Asset Management Plan

Holden Beach Water and Sewer System

2024

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EXECUTIVE SUMMARY

This Asset Management Plan is developed for the Holden Beach Water System and provides the overall inventory of the assets in the system, the condition of infrastructure of the system, a look at future development through a Capital Improvements Plan (CIP), and a detailed description of the Operation and Maintenance of the existing infrastructure. The goal is to have a well-maintained and reliable water system for all customers now and in the future.

The plan has the following breakouts and direction:

- Increase the knowledge and overall understanding of the system by the Town and its users, including field staff who maintain the system daily.
- Provide overall asset listing for major items within the water system.
- Communicate and show how the assets were rated and the current conditions of the assets.
- Proactively plan for replacement and upgrades to equipment before the end of infrastructure life cycles.
- Provide a management roadmap and direction for the Town's employees and Council to plan for needed financial investment and rates for the service.

Asset Management Plan

Holden Beach Water and Sewer System

2024

1. INTRODUCTION

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This Asset Management Plan is developed for the Holden Beach Water System and provides the overall inventory of the system, the condition of the system, a look at future development through a Capital Improvements Plan (CIP), and a detailed description of the Operation and Maintenance of the existing infrastructure.

The plan has the following breakouts:

- Utility Overview: Increase the knowledge and overall understanding of the system by the Town and its users.
- Utility Assessment: Communicate and justify funding requirements for current and future projects and purchases.
- Capital Improvement Plan (CIP): Provide a management roadmap and direction for the Town's employees and Council.
- Operation and Maintenance (O&M) Strategy and Plan: Demonstrate responsible management of the Town's infrastructure, equipment, and components.

The purposes listed above are to help the Town develop, maintain, and continue to build a better water system in the most cost-effective way. This helps to keep the maintenance costs low, which will also keep the utility rates low for the customers and all stakeholders and reduce disruptions of service.

1.1. Holden Beach "About Us" Statement

NATIONALLY RECOGNIZED AS ONE OF THE PREMIER "FAMILY BEACHES" IN THE UNITED STATES. HOLDEN BEACH IS PROUD OF WHAT WE DO NOT HAVE. WE ARE PRIMARILY A RESIDENTIAL COMMUNITY, WITH A SMALL COMMERCIAL AREA. HOLDEN BEACH IS A GREAT PLACE TO RELAX, ENJOY THE BEACH AND THE NATURAL WILDLIFE THAT SURROUNDS US. CLEAN WATER, BLUE SKIES AND LOTS OF FAMILY FUN. COME EXPERIENCE IT FOR YOURSELF!

Safe, Clean, Reliable water and wastewater service is critical to families relaxing and having fun.

2. UTILITY OVERVIEW

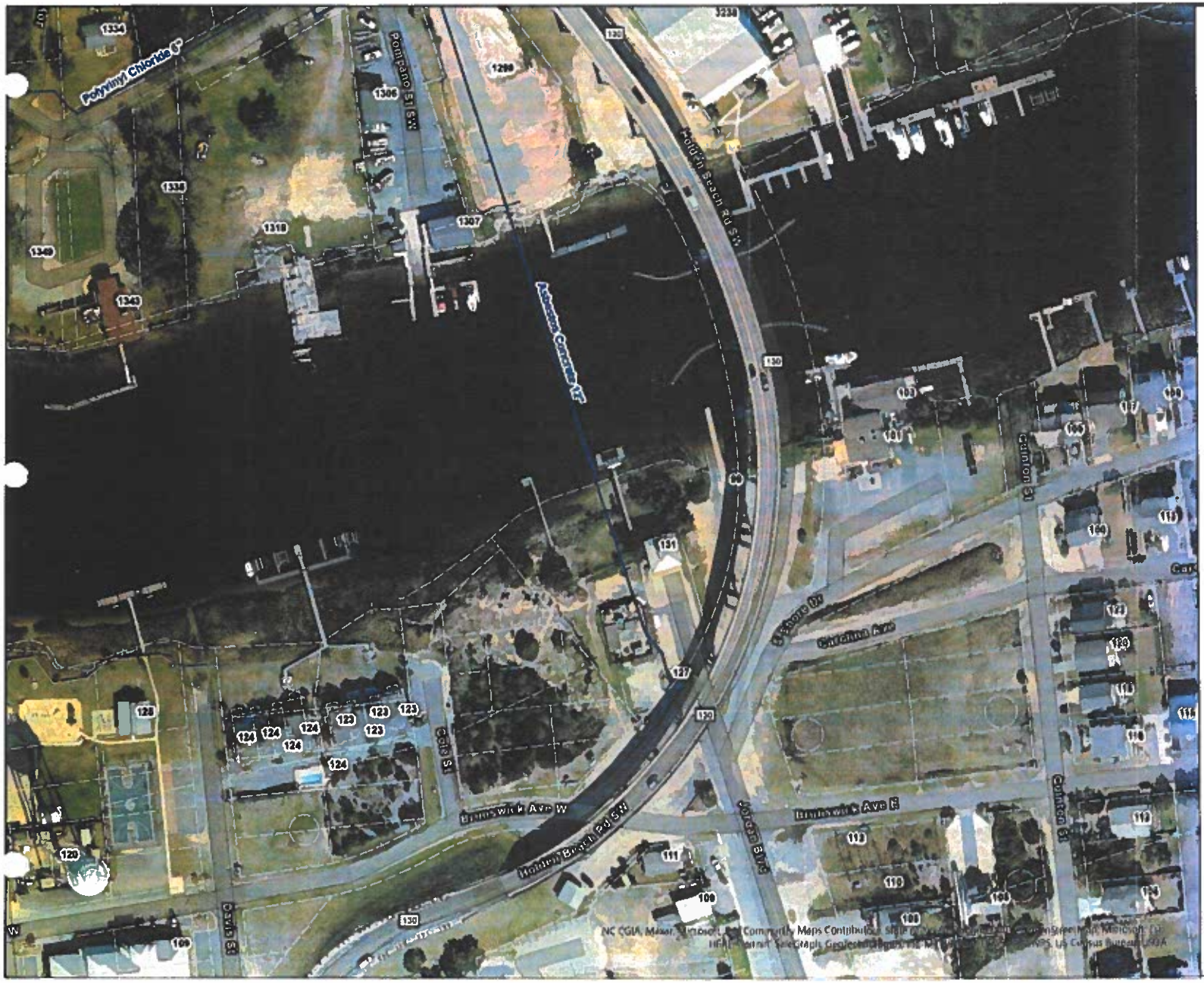
2. UTILITY OVERVIEW

Holden Beach is in southeastern North Carolina. The Town consists of 3.4 square miles (0.7 square miles of this water) with a population (per the 2020 US Census) of 921, but the population swells to 6,579 in the summer months. The Town provides both water and sewer service to their customers. Water is distributed through 22.32 miles of piping ranging from 1-12 inch. There are 3,270 water services. The Town has 1 elevated storage tank holding a maximum of 300,000 gallons and has 2–12-inch major transmission supply lines at Seagull Drive Inland Waterway Crossing and at NC 130 (near the bridge). Water treatment is provided by Brunswick County. The contract is for a maximum of 1.8 MGD and expires in 2061. The Average daily water use was 0.473 MGD and had a maximum daily demand of 1.05 MGD in 2022. **See Table 3-1**

2.1 UTILITY OVERVIEW APPENDIX MAPS AND SPREADSHEETS

A Complete Survey grade GIS file was sent to the Town of Holden Beach for all of their existing assets. On November 3, 2023, all the Utility staff were trained using Leica Zeno FLX100 Plus antenna, Leica Zeno Mobile Application on the Tablet, utilizing the database created by Green engineering from ArcMap. With this simple system they can locate exactly any of their assets within their system. This is particularly important during storm events when horizontal assets may be covered with sand during over wash of the island.

GIS maps were also provided as a back-up are in a bound ring binder entitled **"Asset Inventory Maps Holden Beach Public Works".** It shows all the assets in the system including all water valves, all sewer valves, all fire hydrants, all ss valve pits (vacuum sewer system), Water Meters, Blow-offs, Drop Inlets, 1–12-inch water mains by material (AC, PVC, Ductile), 6-10 inch Force Mains between pump stations and from the island to Brunswick County, all 4-10 inch vacuum sewer, and all combo vacuum / sewer pumping stations.



