons = \$4.50 per 1000 gal
- 8,001 gallons and above = \$5.50 per gal

Blocks might be utilized based on desired objectives, such as encouraging conservation or encouraging industries to locate within your utility. Blocks should be reflective of the usage patterns of customers, and the differential should be significant enough to warrant the extra complication (a \$0.25 difference may not be worth the added implementation effort). Finally, for block structures to be effective, meter reading should be punctual and meters should be replaced frequently (aging meters tend to be inaccurate and measure lower than the actual volume of water delivered, resulting in loss of revenue).

2.6.3. What are the different types of rate structures?

There are several different types of rate structures to choose from; each has a slightly different impact on revenue generation and sends a different message about usage. Below are brief descriptions of some of the more simple/common rate structures, but there are others that could better suit a unique circumstance within a utility.

- *Flat Rates*: A flat rate is one price per billing period that includes unlimited water usage. This rate structure is very simple to implement and doesn't even require flow meters. The disadvantage is that it does not encourage conservation, and it does not equitably distribute cost based on usage.
- *Uniform Volumetric Rate*: Uniform volumetric rates charge the same price for each unit of water. This system is also relatively easy to implement, and it does charge based on volume used, so it more equitably distributes the system costs to the customers.
- *Increasing Block Rate*: An increasing (or inclining) block rate structure includes an initial rate for the first volume block of water, then increases the price per unit for the next volume block of water as consumption increases. Inclining rates are often called conservation rates because they discourage higher levels of water consumption through price signals. Conservation rates are encouraged for residential customers in most situations, and they also allow easy incorporation of "lifeline" rates for affordability consideration.
- *Decreasing Block Rate*: Decreasing (or declining) block rates charge an initial rate for the first unit of water and then decrease the price per unit of water as consumption increases. Decreasing block rates are rare and discouraged for residential users, but may be appropriate when considering commercial, industrial, or institutional customers if a stated goal for the utility is having business friendly water rates.

- Seasonal Rates: Seasonal rates vary by season. For example, certain water systems charge a summer seasonal rate that is higher during summer months to encourage water conservation and reduce discretionary water usage (such as irrigation). These are common in coastal areas and areas with large vacation and second home populations. Seasonal rates may be combined with other types of rates (e.g., uniform volumetric rates or block rates).
- Drought Surcharges: Provides the ability to raise rates during water restrictions to maintain revenue. The utility should have a well-described policy for it to operate properly and be understood by the customers (how much does the rate increase, what is the rate increase trigger, what is the trigger to end the increase, is it simply a base charge increase or do volumetric rates increase, etc.). Drought surcharges may be combined with other types of rates (e.g., uniform volumetric rates or block rates).

2.6.4. What are general facilities charges (system fees)?

Every LGU will have a collection of general facilities charges (or system fees). These should not only be listed with the rates and fees schedule, but should also be covered in some form of policy statement so that the purpose and intent are documented and can be reviewed in the future. The general facilities charges should be reviewed every time the rates are reviewed, and they can even be studied as part of a rate study. The fees should be based on cost recovery for the system based on those activities and may involve complicated calculations. Some examples of general facilities charges and when they may be used are shown below:

- Tap Fees: to cover the entire cost of doing the line tap
- Availability Fees: when pipes are run in front of properties that have not yet connected to the system
- System Development Fees: to have new users contribute to the costs already paid by existing customers, and/or cover future expansion costs caused by additional customers
- Deposits: to cover when a customer leaves and does not pay the final bills
- Meter Re-Read Fee: to cover cost when a customer disputes the meter reading volume
- Meter Test Charge: to cover cost when a customer still disputes the volume after the meter reading has been verified
- Late Payment Fee: to cover the administrative costs of late customer payments (check or electronic payment), possibly including the cost to turn off or remove the meter
- Return Item Charge: to cover non-sufficient funds fees (NSF fees) from customer payments (check or electronic).
- Special Assessments: typically charging specific users for specific capital upgrades and replacements directly attributable to those customers

2.6.5. What is a billing period?

Most utilities bill customers for water and/or wastewater services on a monthly basis, though some may charge on a bi-monthly or quarterly basis. Monthly billing is recommended (if possible) because it provides the most even flow of revenue and allows for prompt adjustments to issues (billing errors, bill delinquency, leaks, etc.). However, monthly billing takes additional time from staff that may already be stretched thin. A billing period should be chosen that best balances the utility's needs and staffing capacity.

2.6.6. What are reserves?

Reserves are an accumulation of funds for a future purpose. They are fundamentally tied to the budget, rate structure decisions, CIP, and key financial indicators, and are a critical tool to help utilities achieve viability. Some utilities just have a single line-item cash position (often called the fund balance in rate studies), while others have several reserve accounts within that fund balance that serve specific purposes, such as:

- Operating reserves / Rate stabilization reserves: to level out operating income and expense anomalies
- Capital (or capital improvement) reserves: to help a utility save and pay for future capital projects to keep the system operating properly
- Equipment replacement reserves: to replace equipment such as vehicles, pumps, computers, etc.
- Debt service reserves: to ensure that debt service payments are met

Most reserve funds are restricted cash positions intended very specific uses (like customer deposits, system development fees, or debt service fund), while other funds may be considered unrestricted (can be spent on budgeted items like operations, emergency repairs, and planned capital expenses). It should be noted that fund balance money is needed for ongoing operations and renewal of the system infrastructure, and should not be depleted year after year simply to postpone a needed rate increase.

A good strategy is to specifically budget contributions to the reserves (pay yourself first), rather than wait and hope there is money left at the end of the year to put into the reserves.

It is recommended to have a reserves policy that details the purpose of the reserve account, and a financial target for the account (e.g., a set dollar amount, a percentage of a budget amount, certain capital items, etc.). These reserve policy documents should be referred to at least annually at budget and rate-setting time, with a deep review of purpose and targets every three to five years.

A capital improvements reserve account often requires some additional calculations to determine the account balance targets. It should be based off an approved CIP, making sure

that funds are available in the future for the portions of each project that are intended to be self-funded.

An R&R reserve account balance target can be complicated to determine, especially if the utility uses this account as their “emergency” repair fund. There are likely regular, ongoing R&R expenses, as well as unexpected repairs and expenses throughout the budget cycle. The account balance target can be calculated using several methods. First, there are identified R&R expenditures in the AMP document. You may also calculate the estimates from an experience standpoint, such as how much has been spent over the last three years for R&R work, and add an inflation factor. This technique can be especially helpful in capturing the unplanned R&R costs over the years. Additionally, a less specific method for estimating those types of expenses would be to use the calculated depreciation on the system each year. Although depreciation values may not accurately reflect the true condition of any particular asset, they are an important financial tool and indicator. Depreciation values are typically provided by the accountant in the utility’s audited financial statements, and can also be found in the capital asset note. The most common method to calculate depreciation is straight-line depreciation, which is an annual amount equal to the original value of an asset divided by the designated useful life in years (e.g., 10, 20, 50, etc.).

To account for emergencies, smaller utilities may need a larger fund balance or reserve amount relative to the operating budget than a large system does.

Additional detail about reserve accounts will be provided in the LTVP guidance document that should be available during calendar year 2025.

2.7. How do I implement and maintain rate adjustments?

Increasing user rates and fees over time is necessary to maintain a financially healthy utility but is seldom appreciated by customers. Therefore, it is critical to get support early, be transparent during the process, have a rate increase plan projecting well into the future, and be able to defend the new rates with the customers.