Brunswick County Public Utilities

Water Service (East)
Town of Holden Beach
Requested by
Rodney Tart - Green Engineering
2/27/2023

Legend

— Water Main

0 100 200 Feet

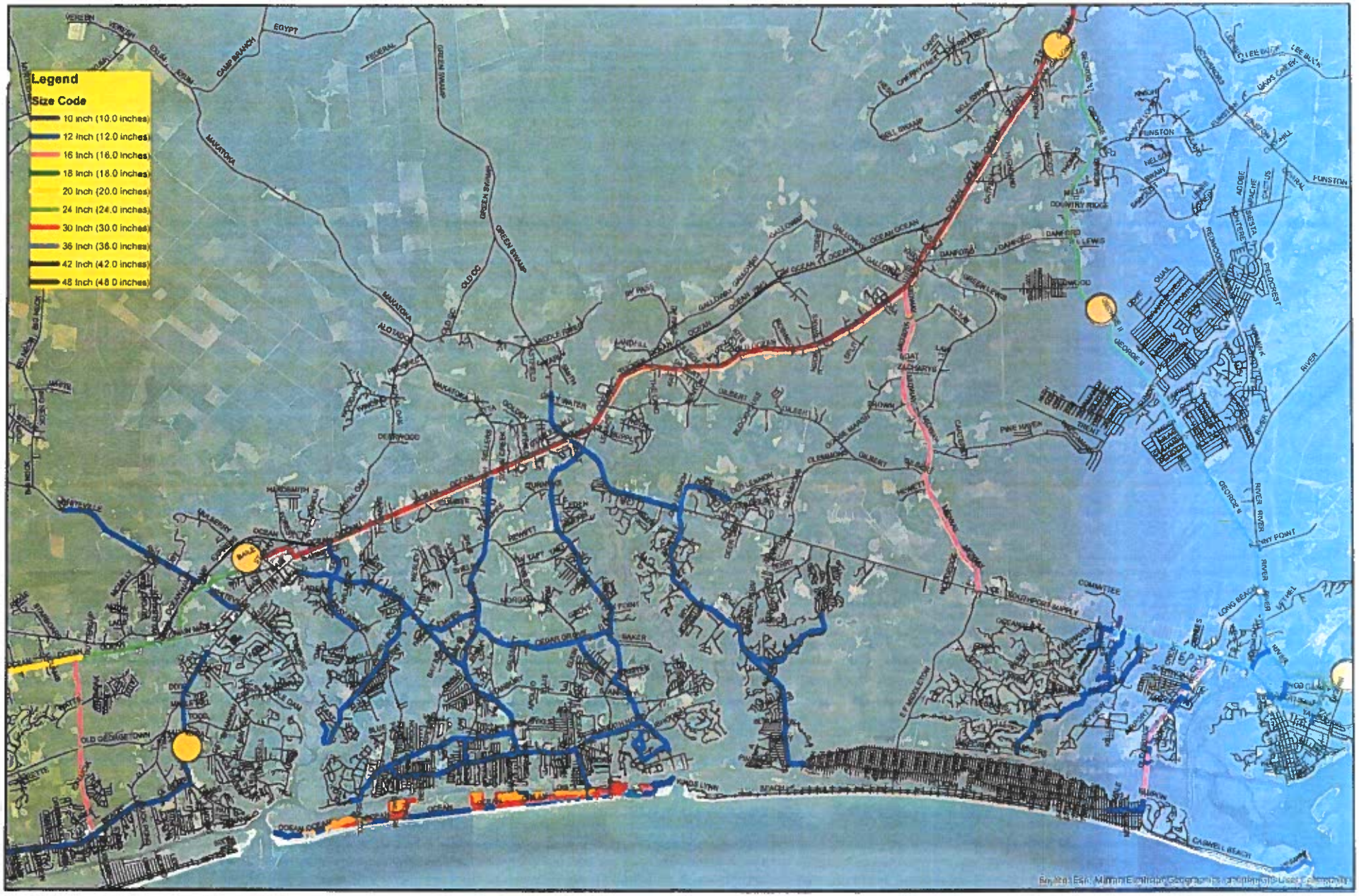
N
W E
S

Brunswick County Public Utilities

Water Service (West)
Town of Holden Beach
Requested by
Rodney Tart - Green Engineering
2/27/2023

Legend

- Water Main
- As Built Index



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2.2 UTILITY FACILITIES

Holden Beach has their main maintenance facility for their Utility Operations off the island on the mainland at their Emergency Operations Center located at 1044 Sabbath Home Road, Supply, NC. This is where they store almost all necessary repair parts and piping. They have a well-stocked inventory of all materials necessary for almost any repair for their horizontal and vertical assets including vacuum pumps and transfer FM pumps. The remainder of their operations are out of their Town Hall located at 112 Rothschild Street Holden Beach, NC. This is a modern well-equipped facility. They use the elevated tank site and the wastewater vacuum and pumping stations as storage sites for some equipment, but they are very limited for space.

3. WATER SYSTEM

3 WATER SYSTEM

Table 3-1 Holden Beach Water System Overview

Category	Description
Water Facilities	
Operations Warehouse	1044 Sabbath Home Road, Supply, NC.
Billing Office	112 Rothschild Street Holden Beach, NC
Distribution System	
Residential Connections	3,260 (survey) / 3,173 WSP 2022
Commercial Connections	None Identified as such
Main Transmission Connections	2- 12 inch
Elevated Water Tank Capacity	300,000 Gallons
Ground Storage Tanks	0
Distribution Mains and Appurtenances	22.32 miles (GIS) of various sizes from 1" to 12" mains, 291 valves and 162 fire hydrants.
Water Treatment Bruns County	1.8 MGD (Max Day 58% 1.05 MGD in 2022)
Booster Pump Stations	0
Blow-offs	15
Control Systems	Radio Telemetry System with power back-up Provided by Custom Controls only EST level and Sewer PS 3&4 at this time
Water Supply Wells	0
Employees/Staff	5.25 FTEs total: 4.25 System, 1 Business Office and Customer Service
Miscellaneous Equipment	2019 Vac-Con, 2014 CAT Backhoe, 2016 Mini Excavators, Dump Truck from PS (shared), 2 Godwin CD150 Water Pumps, 5 F-150 Crew Trucks

Radio Telemetry

3.1 Distribution Mains and Appurtenances

The existing distribution system is composed of approximately 22.32 miles of water lines ranging in size from 1-inch to 12-inch mains. As part of the AIA process the town now has every asset geolocated in a GIS database for the system. A large portion of the system was constructed in 1977. The larger mains installed at that time were Asbestos Cement for lines 4 inches and above in diameter. Crosslines on DOT roads were to be DI and 2 inch, and 1-inch lines were constructed of PVC. 2-inch lines were encased in steel under DOT roads. Service lines from the main to the meter base are polyethylene. Holden Beach does not have a GIS Department: updates are being recorded and kept for future updates by their Engineer of Choice or by Brunswick County. The 12-inch HDPE transmission lines from Brunswick County at NC130 near the bridge, and the 8-inch HDPE crossing to 12 inch PVC main on Sea Gull Drive are the only sources of water for the Town.

There are 126 valves for shutting off water service, ranging from 1-inch through 12-inch, with 15 dead-end blow offs, and 162 fire hydrants. Valve sizes were not collected for survey, but valves on any size line should be the same as the pipe unless they are for a hydrant leg or a lateral feed. The overall pipe length totals in miles and percent of the entire system are condensed into **Table 3-1.1, and Hydrants, Valves, Blow-Offs and Meters are in Table 3-1.2.**

Table 3-1.1 Overview of Pipes (Horizontal Assets) in Holden Beach Water System

Pipe Size	Holden Beach Totals (Miles)	Percent of System
1"	0.07	0.3%
2"	3.42	15.3%
4"	0.29	1.3%
6"	9.48	42.5%
8"	0.29	1.3%
10"	0	0%
12"	8.77	39.3%
Total	22.32	100%

Table 3-1.2 Overview of other Water (Horizontal Assets) in Holden Beach Water System

Hydrants, Valves, Blow-Offs, Meters	Total Number	Per 1000 feet of System
Hydrants	162	1.37 Avg every 730 ft)
Valves	291	2.47 (w/ hydrant valves)
Blow-Offs	15	0.13
Meters	3,260	27.7