2.7.1. How do I educate the board?

Since your governing board will be making the final decision on any rate adjustments, it is imperative that the reasoning and calculations are clear to them. It is recommended your utility staff take the governing board on tours of the facilities and show photos of failing infrastructure at presentations to highlight operational and capital needs, and provide detailed data in presentations with clear reasoning to support the rate increase recommendations. Most governing board members will not have a background in utility systems, so it can be beneficial to provide background information and present items in a manner easily understood by people outside the industry. It is often helpful to present several alternatives of how to achieve the revenue target so that the conversations can be focused on the constructive process of “what are the best ways to accomplish what is needed”, and not get stuck on “do we really need to raise rates”.

You might even want to ask the board members what they have questions about, and how they would like information presented to better understand the situation. Your governing board should be provided a plan on how to deal with public perception and have enough information to answer common questions they will get from the customers.

2.7.2. How do I educate the customer?

Your customers will be paying the increased rates and will, therefore, be the most likely to put forth objections. While customers often also have the ability to vote governing board members out of office if they are unhappy, this rarely actually happens.¹ To make the rate increase easier for your governing board to approve, it is best to have a rigorous plan on communicating with and educating the customers along the way. If you can control the narrative by communicating early and often, this decreases the likelihood that someone else will control the narrative.

To help with public perception, your utility staff and governing board should ensure that customers understand:

- The expenses required to cover the full cost to produce, treat, store, distribute, and collect the water and wastewater, and the corresponding revenue needs
- Efforts that your utility staff makes to reduce expenses and keep rates as low as possible
- Whether, based on hard data, the customers are paying a fair and equitable share of providing safe drinking water and wastewater collection and treatment
- The existing and proposed rates and rate structure, and how future utility bills will compare to the current ones
- The long-term costs for R&R and capital improvements

As with governing board members discussed above, the typical customer does not have a background in utility systems, so it can be beneficial to provide background information and present items in a manner easily understood by people outside the industry. You can disseminate this information to the public through various means, including newspapers, dedicated websites, social media, civic groups and churches, open houses/tours and traveling public meetings, radio/television interviews, booths at local events, FAQs, and newsletters/bill stuffers/notices. Invite the public to see and understand the value that your water/wastewater utility provides to your community.

The people in the most contact with your customers on a day-to-day basis are your utility staff, including billing staff and field staff. It is important that all staff members understand the facts and reasoning behind the rates so they can explain them properly to customers.

¹ Hansen, Eskaf, and Mullin (2002). Avoiding Punishment? Electoral Accountability for Local Fee Increases. *Urban Affairs Review* 58(3), pp. 888-906.

2.7.3. Why do I need to do periodic reviews and adjustments of our rates?

The financial situation of your utility changes constantly throughout the fiscal year. Prices of materials, chemicals, electricity, staff, etc., typically increase on an annual basis. Customer use and corresponding revenues change seasonally and/or annually, and emergencies can happen leading to unexpected new capital expenses. Therefore, it is critical that you check the financial health of your utility and make any necessary adjustments at least annually. This should be done as part of your annual budget process as detailed in [NCGS § 159-8 to 159-15](#).

Rate increases are inevitable, but a utility does have some control over how much impact it has on customers. In general, small annual increases are much more easily absorbed and accepted by residents and businesses alike, rather than large one-time rate increases. With this in mind, we recommend that you implement a policy of annual rate increases that are guided by projections from a rate study and adjusted with annual rate checkups.

Typically, smaller, incremental rate changes, rather than large occasional increases, are easier for both residential and business customers alike to adjust to.

2.8. What are other additional considerations?

2.8.1. What is affordability?

A common concern when discussing the possibility of raising rates is the impact on low-income customers, and whether the water and wastewater bills will be affordable. There are many ways to calculate and consider affordability. One historic method is to look at the annual average water and sewer bill and compare that as a percent of Median Household Income (MHI). There is no official value under which utility bills are considered “affordable”, but a common range is anywhere under two percent to four percent of MHI for a combined water and wastewater bill.

However, since half of your customers earn less than the MHI, it may not be the best measure of affordability for low-income customers. You may wish to compare the projected utility bills to the income of the lowest quintile of household income, or those below the poverty rate, or below a set income threshold (say \$25,000/year). There are several online tools to help a utility consider affordability, including the UNC EFC Water & Wastewater Residential Rates Affordability Assessment Tool, and the Duke University Nicholas Institute Water Affordability Dashboard (links below). They compare rates against census tract income and other key socio-economic indicators:

- <https://efc.sog.unc.edu/resource/water-and-wastewater-residential-rates-affordability-assessment-tool-2/>
- <https://nicholasinstitute.duke.edu/water-affordability/water-affordability-dashboard/>

Finally, when deciding on new rates, it may be tempting to make comparisons with utility bills in neighboring towns and other similar utilities. However, given that every utility has its own unique circumstances, it is recommended to compare rates with state averages or groupings of similar utilities rather than single utilities. The UNC EFC has an NC Water and Wastewater Rates Dashboard that can compare a utility's average utility bill to all utilities in the state, similar sized utilities, utilities within a certain distance, etc. The link to the Rates Dashboard is provided below.

- <https://dashboards.efc.sog.unc.edu/nc>

2.8.2. What are customer assistance programs?

Providing direct assistance to those in need can be a much more efficient and effective way of helping, while not creating a negative impact on the utility finances.

Although your governing board might be concerned about affordability for low-income customers when discussing the possibility of raising rates, they need to ensure the finances of the utility aren't adversely affected by setting artificially low rates for all customers. Rates should be set to meet full-cost pricing needs for the entire customer base. However, there are ways to assist customers with affordability issues, typically called Customer Assistance Programs (CAPs). **In North Carolina these programs cannot be funded by utility rate revenues, so**

that limits the types of CAPs that the utility can utilize on their own. However, CAPs can also be funded and operated through non-utility channels, such as social services, non-profits, voluntary contributions, fundraising, and municipal general fund assistance programs.

First you should identify the priorities and goals of any CAP that you may want to implement, based on interviewing both customers and the utility staff. You can then determine which type of CAP(s) would best meet those priorities and goals. Qualification criteria, funding plans, and possible community partners, would also be discussed in the CAP policy that is developed.

There are five typical categories of CAPs:

- Lifeline rates: a limited consumption volume that is provided at a reduced rate
- Bill discount: typically a long-term reduction (discount) to the customer's monthly bill
- Flexible terms: modified bill payment plans can be developed
- Temporary assistance: one-time or short-term assistance can be provided based on pre-defined, acute hardship issues
- Water efficiency: reducing water consumption through installation of low flow fixtures and appliances, and other means, on the customer's side of the meter, to lower the customer's water bill

Developing a CAP can be a complicated endeavor, but there are many sources of additional guidance and assistance. Below are two UNC EFC webpages and some links to US Water Alliance resources discussing CAPs. They contain overviews of how small utilities can implement

CAPs, how they help both the community and the utility, and the complicated legal aspects of CAP development. There are also links within the links below to the Bill Payment Assistance Program Cost Estimation for Water Utilities Tool and the Residential Rates Affordability Assessment Tool from the UNC EFC. The UNC EFC can provide technical assistance on developing a CAP tailored to your specific utility's needs.

- <https://efc.sog.unc.edu/implementing-a-customer-assistance-program-for-a-small-system/>
- <https://efc.sog.unc.edu/resource/navigating-legal-pathways-rate-funded-customer-assistance-programs-guide-water-and/>
- <https://uswateralliance.org/wp-content/uploads/2023/10/Making-Customer-Assistance-Programs-Accessible-Guidance-for-the-Water-Sector.pdf>
- <https://uswateralliance.org/how-water-utility-customer-assistance-programs-can-help-build-resilient-healthy-communities/>

2.8.3. What are fair and equitable rates?

The concept of utility rates being fair and equitable is based on the notion that all customers from all classifications pay an amount similar to their proportional usage and demand on the system. For instance, if commercial users use approximately 10% of the water and wastewater capacity, they should probably pay approximately 10% of the expenses through their billing revenue.