Table 3.1.3 Holden Beach Meter Count by Size

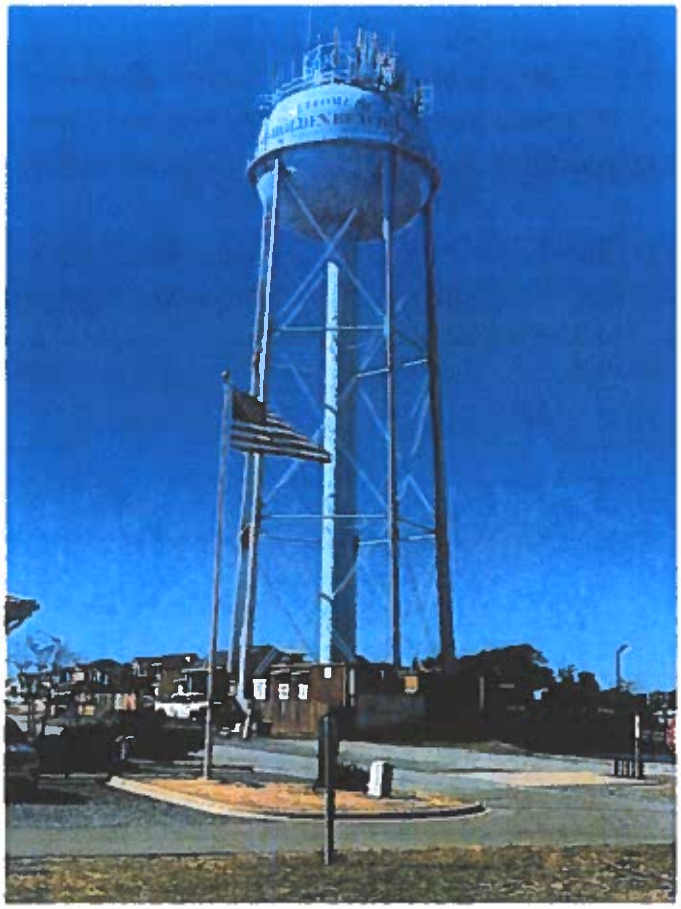
Count of METER Type	
METER Type	Total
1 Inch	34
2 Inch	4
3/4 Inch	3360
Grand Total	3398

3.2 Elevated Storage Tank and Water Supply

The Holden Beach Water System has one elevated water storage tank with a capacity of 300,000 gallons. **Table 3-2** shows the tank location, overflow elevation, and range.

Table 3-2. Water Storage Tank Information Built in 1978

Facility	Address	Capacity (gallons)	Footing Elevation (ft)	Height to Overflow (ft)	Overflow Elevation (ft)	Tank Range (ft)
Tank 1	Brunswick Ave W. Holden Beach, NC	300,000	13.0	155.0	168.0	28.0
Tank 2 Future	Possible Future					



Current Water Demand and Storage:

Based upon the average daily water demand for 2022 of approximately 0.473 million gallons per day (LWSP), the system has just over a 15-hour supply if the tank was completely full and both transmission lines failed. There would only be a 6.9-hour supply on a maximum demand day. This amount of storage is adequate as the minimum state standards under **15A NCAC 18C 0805(c)** for all water systems is one half day's supply on an average day, but does not meet the standard if the Town wishes to meet the requirement on a peak demand day. Holden Beach is also unique when compared to other communities as the maximum daily water demand in the summer versus the minimum monthly average water demand in the winter is 6 times greater. (1.05 MGD versus 0.1733 MGD) And the monthly maximum is 4.8 times the monthly minimum (0.834 MGD versus 0.1733 MGD). Small towns of this size typically have a ratio of less than 2 times greater maximum month to minimum monthly average. The very large swing in water demand which occurs seasonally must be considered when planning for infrastructure size, including water storage.

Growth and Population Projections:

Based on current property maps for the Town of Holden Beach, approximately 22% of the island is open for development. In addition, many of the properties which are being redeveloped are much larger than the original houses on the property, and irrigation is more prevalent than even 20 years ago, placing additional demands on the water system. State DWR growth projections for Holden Beach currently show an 8% increase in water demand by 2030, a 19% growth in water demand by 2040, and a 30% increase in water demand by 2050. Based on these numbers, by 2050 the current elevated tank will only supply 5.3 hours of water on a peak demand day and 11.7 hours on an average day assuming both water lines failed from Brunswick County. **This will not meet the state recommended 12 hours of storage for an average demand day in 2046. See Chart 3.2.** On a maximum demand day, the town will only have a 6.9-hour storage capacity currently which drops to 4.8 hours by 2060. **See Chart 3.2.1.** Similar results are seen for the maximum demand monthly average. Adding a second 300,000-gallon tank increases the storage capacity to more than 12 hours through 2068 when the town should be near build-out. **See Chart 3.2.2** Another important issue is water system turnover. 72 hours is a desired tank turnover to maintain water quality. The town's minimum monthly water demands are 3 days by 2037 even with a second tank. **See Chart 3.2.3.**

Properties for Future Development Shown in Blue for Example

Chart 3.2 Growth in Average Annual Demand Exceeds State Standards in 2046

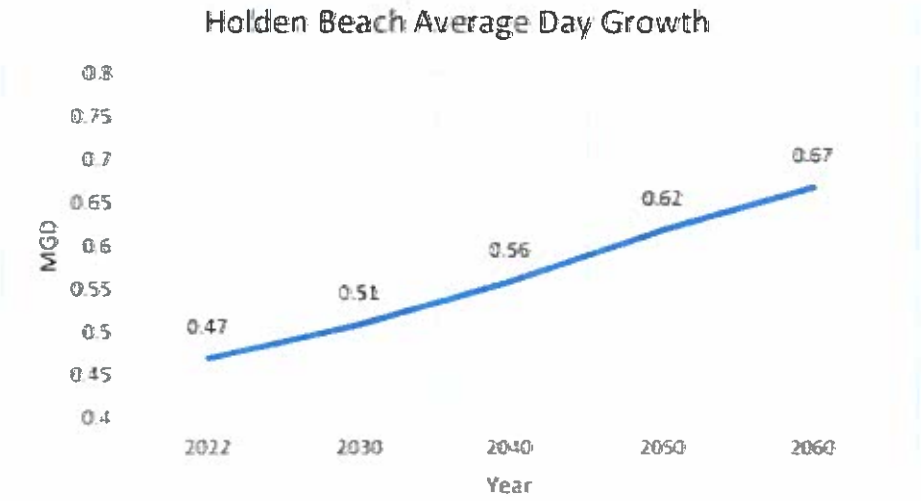


Chart 3.2.1 Current Storage 6.9 Hours Decreases to 4.8 Hours Storage

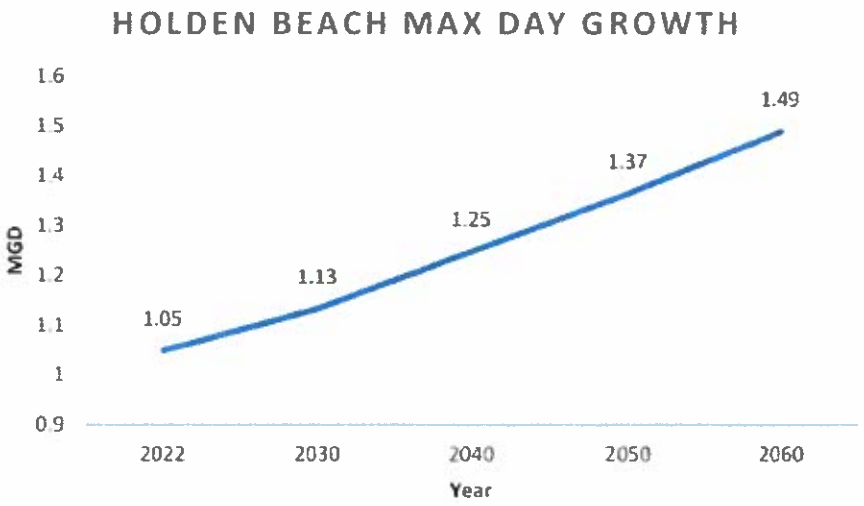


Chart 3.2.2 Current Storage 8.7 Hours Decreases to 5.7 Hours by 2070
Add Second 300,000 Gallon Tank Storage Increases to 17.3 Hours Current to 11.3 in 2070