The typical comparison table would include each customer classification, how many accounts in each classification, and how much of the total flows are consumed or created by each classification. The table would also project the total revenue likely to be generated by each classification with current rates and proposed rates. It can be helpful to compare results visually by producing pie-charts comparing the annual water usage per classification, and the projected revenue per classification.

Although using this comparison can help determine if the current or proposed rates are inadvertently causing unequitable cost sharing, it is allowable to have rates that result in different classifications paying a larger or smaller burden of the expenses of the system relative to what they actually consume. However, when doing this, your utility should be clear in your goals and priorities as to why one classification is slightly subsidizing another. Be transparent with the public with the results of the cost comparison analysis. Again, the utility should reference NCGS [§ 160A-314](#) and [§ 153A-277](#), and the UNC School of Government and/or the LGC with any legal questions regarding rate setting.

3. Rate study report requirements

This section provides the minimum requirements for a rate study funded through a Division grant or loan program, and also details industry best practices when developing a rate study. Rate studies must also include any additional information the Division may require to meet minimum requirements that SWIA and/or the LGC determine necessary for the long-term sustainability of the utility. In some sections below, we provide optional recommendations for additional items that may provide the governing board and staff further insight for better decision-making on rates, fees, and financial management.

3.1. Narrative

The rate study must include a written narrative to provide a clear understanding of the proposed scenarios for the governing board and management, as well as a realistic pathway for implementation. It must be comprehensive enough that (combined with the data tables, figures, and supporting documents) a reader not involved directly with the study process (now or in the future) can understand the process and results of the rate study. However, it does not need to be any longer than it takes to convey the necessary information. It can be accomplished through a combination of text and notes on tables and figures.

A written narrative is a requirement for a rate study document.

At a minimum, the narrative must describe the following:

- Goals and objectives of the governing board and how those are applied to the proposed rates
- Sources and years used for the data in the analysis
- Assumptions made in the projections, such as growth factors, inflation, feasible CIP funding strategies, etc.
- Scenarios and rate options that were analyzed
- Conclusions and recommendations
- How rate check-ups will be integrated into the utility's ongoing management (i.e. annually with the budget cycle), as well as what frequency full rate studies will be performed (i.e. every 3-5 years), and a list of example triggers for initiating one sooner.

3.2. Revenue calculations

A summary table of the existing and projected revenue for each separate utility (water and wastewater, if your utility has both) must be provided in the rate study. **The revenue calculations must utilize a minimum of one year of historical revenue data (three years recommended)** to calculate the following:

- Number of existing and projected customers per rate classification
- Existing and projected volume of water metered per rate classification (and block if existing rate structure has volumetric blocks)
- Existing and projected revenue generated via base charge
- Existing and projected revenue generated via volumetric charge
- Existing and projected non-production revenue (connection fees, late fees, shut-off and reinstate service fees, interest, etc.)
- **Project revenue out for a minimum of ten years (twenty or more years is preferable).**
- List the factors used to calculate future increases or decreases. Discuss any anomalies that led to an unusual or difficult-to-predict value in the narrative.

Historical analysis to determine baseline values and trends should include the most recent three years of audited financial data.

Although best practices include utilizing three years of historical revenue to analyze if any short-term trends can be seen, if necessary, the rate study can be based only on the most recent full fiscal year of data.

Additionally, although not required, best practices could include looking at monthly revenue data to determine any cyclical trends, especially if there is considerable irrigation use within

the utility's service area, or if there are a lot of seasonal customers, etc. Charts and graphs can also be provided for better visualization.

The utility may wish to include a bill collection ratio as part of their revenue calculations to account for unpaid bills. Additionally, as mentioned in Section 1.6.2, the utility may want to look at how much water is produced and how much is billed. This can be done by simply using overall flow data or by conducting a full water loss audit as an additional study. On the wastewater side, a similar calculation can be performed based on the gallons billed and the gallons treated, using either overall flow data or a complete I&I study as an additional study, as mentioned in Section 1.6.2.

An example rate schedule table (**Table 1**) and table of historical revenue and expenses (**Table 2**) are provided below.

Table 1. Example rate schedule table

Current Rates		
Residential		
Base Rate	25.00	\$/mo
Volume Charge		
1-4000 gal	4.50	\$/1000gal
4001-6000 gal	5.75	\$/1000gal
6001+ gal	7.25	\$/1000gal
Commercial		
Base Rate	45.00	\$/mo
Volume Charge		
1+ gal	6.25	\$/1000gal
Industrial		
Base Rate	80.00	\$/mo
Volume Charge		
1+ gal	7.25	\$/1000gal

3.3. Expense calculations

The rate study must provide a summary table of the existing and projected expenses for each separate utility (water and wastewater, if the utility has both). If the utility has combined financial departments for both water and wastewater administration expenses (or expenses are completely combined), effort should be made to estimate a breakout of expenses to each separate utility. **The expense calculations must utilize a minimum of one year of historical expense data (three years recommended)**, and meet the following requirements:

- Data must be “actuals” from certified financials, not budgeted amounts.
- **Expenses must be projected out for a minimum of ten years (twenty or more years is preferable)**, but the number should match the number of years the revenue was projected.
- List the factors used to calculate future expense increases or decreases. Discuss any anomalies that led to an unusual or difficult to predict value in the narrative.

Although best practices would include utilizing three years of historical expense data to analyze if any short-term trends can be seen, if necessary, the rate study can be based only on the most recent full fiscal year of data.

Additionally, having the expense line-items in the rate study match those line-items used in the annual budget document provides the best detail and allows for matching of values between source and calculation. It is, however, acceptable to summarize expenses used in the rate study calculations into the four line-items detailed in the following sub-sections of this report: operation and maintenance, capital expenses, reserve contributions, and debt service.

The rate study must contain a minimum of 10 years of future revenue and expense projections, and financial analysis.

If a utility is behind in their audits, it is better to utilize un-audited data rather than old audited data, but note the exception in the narrative. Finally, although not required, note that a look at monthly expense data can show cyclical trends, especially if there is considerable irrigation use within the utility, or if there are a lot of seasonal customers. Charts and graphs can also be provided for better visualization.