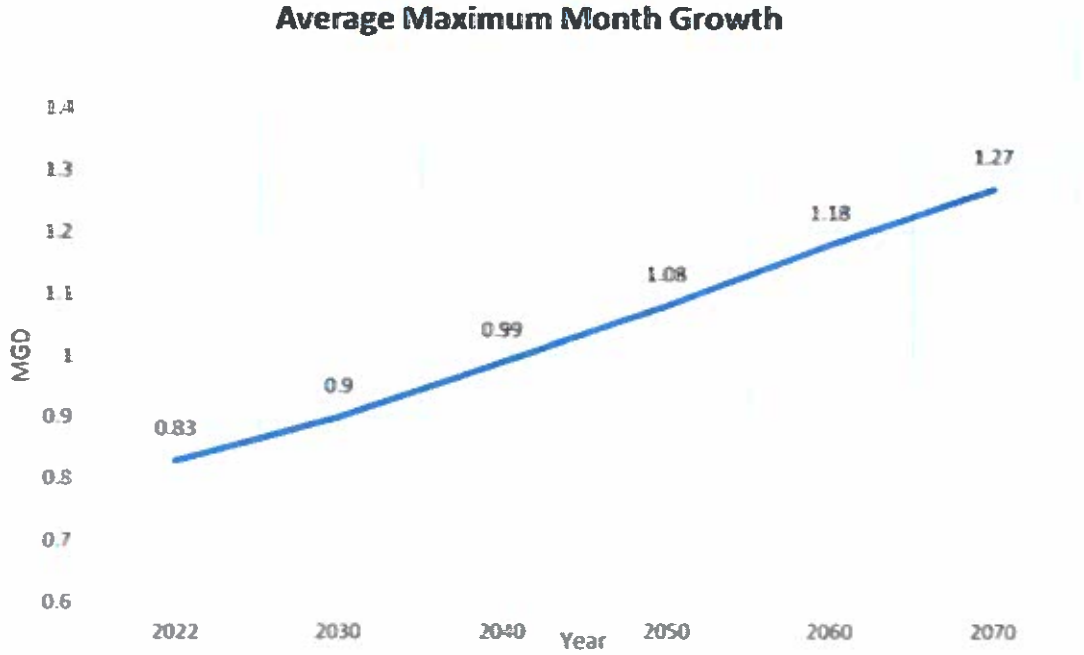
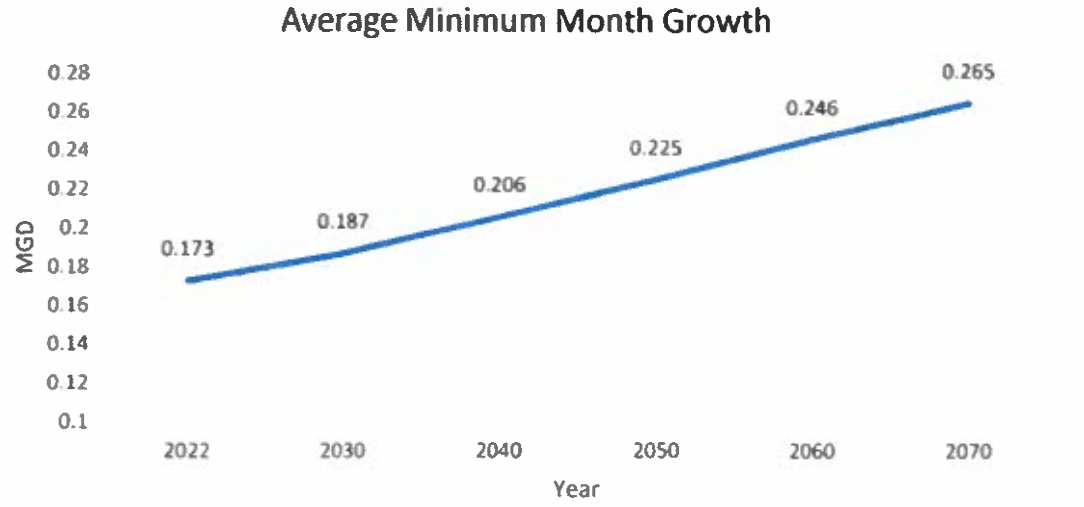


Chart 3.2.3 Current Turnover 1.7 days Decreases to 1.1 Days by 2070
Add Second 300,000 Gallon Tank Current 3.47 Days, 3 Days in 2036*
***3 Days or Less Desired**

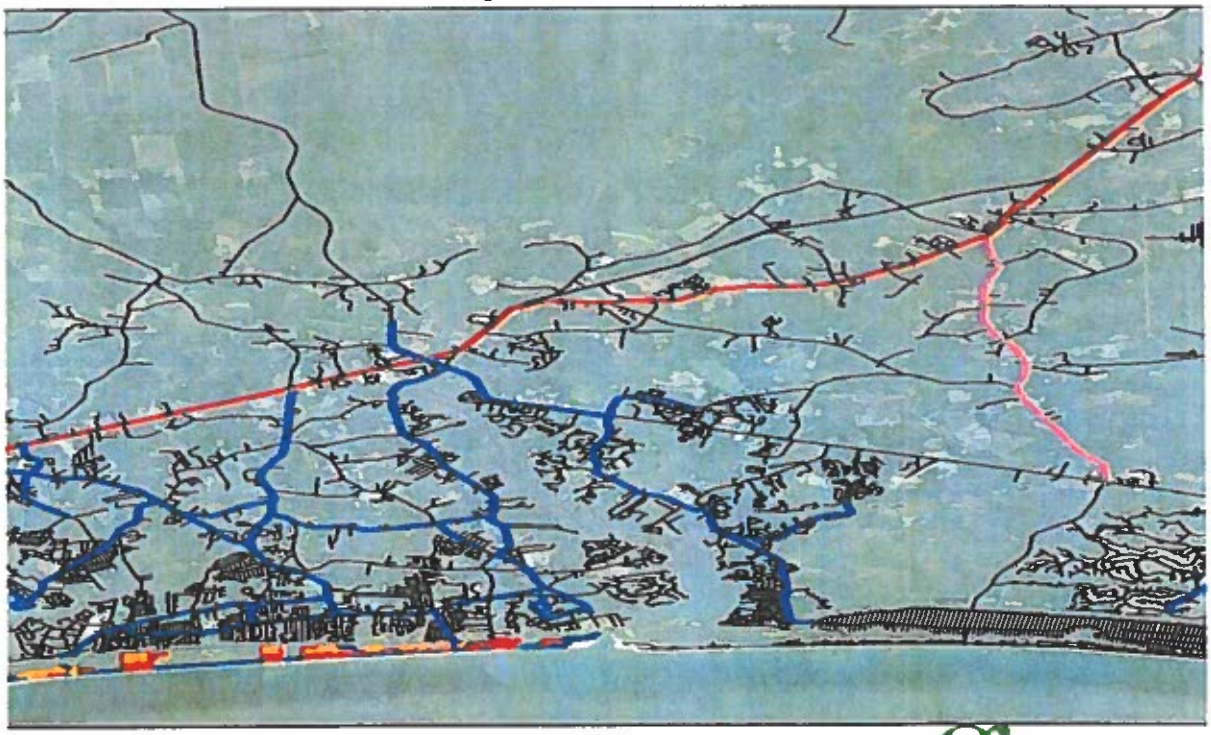


Potential for Loss of Service from Brunswick County

If any of the following occurred or a series of events occurred Holden Beach would be reliant on the elevated tank(s) alone. 1) Both supply lines (12 inch at the bridge at NC 130 and the 8-inch to 12 inch on Seagull Drive from Brunswick County failed. Upstream there is a network of 12 inch and smaller pipelines, but they all originate from one large 30-inch transmission main on US 17 which feeds from a pumping station at Bell Swamp at the 4 MG ground water storage tank 2) Brunswick County's pump station from the on-ground tanks at Bell Swamp failed, 3) The two treatment plants or their pump stations failed (they both have generator back-up). There is limited elevated storage capacity in this area of the Brunswick County Water System of 1.1 MGD total to serve from Bell Swamp to Calabash. There is more than adequate ground storage at Bell Swamp near the US 17 and NC 87 intersection near Winnabow, but the tank is 20 miles from the Shallotte elevated tank and another 9.5 miles to Holden Beach. **(See Table 3-2.2)** 4) A major leak in the Brunswick County system near the two water line feeds to Holden Beach could cause very low pressure in the supply lines.

All 4 scenarios above are unlikely to occur, but they are possible.

Red 30-inch US 17 South from Pump Station, Pink 16 in, Blue 12 in, Holden Bottom Left



The Town should also be aware that a water main break on the 12-inch AC main on Ocean Boulevard west of where the 12-inch line from Seagull enters the system would result in losing system pressure for all customers west of this location until the line was repaired or replaced. This is more than 330 customers, or more than 10% of the system. Any break on Ocean Boulevard beyond Brunswick Avenue and before Seagull, and the west end of the island can only be fed by the Seagull Drive line. **See Figure 3-3 on page 14.**

Table 3-2.2 Brunswick County Water Storage and Pump Stations Holden Beach Area

Facility	Name	Capacity (gallons)	Overflow Elevation (ft)	Distance to Elevated Tank
Ground Storage	Bell Swamp	4 MG	60	20 miles to Shallotte Elevated Storage Tank (EST), 29.5 miles to Holden Beach
Elevated Storage	Shallotte	0.3 MG	175	Supplies Shallotte area 9.5 miles to Holden Beach
"	Shallotte Point	0.3 MG	168	Supplies Ocean Isle Beach 5.0 miles to Shallotte EST
"	Sunset	0.2 MG		Supplies Sunset Beach 12.5 miles Shallotte EST
"	Calabash	0.3 MG	168	Supplies Calabash 14.25 miles to Shallotte EST
Pump Station	Bell Swamp		N/A	Pumps into 30 inch on US 17 South

Figure 3-2. Transmission Lines from Brunswick County Shown. Ocean Boulevard 12-inch Transmission Line is a single pipeline beyond Brunswick Drive. Potential tank (shown with red arrow) located on higher ground away from erosion zone for the island could supply 300+ Homes if the 12 Inch AC Pipeline on Ocean Boulevard failed west of Seagull Drive.

Photo: Francisbausch/Creative Commons

3.3 Alternatives to Mitigate Risks if the Town Desires

If Holden Beach feels that the risks mentioned in section 3-2 above are too great or they want to store additional water for high demand periods during the summer, or they want to prepare for future growth, then there are alternatives that would mitigate some of the risks for the community.

Alternative 1) There are benefits of having a second elevated water tank or water feed from the western end of the island because of Holden Beech's unique long and narrow distribution system. A second tank would of course help if the supply from Brunswick County were lost, as it would help sustain pressures and flow until the supply was restored. A second tank would help maintain pressure when the one existing tank is out of service for any reason including painting and maintenance. During a large fire event it would help to stabilize pressure as the tank would be on the island. However, Brunswick County's eastern water tanks also operate at the 168–175-foot overflow elevation **(See Table 3-2.2)** and should support Holden Beach pressure under most circumstances with only minor pressure losses. Green Engineering has completed a hydraulic model of the Holden Beach water system, and the results of the study are available in a separate report.

A second elevated tank will be needed before 2046 based on NCDWR projected growth rates for an average day's demand to meet the recommended requirements under **15A NCAC 18C 0805(c).** Another benefit of having a second tank on the western portion of the island is to maintain water supply in that portion of Holden Beach in the event the 12-inch asbestos cement line along Ocean Boulevard West (SR116) failed anywhere west of Sea Gull Drive. (west of where the second feed from Brunswick County crosses the inland waterway) This AC pipeline which is already more than 40 years old is more likely to fail due to age and due to the fragile nature of AC pipe. However, town authorized testing of the pipeline at three locations by a company specializing in AC pipeline analysis showed the pipeline to be in good condition a few years ago. This was an excellent predictive tool for this aging pipeline, and the Town is to be commended for taking this proactive step. When the line does fail in the future, an elevated tank would keep the west end of the island supplied with water if the line could not be quickly or easily repaired. This would ensure more than 330 homes west of Seagull Drive (10% of the entire system) (some with as many as 16 bedrooms) would have water service during the repair or extended outage. If two tanks were in place, water would be fed from both the east and the far west sides of the island minimizing outages to isolated areas between valves during a main break anywhere on the island, improving reliability.

An additional tank of 300,000 gallons or more would increase the back-up water supply to almost 14 hours on the current maximum demand day when it is most needed and to almost 31 hours during an average day. This would then exceed the state recommended storage of a half day minimum storage during the whole year, including the heavy demand period of May through September. The items to be considered before adding a second tank are the cost for the tank and land (cost estimate $2.473 M) **See Table 3-3** not including land costs), cost to maintain annually, and finding a stable and safe site near the western end of the island that would be available. **It is also understood that the Town may prefer to site the second tank on land that is already owned by the town, as land at the western end of the island is not available. The second tank is currently shown to be funded in the FY32 and FY33 budgets in the CIP before the town fails to meet the state requirements for water storage, and in case water use growth exceeds current projections.**

A concern that has been expressed is that the water will not be turned over often enough during the Winter with a second tank. Based on low water flow averages in January and February of 0.2104 MGD and 0.1733 MGD, water would be turned over with the tanks completely full every 2.85 days to 3.46 days based on having two 300,000-gallon tanks, very close to the recommended 3 days for a water system. Therefore, water age should not be a great concern if the town decides to add a second 300,000-gallon tank. The town could consider performing some fire flow testing or performing unidirectional flushing during this period to increase water turnover if desired, which would improve turnover. The downside is that this water must be purchased from Brunswick County without a return in revenue from customers, so this needs to be minimized when possible.

See Table 3-3 for Cost Breakdown for Tank

Table 3-3

Construction Costs	
300,000 Elevated Tank & Altitude valve	$1,980,000.00
	$1,980,000.00
Contingency (10% of construction costs):	$198,000.00
Construction Subtotal:	**$2,178,000.00**
Engineering Costs	
Engineering Design	150,000
Permitting	1500
Land Surveying Costs	2700
Other:	
Engineering Subtotal:	***$154,200.00***
Administration Costs	
Planning (pre-construction costs)	
Easement Preparation	1,500
Engineering Report Preparation	8,500
Environmental Documentation Preparation (if applicable)	
Legal Costs	1,500
Project administration	35,000
Field Observation	90,000
Bid and Award	4,500
Administration Subtotal:	***$141,000.00***
TOTAL PROJECT COST:	**$2,473,200.00**

Alternative 2) An alternative that could be considered is a second 12-inch or 8-inch main which could be fed west down Ocean Boulevard from Seagull Drive to Skimmer Court 0.56 miles This would be tied into the 12-inch AC main at two or three places along the line to provide back-up during supply for about 2/3 of the 330 homes at the west end of the island beyond Seagull if the line along Ocean Boulevard failed.. This is a very crowded area and digging would be very impactful to both customers and staff as every water, sewer, electric, telephone, and cable line will have to be worked around. Ocean Boulevard would be impacted more than during the recent bike widening project. Because of the difficulty of construction, the cost per foot to install the pipe is much greater than an average project. Total cost estimates for the project are $600,000 to $900,000. No other benefits of an elevated tank are provided by this project and it should be considered a temporary solution as the Town will require additional storage at least in 2046. See Chart 3-2

Alternative 3) Third feed from mainland from the end of Windy Point under the inland waterway to west of Skimmer Court. Windy Point is only a 6-inch water main at the end of the street but could provide enough water for the again 2/3 of the 330+ homes. This alternative is probably not practical due to permitting and other issues to obtain a third supply to the island, and would cost more than the alternative 2 above, making it less practical. Another feed with slightly more benefit but even higher costs would be to run an 8 inch from Calvin Point near Ocean Isle Beach under the Intercoastal Waterway to the end of Ocean Boulevard. This would be very disruptive, but with the slight additional benefit of covering 100% of the west end of the island in the event of a major water line failure on Ocean Boulevard. Permits would be difficult to obtain, and cost may be prohibitive, without major additional benefit. This alternative is not practical or cost effective either and does not add the benefits of increased water storage which will be needed in the future.

Alternative 4) Install a second tank on an adjacent site now or later of 300,000 gallons capacity. The storage benefit would be the same for emergencies, but it would not protect the west end of the island from a pipe failure. There is also a limited amount of space in this area and the tank would need to be located to not block the signals from the existing mobile phone tenants. Because this is a significant source of income for the town this should be rejected. A similar option is to eventually replace the existing tank with a larger 500,000-gallon tank on the same or an adjacent site when the current tank reaches the end of its life cycle. The current elevated tank at the bridge is still in excellent condition but the Town could eventually replace the existing tank with a larger 500,000-gallon tank on the same or an adjacent site when the current tank reaches the end of its life cycle. This is rejected as a very long solution, as with proper maintenance tanks can last 100 years or more.

Alternative 5) Leave the system as is currently designed. The Town has 2–12-inch supply lines from Brunswick County (Bridge and Seagull Drive). Either supply line is large enough to supply the town by itself, so you already have redundancy of supply. Brunswick County has an adequate supply of both raw water and treated water and Holden Beach recently updated the supply contract with the County to 1.8 MGD until 2061.The max day demand was only 1.05 MGD or 58% of this volume and should be more than adequate through the contract period. See Chart 3-2.1 Brunswick County is a large and well-run water system with two large water treatment facilities and a large network of tanks and booster pump stations. While the 300,000-gallon tank is 47 years old, it has been well maintained throughout its life. You currently have a Service Contract for the elevated storage tank which handles maintenance and painting. The tank is also a source of revenue for the Town as there are currently 5 cell phone companies paying a lease for the property to place their equipment on the tank. Even though the tank only holds a little over 7 hours of water during the highest demand day, it is normally kept almost full by the Brunswick supply lines under normal circumstances. Even with the limited volume of 300,000 gallons, the tank does meet the current NCDEQ recommended 12 hours of capacity on an average day, with 15 hours storage. While it is possible for the 12-inch AC pipeline on Ocean Boulevard to fail placing customers out of water, the Public Works Department keeps a well-stocked supply of materials to fix the pipeline, hopefully limiting the time without water. The pipeline was also tested by a nationally recognized testing firm for AC pipelines, and they stated that the line had 40 more years of life expectancy just a few years ago. However, it is recommended that the town prepare to begin replacing at least portions of the line in the next few years as this 12-inch AC pipeline down Ocean Boulevard is the critical "backbone" of your water system. Staying with the current design of the system will of course cost $0, saving the funds for other needed water and wastewater projects, or not spending for the tank now will of course keep rates lower at least for now.