Table 2. Example table of historical revenues and expenses

Historical Revenues and Expenses							
	FY(-2)	FY(-1)	FY(0)	% Change FY(-2) to FY(-1)	% Change FY(-1) to FY(0)	Yearly % Change FY(-2) to FY(0)	Projections Rate
Sales Revenue							
Residential							
No. Users	600	597	596	-0.5%	-0.2%	-0.3%	(0.5)
Block 1 Volume (kgal/mo)	1,350	1,320	1,300	-2.2%	-1.5%	-1.9%	(2.0)
Block 2 Volume (kgal/mo)	820	800	780	-2.4%	-2.5%	-2.4%	(2.5)
Block 3 Volume (kgal/mo)	510	500	480	-2.0%	-4.0%	-2.9%	(3.0)
Commercial							
No. Users	8	8	9	0.0%	12.5%	6.3%	0.0
Volume (kgal/mo)	220	220	260	0.0%	18.2%	9.1%	0.0
Industrial							
No. Users	2	1	1	-50.0%	0.0%	-25.0%	0.0
Volume (kgal/mo)	1,120	470	470	-58.0%	0.0%	-29.0%	0.0
Sales Revenue Totals	\$474,030	\$411,750	\$410,790	-13.1%	-0.2%	-6.7%	
Fees, Charges, Other Income							
Tap Fees	\$300	\$300	\$1,200	0.0%	300.0%	150.0%	0.0
Late/Reconnect Fees	\$4,750	\$4,920	\$4,680	3.6%	-4.9%	-0.7%	0.0
Interest	\$370	\$290	\$280	-21.6%	-3.4%	-12.2%	0.0
Other	\$80	\$120	\$70	50.0%	-41.7%	-6.3%	0.0
Total Annual Revenues	\$479,530	\$417,380	\$417,020	-13.0%	-0.1%	-6.5%	
Operating Expenses							
Salaries and Benefits	\$73,800	\$78,500	\$84,200	6.4%	7.3%	7.0%	7.0
Contract Labor	\$7,300	\$7,600	\$7,700	4.1%	1.3%	2.7%	2.0
Electricity	\$26,300	\$18,400	\$19,000	-30.0%	3.3%	-13.9%	3.5
Insurance	\$3,400	\$3,500	\$3,600	2.9%	2.9%	2.9%	3.0
Chemicals	\$11,600	\$8,800	\$9,300	-24.1%	5.7%	-9.9%	6.0
Repair/Maintenance	\$14,200	\$32,000	\$15,600	125.4%	-51.3%	4.9%	5.0
Phone and Internet	\$1,200	\$1,300	\$1,400	8.3%	7.7%	8.3%	8.0
Legal and Accounting	\$3,400	\$3,600	\$3,700	5.9%	2.8%	4.4%	4.0
Testing	\$2,100	\$2,300	\$2,400	9.5%	4.3%	7.1%	5.0
Training and Development	\$1,800	\$1,900	\$2,200	5.6%	15.8%	11.1%	12.0
Office Expenses	\$790	\$780	\$790	-1.3%	1.3%	0.0%	2.0
Fuel and Truck Expense	\$2,200	\$2,500	\$2,600	13.6%	4.0%	9.1%	8.0
Operating Expenses Totals	\$148,090	\$161,180	\$152,490	8.8%	-5.4%	1.5%	
Capital Expenses							
Replace Pump at Station #2	\$0	\$0	\$145,000				
New Pickup	\$37,000	\$0	\$0				
Reserve Contributions							
Capital Reserve	\$0	\$0	\$0				
Operations Reserve	\$0	\$0	\$0				
Debt Service (P&I)							
USDA Loan 2004	\$95,000	\$95,000	\$95,000				
NC SRF Loan 2013	\$135,000	\$135,000	\$135,000				
Total Annual Expenses	\$415,090	\$391,180	\$527,490	-5.8%	34.8%	13.5%	
Note: There are no expected changes in commercial or industrial customers or flow.							

3.3.1. Operation & maintenance

A rate study must include a line-item for O&M expenses. The O&M expenses should be broken down into detail similar to, if not the same as, the annual budget line-items. This provides not only a level of granularity to better analyze where the money is going, but also a level of continuity between the budget process and the rate-setting process.

It is recommended that when utilizing three years of past actual expenses, the annual changes and total changes over the three years be calculated for each line-item. This allows better determination of individual rates of increase or decrease based on actual data to be applied to each line-item for future projections, rather than blanket estimated increases used across the board. It also helps in identifying anomalies in recent years that can be researched and accounted for when projecting future values.

It is also recommended that the utility consider possible hidden costs that are not currently properly accounted for in the budget. Not only should these items be accounted for in the budget and rate-setting exercises, but also in real dollars by charging the general fund or enterprise fund, as appropriate, utilizing the Cost Allocation Method and by avoiding direct transfers between the general fund and enterprise fund. Not properly allocating these hidden costs is an indirect way of the general fund supporting the enterprise fund (or vice versa).

Typical hidden costs can include:

- Salaries of town staff that split work between both the utility and general government duties.
- Office expenses that are split, such as office space (a utility office in town hall), computers, printers, paper, and other office supplies
- Professional services that are split (accounting, legal, audit)
- Insurance policies
- Electricity bills, water bills (do the town hall and fire station pay for water?), lawn maintenance contracts, etc.

3.3.2. Capital expenses

A rate study must include a line-item for capital expenses. If the utility has an adopted CIP, then those project costs and corresponding dates should be utilized in the future projected capital expense lines of the rate study expenses. All the capital expenses for one year in the CIP can be added together and put in a single line-item in the rate study, or individual projects can be listed out separately. If there are known changes to project amounts or dates of construction compared to the original written/adopted CIP, make the adjustments to the values entered in the rate study and document the changes in the narrative of the report.

For those capital expenses that will be debt funded, make sure to include the corresponding additional annual debt payments in the Debt Service calculations of the rate study.

Although a utility progressing through the VU Program should likely have a CIP completed as part of the earlier AIA/AMP step, it is possible that a utility may not have an accurate, up-to-date, adopted CIP to utilize while working on the rate study. If that is the case, there may still be some upcoming projects the utility is aware of, and some

corresponding rough cost estimates. Utilize whatever information is known, with ample documentation in the narrative, and prioritize producing a comprehensive CIP prior to the next rate checkup or rate study.

It is also possible that a utility has knowledge of a costly project that may be further out than the CIP or expense projections timeframe of the rate study. Examples of this could be a treatment plant relocation, or a new 12-mile water supply line, expected in approximately 15 years, but the CIP and rate study project out only 10 years. As such, a critical and expensive project like this could have a large impact on the utility rates, but not be included in the rate calculations for several years. Consideration should, therefore, be given to adding a special capital expense line item for such a project in the current rate study, even if it is not in the planning timeframe, and even if the values used are roughly estimated, so that any necessary rate adjustments can be taken as soon as possible to lessen their annual impact.

A good tool from the UNC EFC related to planning long-term financial needs for future capital projects is the Plan-to-Pay Tool. The tool can be accessed from the link provided below.

- <https://efc.sog.unc.edu/resource/plan-pay-scenarios-fund-your-capital-improvement-plan/>

Note that, typically, repair expenses are considered a day-to-day operating cost, while replacement expenses are a capital cost. Although each utility may do things in slightly different ways, it is at least important to be consistent in how you apply concepts, and under which line-items expenses are accounted for within the utility finances.

A rate study must include the expense of all known capital projects within the planning period, and the corresponding one-time expenses, future debt payments, or reserve contributions to achieve the funding goals for those capital projects.

3.3.3. Reserve Contributions

A rate study must include a line-item for reserve contributions. The reserve contributions line-item shall encapsulate the following concepts:

- Reference the utility's reserve policies to determine what the reserve target values are and how to calculate them.
- Provide detail in the narrative describing the reserve account goals (e.g., starting value, how the target was determined, and how many years before they plan to reach the target level).
- Separate line-items if the utility maintains separate reserve accounts.
- Provide the current balance on any existing cash positions (or the "fund balance").
- Use the adopted CIP to calculate contribution amounts to the capital reserve for each year to account for upcoming expenditures. Show the calculations.
- Use the adopted AIA/AMP report replacement cost(s) or depreciation values from the audited financials to determine the necessary contributions into any R&R reserves.

Most utilities working on a rate study will have already completed a recent AIA/AMP and CIP by the time they do a rate study. However, there will be utilities that do not have those documents available to provide the detailed information described in the points above. In that case, it will be acceptable to utilize annual system depreciation values for the reserve contribution amount in the expenses portion of the rate study calculations. These depreciation values need to be from audited financials, and a copy of the information source must be provided in the supporting documents of the rate study.

3.3.4. Debt service

The rate study must include a line-item for debt service, and a corresponding debt service table, containing the following elements:

- The debt service table should contain a listing of each individual debt issue, showing principal and interest payments for each year of the rate study planning period.
- In the narrative, or as part of the debt service table, the terms of each debt issue should be listed, including the year acquired, year of estimated payoff, initial debt amount, and interest rate.
- The debt service table must have a sum total for each fiscal year, and that value can be put as a single line-item in the expense calculations table of the rate study, or individual debt line-items may be used.
- The debt service table must be included in the supporting documents of the rate study.

If the utility has no debt or only a single debt issue, a debt service table will not be required, but the line-item must still be placed in the expense calculations. The specifics of the situation should be described in the narrative.

An example table of revenue and expense projections utilizing the current rate schedule is provided in **Table 3**.

Table 3. Example table of revenue and expense projections based on current rate schedule

Revenue and Expense Projections - Current Rates												
	Base Year FY(0)	Multiplier	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)
Sales Revenue												
Residential												
No. Users	596	(0.5)	593	590	587	584	581	578	575	573	570	567
Block 1 Volume (kgal/mo)	1,300	(2.0)	1,274	1,249	1,224	1,199	1,175	1,152	1,129	1,106	1,084	1,062
Block 2 Volume (kgal/mo)	780	(2.5)	761	741	723	705	687	670	653	637	621	606
Block 3 Volume (kgal/mo)	480	(3.0)	466	452	438	425	412	400	388	376	365	354
Commercial												
No. Users	9	0.0	9	9	9	9	9	9	9	9	9	9
Volume (kgal/mo)	260	0.0	260	260	260	260	260	260	260	260	260	260
Industrial												
No. Users	1	0.0	1	1	1	1	1	1	1	1	1	1
Volume (kgal/mo)	470	0.0	470	470	470	470	470	470	470	470	470	470
Sales Revenue Totals	\$410,790		\$405,894	\$401,101	\$396,410	\$391,817	\$387,321	\$382,919	\$378,608	\$374,387	\$370,253	\$366,204
Fees, Charges, Other Income												
Tap Fees	\$1,200	0.0	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200
Late/Reconnect Fees	\$4,680	0.0	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680
Interest	\$280	0.0	\$280	\$280	\$280	\$280	\$280	\$280	\$280	\$280	\$280	\$280
Other	\$70	0.0	\$70	\$70	\$70	\$70	\$70	\$70	\$70	\$70	\$70	\$70
Total Annual Revenues	\$417,020		\$412,124	\$407,331	\$402,640	\$398,047	\$393,551	\$389,149	\$384,838	\$380,617	\$376,483	\$372,434
Operating Expenses												
Salaries and Benefits	\$84,200	7.0	\$90,094	\$96,401	\$103,149	\$110,369	\$118,095	\$126,361	\$135,207	\$144,671	\$154,798	\$165,634
Contract Labor	\$7,700	2.0	\$7,854	\$8,011	\$8,171	\$8,335	\$8,501	\$8,671	\$8,845	\$9,022	\$9,202	\$9,386
Electricity	\$19,000	3.5	\$19,665	\$20,353	\$21,066	\$21,803	\$22,566	\$23,356	\$24,173	\$25,019	\$25,895	\$26,801
Insurance	\$3,600	3.0	\$3,708	\$3,819	\$3,934	\$4,052	\$4,173	\$4,299	\$4,428	\$4,560	\$4,697	\$4,838
Chemicals	\$9,300	6.0	\$9,858	\$10,449	\$11,076	\$11,741	\$12,445	\$13,192	\$13,984	\$14,823	\$15,712	\$16,655
Repair/Maintenance	\$15,600	5.0	\$16,380	\$17,199	\$18,059	\$18,962	\$19,910	\$20,905	\$21,951	\$23,048	\$24,201	\$25,411
Phone and Internet	\$1,400	8.0	\$1,512	\$1,633	\$1,764	\$1,905	\$2,057	\$2,222	\$2,399	\$2,591	\$2,799	\$3,022
Legal and Accounting	\$3,700	4.0	\$3,848	\$4,002	\$4,162	\$4,328	\$4,502	\$4,682	\$4,869	\$5,064	\$5,266	\$5,477
Testing	\$2,400	5.0	\$2,520	\$2,646	\$2,778	\$2,917	\$3,063	\$3,216	\$3,377	\$3,546	\$3,723	\$3,909
Training and Development	\$2,200	12.0	\$2,464	\$2,760	\$3,091	\$3,462	\$3,877	\$4,342	\$4,863	\$5,447	\$6,101	\$6,833
Office Expenses	\$790	2.0	\$806	\$822	\$838	\$855	\$872	\$890	\$907	\$926	\$944	\$963
Fuel and Truck Expense	\$2,600	8.0	\$2,808	\$3,033	\$3,275	\$3,537	\$3,820	\$4,126	\$4,456	\$4,812	\$5,197	\$5,613
Operating Expenses Totals	\$152,490		\$161,517	\$171,128	\$181,363	\$192,266	\$203,883	\$216,263	\$229,459	\$243,530	\$258,536	\$274,543
Capital Expenses												
Replace Pump at Station #2	\$145,000											
Replace MH#17			\$60,000									
Generator PS #4				\$55,000								
Replace Well #2 Pump					\$75,000							
Slipline Mainstreet Sewer							\$185,000					
Replace Utility Truck									\$55,000			
Replace First Ave Water Main											\$320,000	
Reserve Contributions												
Fund Balance	\$0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Debt Service (P&I)												
USDA Loan 19XX	\$95,000		\$95,000	\$95,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
NC SRF Loan 20XX	\$135,000		\$135,000	\$135,000	\$135,000	\$135,000	\$135,000	\$135,000	\$135,000	\$135,000	\$0	\$0
Total Annual Expenses	\$527,490		\$451,517	\$456,128	\$391,363	\$327,266	\$523,883	\$351,263	\$419,459	\$378,530	\$578,536	\$274,543

3.4. Revenue requirements analysis

It should be noted that the revenue requirements analysis is a cash analysis for the utility. Although it is common for rate studies (and this document) to refer to the resulting cash positions as “fund balance”, this term is not to be confused with the overall fund balance of the utility in audited financials, which contains many more factors.

The rate study must have a table that shows the following values on a single page:

- the total revenues per year,
- the total expenses per year,
- the resulting net surplus (deficit) for each year,
- the starting cash position (fund balance with reserves), and
- ending cash position (fund balance with reserves) for each year.

The aforementioned values should be for all historic and projected years of the study period of the rate study. This can all be included in a single table with the other revenue and expense data or as a separate financial summary table.

If the utility has multiple reserve accounts, there may need to be a more elaborate calculation of the impact on those individual accounts.

An example of a revenue requirements analysis table utilizing the current rate schedule is in **Table 4**.

Table 4. Example table of a revenue requirements analysis based on current rate schedule

Revenue Requirements Analysis - Current Rates											
	Base Year FY(0)	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)
Total Revenue	\$417,020	\$412,124	\$407,331	\$402,640	\$398,047	\$393,551	\$389,149	\$384,838	\$380,617	\$376,483	\$372,434
Total Expenses	\$527,490	\$451,517	\$456,128	\$391,363	\$327,266	\$523,883	\$351,263	\$419,459	\$378,530	\$578,536	\$274,543
Net Surplus (Deficit)	(\$110,470)	(\$39,393)	(\$48,797)	\$11,277	\$70,781	(\$130,332)	\$37,886	(\$34,621)	\$2,087	(\$202,053)	\$97,891
	Base Year FY(0)	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)
Starting Fund Balance	\$149,000	\$38,530	(\$863)	(\$49,660)	(\$38,383)	\$32,398	(\$97,933)	(\$60,047)	(\$94,668)	(\$92,581)	(\$294,635)
Net Operating Gain (loss)	(\$110,470)	(\$39,393)	(\$48,797)	\$11,277	\$70,781	(\$130,332)	\$37,886	(\$34,621)	\$2,087	(\$202,053)	\$97,891
Ending Fund Balance	\$38,530	(\$863)	(\$49,660)	(\$38,383)	\$32,398	(\$97,933)	(\$60,047)	(\$94,668)	(\$92,581)	(\$294,635)	(\$196,744)

3.5. Rate adjustments and impacts on finances

Based on the stated goals and objectives of the rate study, at least one, but possibly several rate schedule options, can be developed and analyzed. The following minimum considerations must be followed:

One proposed rate scenario must reach full-cost pricing within the fifth year of the study period.