No matter the final decision by the Town, Alternatives one or two could be completed later if desired. Option 5 to not add a second tank would save money for other needed projects and keep rates as low as possible. Although not mentioned above because the 300,000-gallon elevated tank at the bridge is still in excellent condition could be to eventually replace the existing tank with a larger 500,000-gallon tank on an adjacent site when it reaches the end of its life cycle or as a second tank on the same site

Maintenance of the existing elevated storage tank is currently provided by Utility Service Company.

Tank location, main sizes, and pumping capacities will be evaluated as part of a hydraulic model which was created utilizing very accurate survey grade data for the water and sewer system.

Latitude and Longitude are available for all assets in the water system including valves, hydrants, and meters provided a part of the AIA. All can be Geo-located after a major storm event even if they are covered with sand or debris since Holden Beach has been provided and trained with survey GIS and Leica Zeno Mobile Devices.

3.4 Water Booster Pump Stations

There are no Booster Pump Stations controlled by the Town of Holden Beach as water is fed from Brunswick County and the system is a one pressure zone system.

3.5 Check Valve Vaults

There are no check valves as the system is in one pressure zone with one elevated tank.

3.6 Control Systems

Radio telemetry

The Holden Beach Water System water tank level is monitored by a radio telemetry system.

3.7 Water Supply Well(s) Or Treatment Plant(s)

All water is supplied by Brunswick County. The town contracts with Brunswick County for their water supply. 04-10-045. 1.8 MGD Maximum. Contract Expiration 2061. Contract is recurring.

4. WASTEWATER FACILITIES

4 WASTEWATER FACILITIES

The entire Holden Beach sewer collection system operates on the vacuum sewer principle and is divided into four (4) service areas by pump station, corresponding to Pump Stations 1 through 4. Pump Stations 2, 3, and 4 have their service areas segregated into an A zone and B zones. The A and B zones generally run one zone east and one zone west along the island. Pump Station 1 service area contains 4 zones. Zones are divided as east and west running lines, and oceanfront, versus the inland waterway side. Each zone enters the collection tank through a separate inlet pipe and isolation valve. There are a total of 21.06 miles of Vacuum Sewer Collection lines ranging in size from 4 inch to 10 inches in diameter. From the vacuum collection system, the wastewater first enters the pump stations carbon steel collection tanks. (PS1 4500 Gallons and PS2-4 3000 Gallons each) The sewage transport components at the Holden Beach pump stations are segregated into two types of systems. The first type - included at all four (4) pump stations - are sewage transfer pumps, which are connected to the collection tank. They transport the sewage from the tank to a wet well containing transfer pumps. The submersible transfer pumps are located in a wet well adjacent to the subsurface structure at Pump Stations 1 and 4. 5.25 miles of 8-inch and 10-inch PVC and HDPE force mains transport the wastewater off the island from pump stations 1 and 4 to the mainland for treatment and disposal by Brunswick County. The entire collection system and vacuum and pumping stations were put into service around 2005. The contract for treatment with Brunswick County is for 1 MGD per day and the average discharge in 2022 was 0.2752 MGD and the max flow was 0.5628 MGD. The Collection System Permit WQCS00340 is currently permitted for 2.0 MGD.

Table 4-1 on the next page is an overview of the utility and the customers it serves:

Table 4-1. Holden Beach Wastewater Vacuum and Pumping Collection System Overview

Category	Description
Wastewater Facilities	
Holden Beach EOC /Operation	1044 Sabbath Home Road, Supply, NC
Town Hall Billing Office	112 Rothschild Street Holden Beach, NC
Collection System	
Connections	2,984
SS Valve Pits	1,492 SS Valve Pits (Vacuum Valves)
Vacuum Piping Size	4-10 inch
Vacuum Collection System Feet	111,197 Feet (21.06 Miles)
Sewer System Valves	126
Rotary Vane Vacuum Pumps	PS1 4-455 CFM Vacuum Pumps (Collects
Pump Station Capacities	from Service Area 1 and PS2)
	PS2 2-455 CFM Vacuum Pumps
	PS3 2-455 CFM Vacuum Pumps
	PS4 2-455 CFM Vacuum Pumps (Collects from Service Area 4 and from PS3
Vacuum Storage Tanks Carbon Steel	PS1 4,500 Gallons all others 3,000 Gallons No Redundancy
Transfer Pump Capacities	PS1 1165 GPM
	PS2 450 GMP
	PS3 349 GPM
	PS4 364 GPM
Force Main Piping Size	6 inch and 8 inch- 2 connections to mainland
Force Main SS Piping Feet	27,720 (5.25 miles)
Waste Treat Brunswick County	1.0 MGD (Max Avg Month 56% 0.563 MGD in 2022)
Control Systems	Radio Telemetry System / Custom Controls
Water Supply Wells	None
Employees/Staff	5.25 FTEs total: 4.25 System, 1 Business Office and Customer Service
Miscellaneous Equipment	2019 Vac-Con, 2014 CAT Backhoe, 2016 Mini Excavators, Dump Truck from PS (shared), 2 Godwin CD150 Water Pumps, 5 F-150 Crew Trucks

Table 4-1.1 Breakdown of Pipes (Horizontal Assets) in the Holden Beach Wastewater System

Pipe Size	Holden Beach Totals (Miles)	Percent of System
8" Force Main	1.37	26.1%
10" Force Main	3.88	73.9%
Total	5.25	100%
4" Vacuum SS	9.97	47.3%
6" Vacuum SS	4.25	20.2%
8" Vacuum SS	4.66	22.1%
10 Vacuum SS	2.18	10.4%
Total	21.06	100%

Table 4-1.2 Breakdown of Other Horizontal Assets in the Holden Beach Wastewater System

Sewer Valves, SS Valvepits	Total Number	Per 1000 feet of System
SS Valves	126	0.88
SS Valvepits	1492	13.4(serves 2 houses)

5. EMPLOYEE INFORMATION

5. EMPLOYEES/STAFF AND EQUIPMENT

There are 4.25 Full Time Equivalents (FTEs) total in the Holden Beach Water and Wastewater System at the current time. These employees operate and repair all the water distribution system, hydrants, valves, services, meters and radios, and elevated tank on a day-to-day basis. The same employees operate and repair the vacuum sewer system including the 4 major vacuum and pumping stations, all the vacuum lines, all the force main lines and valve boxes. One full-time employee operates the business office functions and customer service functions for the water system. The following is the breakout of the employees, their education, and their training / Certifications.

Table 5.1 Employee Information Breakout

Position	Education	Certifications
Director of Public Works	High School/GED	A-Dist.;Cross Connection,Collections II
Water and Sewer Supervisor	High School/GED	B-Dist.; Collections II
Public Services Crew Leader	High School/GED	C-Dist; Collections I, CDL
Senior Public Services Technician	High School/GED	C-Dist; Collections I
Senior Public Services Technician	High School/GED	Collections I; CDL
Public Services Technician	High School/GED	CDL
Public Services Technician	High School/GED	
Utility Billing Specialist	Some College	Billing Soft Training