- The narrative must provide a description of the specific rates proposed for each scenario. This includes both the base rate and volumetric rate for each classification and block, if they exist.

- A table similar to the summary in **Table 4**, described in Section 3.4, must be generated for each scenario. The table should show how the new rates impact revenue, net surplus (deficit), and cash position (fund balance with reserves) for every year of the study period. If there is only one rate scenario proposed, and the changes can be shown clearly on the original current rate revenue requirements summary table, that is also acceptable.
- **At a minimum, the rate study must analyze one proposed rate schedule that will provide full-cost pricing (no grant funding assumed) within the fifth year of the study period as a benchmark.** Additional rate schedule scenarios may be developed and analyzed.

The rates necessary to reach full-cost pricing within the five-year benchmark may not be feasible for some utilities. In this case, the utility should consider additional rate scenarios that are actionable and improve financial capacity. To decrease affordability issues, utilities should also consider alternative options for their utility including decentralized/distributed strategies, partnerships, regionalization, and mergers to provide affordable long-term utility service for their customers. Additional information on merger and regionalization programs are provided in brief at the end of this guidance document, as well as on the Division webpage.

Note that research has shown that as a general rule-of-thumb, for every ten-percent increase in price, usage drops three to four percent. Consideration should be given to incorporating these factors into the revenue calculation, depending on the level of rate increases that are proposed in each alternative.

An example proposed rate schedule (**Table 5**), as well as tables of revenue and expense projections (**Table 6**) and a revenue requirements analysis (**Table 7**) utilizing the proposed rate schedule, are provided below.

Table 5. Example table of proposed rates

Proposed Rates											
	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)	
Residential											
Base Rate	26.50	28.00	29.00	30.00	31.50	32.50	33.50	35.00	36.00	37.00	\$/mo
Volume Charge											
1-4000 gal	4.55	4.60	4.65	4.70	4.75	4.80	4.85	4.90	4.95	5.00	\$/1000gal
4001-6000 gal	6.10	6.30	6.50	6.75	7.00	7.20	7.40	7.60	7.80	8.00	\$/1000gal
6001+ gal	7.65	7.95	8.25	8.55	8.85	9.15	9.45	9.75	9.95	10.15	\$/1000gal
Commercial											
Base Rate	47.00	49.00	52.00	55.00	58.00	60.00	62.00	65.00	67.00	69.00	\$/mo
Volume Charge											
1+ gal	6.45	6.65	6.85	7.10	7.20	7.40	7.60	7.75	7.85	7.95	\$/1000gal
Industrial											
Base Rate	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	\$/mo
Volume Charge											
1+ gal	7.65	7.80	7.95	8.15	8.35	8.55	8.75	8.95	9.15	9.35	\$/1000gal

Table 6. Example table of revenue and expense projections based on proposed rates

Revenue and Expense Projections - Proposed Rates												
	Base Year FY(0)	Multiplier	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)
Sales Revenue												
Residential												
No. Users	596	-0.5	593	590	587	584	581	578	575	573	570	567
Block 1 Volume (kgal/mo)	1,300	-2.0	1,274	1,249	1,224	1,199	1,175	1,152	1,129	1,106	1,084	1,062
Block 2 Volume (kgal/mo)	780	-2.5	761	741	723	705	687	670	653	637	621	606
Block 3 Volume (kgal/mo)	480	-3.0	466	452	438	425	412	400	388	376	365	354
Commercial												
No. Users	9	0.0	9	9	9	9	9	9	9	9	9	9
Volume (kgal/mo)	260	0.0	260	260	260	260	260	260	260	260	260	260
Industrial												
No. Users	1	0.0	1	1	1	1	1	1	1	1	1	1
Volume (kgal/mo)	470	0.0	470	470	470	470	470	470	470	470	470	470
Sales Revenue Totals	\$410,790		\$426,097	\$437,791	\$445,853	\$454,601	\$466,179	\$473,871	\$481,406	\$492,179	\$498,653	\$505,013
Fees, Charges, Other Income												
Tap Fees	\$1,200	0.0	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200	\$1,200
Late/Reconnect Fees	\$4,680	0.0	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680	\$4,680
Interest	\$280	0.0	\$280	\$280	\$280	\$280	\$280	\$280	\$280	\$280	\$280	\$280
Other	\$70	0.0	\$70	\$70	\$70	\$70	\$70	\$70	\$70	\$70	\$70	\$70
Total Annual Revenue	\$417,020		\$432,327	\$444,021	\$452,083	\$460,831	\$472,409	\$480,101	\$487,636	\$498,409	\$504,883	\$511,243
Operating Expenses												
Salaries and Benefits	\$84,200	7.0	\$90,094	\$96,401	\$103,149	\$110,369	\$118,095	\$126,361	\$135,207	\$144,671	\$154,798	\$165,634
Contract Labor	\$7,700	2.0	\$7,854	\$8,011	\$8,171	\$8,335	\$8,501	\$8,671	\$8,845	\$9,022	\$9,202	\$9,386
Electricity	\$19,000	3.5	\$19,665	\$20,353	\$21,066	\$21,803	\$22,566	\$23,356	\$24,173	\$25,019	\$25,895	\$26,801
Insurance	\$3,600	3.0	\$3,708	\$3,819	\$3,934	\$4,052	\$4,173	\$4,299	\$4,428	\$4,560	\$4,697	\$4,838
Chemicals	\$9,300	6.0	\$9,858	\$10,449	\$11,076	\$11,741	\$12,445	\$13,192	\$13,984	\$14,823	\$15,712	\$16,655
Repair/Maintenance	\$15,600	5.0	\$16,380	\$17,199	\$18,059	\$18,962	\$19,910	\$20,905	\$21,951	\$23,048	\$24,201	\$25,411
Phone and Internet	\$1,400	8.0	\$1,512	\$1,633	\$1,764	\$1,905	\$2,057	\$2,222	\$2,399	\$2,591	\$2,799	\$3,022
Legal and Accounting	\$3,700	4.0	\$3,848	\$4,002	\$4,162	\$4,328	\$4,502	\$4,682	\$4,869	\$5,064	\$5,266	\$5,477
Testing	\$2,400	5.0	\$2,520	\$2,646	\$2,778	\$2,917	\$3,063	\$3,216	\$3,377	\$3,546	\$3,723	\$3,909
Training and Development	\$2,200	12.0	\$2,464	\$2,760	\$3,091	\$3,462	\$3,877	\$4,342	\$4,863	\$5,447	\$6,101	\$6,833
Office Expenses	\$790	2.0	\$806	\$822	\$838	\$855	\$872	\$890	\$907	\$926	\$944	\$963
Fuel and Truck Expense	\$2,600	8.0	\$2,808	\$3,033	\$3,275	\$3,537	\$3,820	\$4,126	\$4,456	\$4,812	\$5,197	\$5,613
Operating Expenses Totals	\$152,490		\$161,517	\$171,128	\$181,363	\$192,266	\$203,883	\$216,263	\$229,459	\$243,530	\$258,536	\$274,543
Capital Expenses												
Replace Pump at Station #2	\$145,000											
Replace MH#17			\$60,000									
Generator PS #4				\$55,000								
Replace Well #2 Pump					\$75,000							
Slipline Mainstreet Sewer							\$185,000					
Replace Utility Truck								\$55,000				
Replace First Ave Water Main										\$320,000		
From Capital Reserve			-\$40,000	-\$40,000	-\$60,000		-\$185,000		-\$55,000		-\$320,000	
Reserve Contributions												
Capital Reserve	\$0		\$25,000	\$25,000	\$85,000	\$100,000	\$120,000	\$120,000	\$120,000	\$120,000	\$160,000	\$160,000
Operations Reserve	\$0		\$2,000	\$2,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
Debt Service (P&I)												
USDA Loan 2004	\$95,000		\$95,000	\$95,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
NC SRF Loan 2013	\$135,000		\$135,000	\$135,000	\$135,000	\$135,000	\$135,000	\$135,000	\$135,000	\$135,000	\$0	\$0
Total Annual Expenses	\$527,490		\$438,517	\$443,128	\$426,363	\$437,266	\$468,883	\$481,263	\$494,459	\$508,530	\$428,536	\$444,543