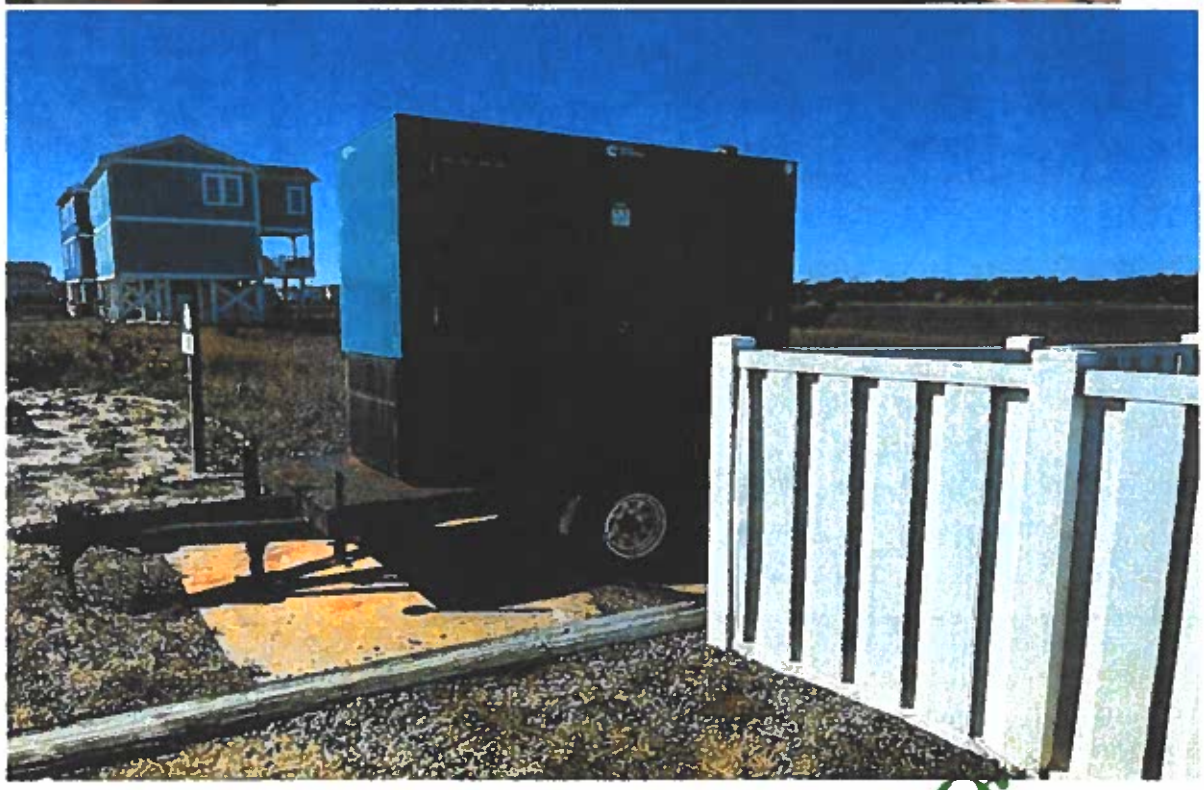
The experience and education of the employees are critical for the proper operation of the water system.

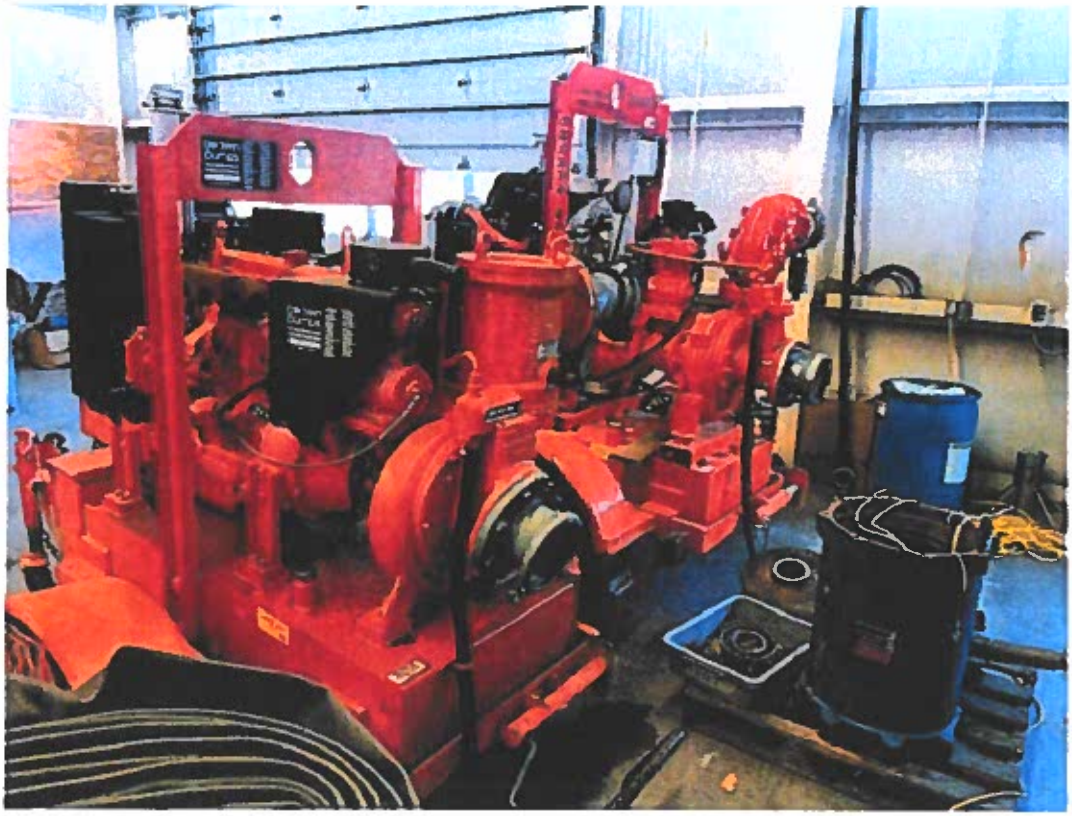
5.1 MISCELLANEOUS EQUIPMENT

The Holden Beach Water System has miscellaneous equipment that is needed for the work and repairs on the system. The equipment listed in Table 3-6 does not encompass all the equipment, but only those that are considered fixed assets worth $5,000 in initial cost.

Table 5-1.1. Miscellaneous Equipment Listing

Category	Quantity	Descriptions
Vehicles		
Service Trucks	5	F-150 4X4 Crew Trucks
Mini Excavators	1	2016 KXO-40 Excavator
Vacuum Truck	1	2019 Vac-Con Vac Truck on Freightliner Chassis
Generator Sets	4	Cummins 150 KW Gen Sets with Trailers
Water Pumps	2	CD 150 150S Dri Prime 6-inch Godwin Pumps
Backhoes	1	2014 Cat Model 420F





6. UTILITY ASSESSMENT

6.0 UTILITY ASSESSMENT

Green Engineering, PLLC, in cooperation with Holden Beach, prepared a Water and System Operation and System Evaluation Study and Capital Improvements Plan (CIP). The asset inventory and assessments were prepared with guidance provided by the US Environmental Protection Agency's (EPA) Checkup Program for Small Systems (CUPSS) to identify and prioritize critical assets. This process included reviewing all assets and recording their conditions, criticality to the utility (consequence of failure) and redundancy (the number of back-up assets to help support each asset). The information collected in the 2024 report was used to assign a risk to each asset. This will ensure that the utility delivers the level of service needed to meet the mission statement and user expectations.

Version release 1.3.8 from October 2014

6.1 The following sections define the metrics used to assess the assets:

6.1.1 Condition

The condition of each of the critical assets was ranked according to the following scale:

- Excellent – New equipment with ≥90% of anticipated equipment life remaining
- Good – Equipment with <90% of anticipated equipment life remaining and in above average condition
- Fair – Average condition and suitable for operation
- Poor – Not suitable for long-term use due to multiple recorded line failures, significant corrosion, end of typical life cycle, reduced capacity, unreliability, or other mechanical or electrical deficiencies.
- Very Poor – Not operable

The condition of the utility assets is further described in Appendix B. Assets rated as poor or very poor are addressed through the CIP.

6.1.2 Consequence of Failure

As defined in the CUPSS guidance, consequence of failure "estimates the degree of impact on utility service should the asset fail". The consequence of failure of each asset was ranked according to the following scale:

- Insignificant – Minimal short-term impact on water production and distribution operations.
- Minor – Minimal short-term or long-term impact on water production and distribution operations.
- Moderate – Operations will be disrupted but may not impact compliance.
- Major – Water production and distribution operations will be severely disrupted, service to customers may be disrupted, and noncompliance is probable.
- Catastrophic – The water wells may shut down, service to customers may be halted for a significant period, or there may be a water quality emergency.

6.1.3 Redundancy

The redundancy of each asset was recorded as one of the following categories:

- 0% Backup
- 50% Backup
- 100% Backup
- 200% Secondary Backup

6.1.4 Risk Category

As defined in the CUPSS guidance, the risk category identifies the "potential for realization of unwanted adverse consequences or events" associated with the condition of performance of a specific asset. Risks were categorized as:

- High – Provide immediate attention to monitor asset condition and develop plans for asset repair. Rehabilitation, or replacement
- Medium – Provide aggressive monitoring.
- Low – Perform routine maintenance for asset to extend remaining useful life.