Table 7. Example table of revenue requirements analysis based on proposed rates

Revenue Requirements Analysis - Proposed Rates											
	Base Year FY(0)	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)
Total Revenue	\$417,020	\$432,327	\$444,021	\$452,083	\$460,831	\$472,409	\$480,101	\$487,636	\$498,409	\$504,883	\$511,243
Total Expenses	\$527,490	\$438,517	\$443,128	\$426,363	\$437,266	\$468,883	\$481,263	\$494,459	\$508,530	\$428,536	\$444,543
Net Surplus (Deficit)	(\$110,470)	(\$6,189)	\$893	\$25,720	\$23,565	\$3,526	(\$1,162)	(\$6,823)	(\$10,121)	\$76,347	\$66,699
	Base Year FY(0)	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)
Starting Fund Balance	\$149,000	\$8,530	\$2,341	\$3,234	\$28,953	\$52,518	\$56,044	\$54,882	\$48,059	\$37,939	\$114,286
Net Operating Gain (loss)	(\$110,470)	(\$6,189)	\$893	\$25,720	\$23,565	\$3,526	(\$1,162)	(\$6,823)	(\$10,121)	\$76,347	\$66,699
Ending Fund Balance	\$38,530	\$2,341	\$3,234	\$28,953	\$52,518	\$56,044	\$54,882	\$48,059	\$37,939	\$114,286	\$180,985
	Base Year FY(0)	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)
Starting Capital Reserve Balance	\$0	\$30,000	\$15,000	\$0	\$25,000	\$125,000	\$60,000	\$180,000	\$245,000	\$365,000	\$205,000
Contributions	\$0	\$25,000	\$25,000	\$85,000	\$100,000	\$120,000	\$120,000	\$120,000	\$120,000	\$160,000	\$160,000
Distributions	\$0	(\$40,000)	(\$40,000)	(\$60,000)	\$0	(\$185,000)	\$0	(\$55,000)	\$0	(\$320,000)	\$0
Ending Capital Reserve Balance	\$0	\$15,000	\$0	\$25,000	\$125,000	\$60,000	\$180,000	\$245,000	\$365,000	\$205,000	\$365,000
	Base Year FY(0)	FY(+1)	FY(+2)	FY(+3)	FY(+4)	FY(+5)	FY(+6)	FY(+7)	FY(+8)	FY(+9)	FY(+10)
Starting Operating Reserve Balance	\$0	\$0	\$2,000	\$4,000	\$14,000	\$24,000	\$34,000	\$44,000	\$54,000	\$64,000	\$74,000
Contributions	\$0	\$2,000	\$2,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
Distributions	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ending Operating Reserve Balance	\$0	\$2,000	\$4,000	\$14,000	\$24,000	\$34,000	\$44,000	\$54,000	\$64,000	\$74,000	\$84,000

Note: At end of Base Year FY(0) \$30,000 was transferred from the Fund Balance to the Capital Reserve Account.

3.6. Customer comparison tables and analysis

Once the finances have been calculated for the various rate scenarios proposed, it is important to look at the impact of different proposed rate scenarios on the customers compared to the current rates. The following paragraphs detail minimum and recommended analyses of customer impact that should be included in the rate study.

At a minimum, **a customer comparison table must be created based on consumption data by an average customer from at least every customer classification** (it is recommended to include a low, medium, and high usage rate for the residential classification). It should show the usage volume and what an estimated monthly bill for each of the customers would be for the current rates and each proposed alternative rate.

The rate study must show what the average monthly customer bill is projected to be.

If the utility has several volumetric blocks in the residential classification, and if information is readily available for the number of customers related to each block, it is recommended (but not required) that an additional customer impact table be created that shows

how many customers are in each usage band, and how much each would pay based on each proposed alternative rate.

Additionally, if the utility has different classifications of water/wastewater users, it is recommended (but not required) that an additional usage/cost comparison be completed. The table would have the number of users per classification, the volumetric usage per classification (how much system demand per classification), and how much revenue is generated by sales to each classification (example in **Table 8**). The results of this table can be shown graphically in pie charts as well (examples are provided in **Figure 1**).

Again, please refer to NCGS [§ 160A-314](#) and [§ 153A-277](#) when analyzing proposed rates developed as part of this process, and how they are applied to customer classifications. They must be applied based on the cost of service to customer classifications, not specific customer characteristics.

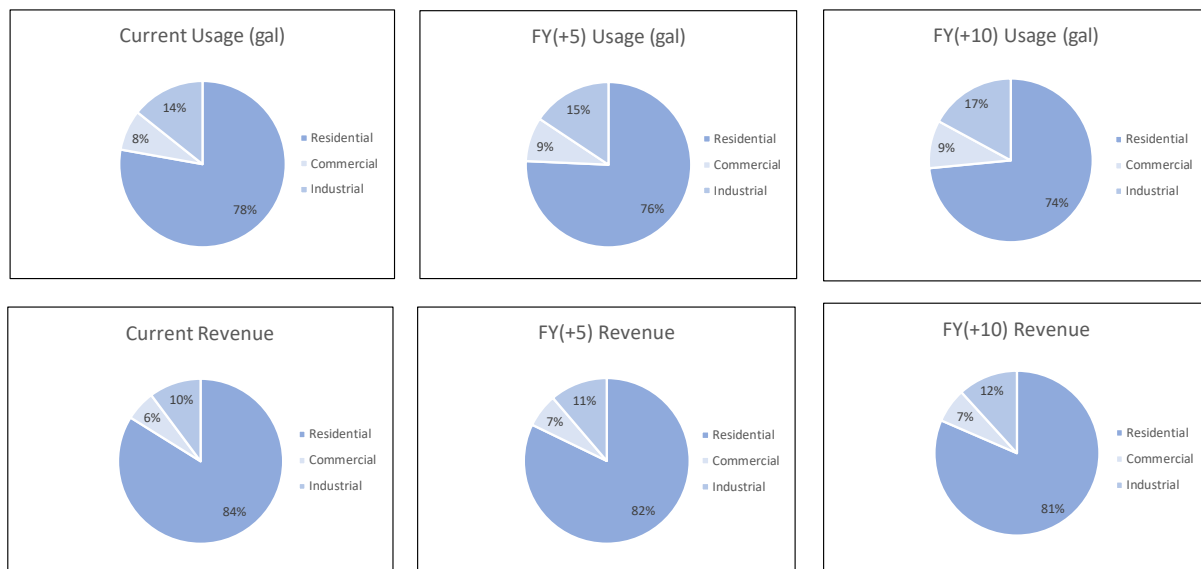
Once new proposed rates and estimated typical monthly bills are available, they can be checked for affordability. There are several measures of affordability that were discussed in Section 2.6.1 above, but as noted in that section, be careful when comparing rates to other utilities. Each LGU has unique circumstances. It is best to compare your existing and proposed rates to state averages or groupings of similar utilities rather than single utilities.

An example table providing current and proposed monthly customer bills (**Table 8**), and some charts comparing current and proposed customer classification usage and revenue contributions, are provided below (**Figure 1**).

Table 8. Example table of average monthly customer bills at current and proposed rates

Average Monthly Customer Bill - Current and Proposed Rates								
	Monthly Usage	Current Monthly Bill	FY(+1) Monthly Bill	% Increase	FY(+5) Monthly Bill	Average Annual % Increase	FY(+10) Monthly Bill	Average Annual % Increase
Average Residential Customer (low flow)	2,000	\$34.00	\$35.60	4.7%	\$41.00	4.1%	\$47.00	3.8%
Average Residential Customer (med flow)	5,000	\$48.75	\$50.80	4.2%	\$57.50	3.6%	\$65.00	3.3%
Average Residential Customer (high flow)	8,000	\$69.00	\$72.20	4.6%	\$82.20	3.8%	\$93.30	3.5%
Average Commercial Customer	30,000	\$232.50	\$240.50	3.4%	\$274.00	3.6%	\$307.50	3.2%
Industry XYZ	470,000	\$3,487.50	\$3,695.50	6.0%	\$4,104.50	3.5%	\$4,674.50	3.4%

Figure 1. Example pie charts for current and projected (5 and 10 years into the future) usage (in gallons) and revenue by customer classification (residential, commercial, industrial)



3.7. Supporting documentation

Those who read the rate study document, both now and in the future, should be able to understand where the numbers used in the rate study calculations were obtained, and how they were calculated. To accomplish this, it is required that supporting documents be provided, either within the rate study report or in an appendix. Below is a list of the minimum supporting documents required with the rate study document:

- Current number of customers per classification and usage block
- Flow data (billed volumes per customer classification) for the previous year (three years recommended)
- Current rate sheet covering all classifications (residential, commercial, industrial, irrigation, etc.), all blocks, and for in-town and out-of-town customers
- Income and expense actuals (not budgetary values) for the previous year (three years recommended) based on audited financial statements.

- Approved 10-year (minimum) CIP
- Current cash position (fund balance with reserves), as well as reserve policies if they exist (can also provide recent accountant's calculation for depreciation, if reserve contributions are based on that)
- Debt service table covering at least the rate study planning period, as well as actual debt agreement documents

3.8. Other matters

If applicable, and if not addressed in the previous sections of this guidance document, include any relevant additional information on other matters identified by SWIA or the LGC in an additional section of the rate study. This additional section may be useful for distressed LGUs designated under Identification Criterion 4 ("D4"), as described in Section 1.3 above.

4. Documentation process

The Division's role is to assist distressed LGUs with development of a rate study and to review completed rate studies to ensure those rate studies comply with the minimum requirements set by SWIA and the LGC as presented in this document (Section 3). The goal is to ensure that the rate study provides an accurate analysis of the utility's financial projections and recommends a rate that is projected to move the utility down the path towards viability.

The LGU should utilize this guidance document to prepare the rate study. In general, the rate study should contain all information and analysis included in Section 3. For questions about this guidance document or for LGUs that wish to modify the recommended structure, please contact [Division VU staff](#).

4.1. LGU requirements

The study results and rate recommendations must be presented to the LGU's governing board, and the board shall take action to accept the report.

The goal is to have the utility's staff and management actively engaged in the rate study process. To accomplish this, the LGU shall assign and provide lead staff for the rate study (e.g., Utility Director, Town Manager or Administrator, Financial Director or Officer, ORC). In addition, the study results and rate recommendations must be presented to the LGU's

governing board at the end of the rate study process. After the presentation, the LGU's governing board shall take action to accept the report and shall consider the rate study results and recommendations.

4.2. Submittal requirements

A draft rate study should be submitted to the Division when available, and the final rate study shall be submitted to the Division in PDF format. The LGU must also submit to the Division approved meeting minutes from the meeting where the rate study was presented and the governing board discussed and/or took action on the rates, or a resolution showing the rate study was presented and accepted.

The final rate study document, as well as documentation showing the study was presented and acted upon, shall be submitted to the Division.

4.3. Review and approval process

4.3.1. Division review and comments

Upon receipt of the rate study, the Division will review it and provide comments as needed. The comments will be mailed or emailed to the LGU and to the person(s) involved in completing the rate study. Comments may request additional information from the LGU, and staff may schedule a conference call with the LGU and other person(s) involved in the preparation of the rate study to address any questions and missing information.

The Division will review the LGU's rate study to ensure that the document meets the minimum requirements set by SWIA and the LGC.

4.3.2. LGU's response to comments

If necessary, the LGU will respond to the Division's comments and requests for additional information.

4.3.3. Completion of the rate study

The Division will review the LGU's revised rate study to ensure that the document meets the minimum requirements set by SWIA and the LGC, and will notify the LGU that it is complete and meets the requirements.

5. Additional resources

5.1. Knowledge resources

Helpful online references that may provide more comprehensive, step-by-step guidance or more information on considerations when performing a rate study include:

- “Formulate Great Rates” by the Rural Community Assistance Partnership
https://www.rcap.org/wp-content/uploads/2021/09/RCAP_RatesGuide-2021-FIN-LO.pdf
- “Setting Small Drinking Water System Rates for a Sustainable Future” by the U.S. Environmental Protection Agency (EPA)
<https://www.epa.gov/sites/default/files/2015-04/documents/epa816r05006.pdf>
- “Building Better Water Rates for an Uncertain World” by the Alliance for Water Efficiency
https://www.allianceforwaterefficiency.org/sites/default/files/assets/AWE_Building%20Better%20Water%20Rates%20for%20an%20Uncertain%20World_Final_0.pdf

5.2. Funding resources

Funding is available to complete a rate study as well as many of the support documents listed in this guidance. NCGS § [159G-34.5](#) defines several grants that are available from the Viable Utility Reserve to assist LGUs with studies to help them achieve financial viability. Those grants are defined below, and more information is available at the Division’s “I Need Funding” website (<https://www.deq.nc.gov/about/divisions/water-infrastructure/i-need-funding>).

- *Asset inventory and assessment (AIA) and rate study grant*: The AIA (and rate study) grant is available to inventory the existing public water or wastewater system (or both), document the condition of the inventoried infrastructure, develop an AMP, a CIP, and conduct a rate study.
- *Merger/regionalization feasibility (MRF) grant*: The MRF grant is available to study the feasibility of consolidating the management of multiple water or wastewater systems into a single operation and/or to provide regional treatment or water supply and the best way of carrying out the consolidation or regionalization. This work can include conducting rate studies for the merger/regionalization partners.
- *Project grant*: Typically these fund all or a portion of the utility’s construction projects, but may also include any other projects that meet the requirements of NCGS § [159G-32\(d\)](#), which could include a rate study.

5.3. Resource agencies

There are many resource agencies in North Carolina that are available to provide assistance to LGUs not only with rate studies, but also with finances, operations, water audits, I&I studies, AIA/AMP studies, etc. A list of the more active resource agencies and their websites is provided below.

- NC League of Municipalities (NCLM)
<https://www.nclm.org/>
 - NC Local Government Commission (LGC) (NC Dept of State Treasurer)
<https://www.nctreasurer.com/divisions/state-and-local-government-finance/local-government-commission>
 - NC Regional Councils of Government (COGs)
<https://ncarcog.org/regional-councils/>
 - NC Rural Water Association (RWA)
<https://www.ncrwa.org/>
 - Southeast Rural Community Assistance Project, Inc. (SERCAP)
<https://sercap.org/>
 - UNC Environmental Finance Center (UNC EFC)
<https://efc.sog.unc.edu/>
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