The risk category was assigned based on the probability of failure and the consequence of failure. The probability of failure was estimated based on the remaining useful life of the equipment and the redundancy provided for the equipment. The steps below summarize the method for assigning a risk category to each asset:

1. Assign a numerical factor to the condition, redundancy, and consequence of failure (COF) rankings according to the tables below:

Table 6-1. Numerical Factors for Condition, Redundancy and Consequence of Failure

Condition	% of Useful Life Remaining	Redundancy	Redundancy Factor	COF	Condition Factor
Excellent	120%	0% Backup	0	Insignificant	2
Good	110%	50% Backup	0.5	Minor	4
Fair (Avg.)	100%	100% Backup	0.9	Moderate	6
Poor	95%	200% Secondary Backup	0.98	Major	8
Very Poor	90%			Catastrophic	10

2. Calculate Estimated Remaining Useful Life (ERUL):
   ERUL = Estimated Useful Life – (Current Year – Installation Year)
3. Calculate Remaining Useful Life (RUL):

   RUL = ERUL x Condition Factor
4. Calculate Replacement Year:
   Replacement Year = Current Year + RUL
5. Calculate Probability of Failure (POF):

a. If RUL < 0, then POF = 10
b. Else POF = [[EUL-RUL]/EUL] x [1-Redundancy Factor] x 10]

6. Assign Risk Factor Category:

a. If COF>5 and POF>5, then Risk Factor = "High – Immediate Attention"
b. Else, if either COF<5 and POF>5 or COF>5 and POF<5, then Risk Factor = "Medium – Aggressive Monitoring"
c. Else, Risk Factor = "Low – Routine Maintenance"

6.1.5 Estimated Useful Life

Part of the asset calculations above includes estimating the useful life of each component of the water system, such as tanks, water lines, booster pumps, etc. The following estimated useful life was determined from a compilation of charts:

Table 6-1.1. Estimated Useful Life Table

Asset	Expected Useful Life (in years)
Storage Tanks	30-60
Pumps	10-15
Buildings	30-60
Electrical Systems	7-10
Transmission Mains W and WW	50-75
Distribution Pipes	50-75
Vacuum Collection System Piping	40-60
Vacuum Pumps	10-15
Vacuum Collection Steel Tanks	30-40
Valves	35-40
Blow-off Valves	35-40
Backflow Prevention	35-40
Meters	10-15
Service Lines	30-50
Hydrants	40-60
Lab/Monitoring Equipment	5-7
Transportation Equipment	10

6.2 Assessment of Existing Inventory

The Holden Beach Water and Wastewater System asset management team has completed the inventory assessment. The assessment was based on operator knowledge, the system evaluation study, and observed equipment performance. Table 6-2 lists the assets that are critical to maintain the performance of the water system. Table 6-2-1 lists the assets that are critical to maintain the performance of the wastewater system. A more detailed listing for each asset is provided in Appendix 2 (whole section)

Table 6-2. Holden Beach Water Asset Inventory Rating

Asset	Asset Status	Installation / Purchase Year	Condition	Consequence of Failure	Estimated Replacement Year	Risk Factor Category	Action Based on Risk
Distribution System							
1" Water PVC sleeved under road	Active	1977-Current	Good	Minor	2037	Medium	Aggressive Monitoring
2" Water PVC sleeved under road	Active	1977-Current	Good	Minor	2037	Medium	Aggressive Monitoring
4" Water PVC	Active	Various	Good	Moderate	Various	Medium	Aggressive Monitoring
6" Water PVC	Active	Various	Good	Moderate	Various	Medium	Aggressive Monitoring
8" Water PVC	Active	Various	Good	Moderate	Various	Medium	Aggressive Monitoring
12" PVC	Active	Various Repairs	Good	Major	Various	Medium	Aggressive Monitoring
4" AC	Active	1977	Fair	Moderate	2027	Medium	Aggressive Monitoring
6" AC	Active	1977	Fair	Moderate	2027	Medium	Aggressive Monitoring
8" AC	Active	1977	Fair	Moderate	2037	Medium	Aggressive Monitoring
12" AC	Active	1977	Fair	Major	2037	Medium	Aggressive Monitoring
4" DI SR Crossings	Active	1977	Good	Moderate	2052	Medium	Aggressive Monitoring
6" DI SR Crossings	Active	1977	Good	Moderate	2052	Medium	Aggressive Monitoring
8" DI SR Crossings	Active	1977	Good	Moderate	2052	Medium	Aggressive Monitoring
12" DI SR Crossing	Active	1977	Good	Major	2052	Medium	Aggressive Monitoring
12" HDPE / PVC Main NC130 Jordan St.	Active	1977	Good	Major	2052	Medium	Aggressive Monitoring
12" HDPE / PVC Main Seagull Dr	Active	1995	Excellent	Major	2070	Medium	Aggressive Monitoring
Hydrants	Active	1977	Good/ Fair	Minor	2027	Low	Routine Maintenance
Valves 1"-12"	Active	1977	Good/ Fair	Minor-Major	2027	Medium	Aggressive Monitoring
Blow-Offs	Active	1977	Good/ Fair	Minor	2027	Low	Routine Maintenance
Meters ¾ " Sensus AMR	Active	Unknown	Excellent	Minor	10-15 Years	Low	Routine Maintenance
Meters 1" Sensus AMR	Active	Unknown	Excellent	Minor	10-15 Years	Low	Routine Maintenance

HOLDEN BEACH WATER SYSTEM

Asset	Asset Status	Installation / Purchase Year	Condition	Consequence of Failure	Estimated Replacement Year	Risk Factor Category	Action Based on Risk
Meters 2" Sensus AMR	Active	Unknown	Excellent	Minor	10-15 Years	Low	Routine Maintenance
EST 1 Brunswick 300,000 Gallon	Active	1977	Good	Moderate (Brunswick Tanks)	2077	Low	Routine Maintenance
Ground Storage Tank	None Brunswick 4 MG	Supplies the Island		N/A			
Booster Pumps	None			N/A			
Check Valves	None			N/A			
Master Meter Vault				N/A			
Water Supply Wells	None			N/A			
Misc. Equipment							
Service Trucks	Active	2014-2021	Fair	Minor	2019-2026	High	Immediate Attention
Mini Excavators 2	Active	2017	Fair	Major	2027	High	Immediate Attention
Dump Truck	Active	1988	Fair	Major	1998	High	Immediate Attention
Backhoes	Active	1999	Fair	Major	2009	High	Immediate Attention
Trailers	Active	1998	Fair	Minor	2009	High	Immediate Attention

Notes:

1. The two 12-inch transmission lines from Brunswick County and the 12-inch AC "Backbone" pipeline running east and west along Ocean Boulevard are critical to maintaining the water system reliability.

2. The water lines grouped per size were installed over a range of years. For the purposes of this table and risk assessment, the earliest installation year for the group is shown.

3. The estimated replacement year is based on the installation date for the oldest water line with a diameter group and may not apply to every line within a grouping. See detailed spreadsheets for exact dates and quantities.

4.The 12-inch AC main trunk was sampled in 3 locations and analyzed for life expectancy. The results showed that the pipe should last at least 25 more years from the date of testing (2045). We recommend a planned replacement of this critical backbone of the system before this date because of the criticality and because there are over 8 miles of pipeline to replace. This will be a significant cost for the Town and should be planned for in the long term (20 year) CIP.

Table 6-2.1 Holden Beach Wastewater Asset Inventory Rating

Asset	Asset Status	Installation / Purchase Year	Condition	Consequence of Failure	Estimated Replacement Year	Risk Factor Category	Action Based on Risk
Collection System							
8" Force Main PVC/ HDPE Seagull	Active	2005	Good	Major	2055	Low	Routine Maintenance
10" Force Main PVC / HDPE NC130	Active	2005	Good	Major	2055	Low	Routine Maintenance
4" Vacuum PVC	Active	2005	Good	Minor	2055	Low	Routine Maintenance
6" Vacuum PVC	Active	2005	Good	Moderate	2055	Low	Routine Maintenance
8" Vacuum PVC	Active	2005	Good	Major	2055	Low	Routine Maintenance
10" Vacuum PVC	Active	2005	Good	Major	2055	Low	Routine Maintenance
Sewer Valves (126)	Active	2005	Good	Moderate	2045	Low	Routine Maintenance
SS Valve Pits 1,492	Active	2005	Good	Minor	2035	Low	Routine Maintenance
Zone 1 Pumping Station Carbon Steel 4500 Gallon Vacuum Tank	Active	2005	Good	Major	2035	Medium	Aggressive Monitoring
Zone 2 Pumping Station Carbon	Active	2005	Good	Major	2035	Medium	Aggressive Monitoring

Asset	Asset Status	Installation / Purchase Year	Condition	Consequence of Failure	Estimated Replacement Year	Risk Factor Category	Action Based on Risk
Steel 3000 Gallon Vacuum Tank							
Zone 3 Pumping Station Carbon Steel 3000 Gallon Vacuum Tank	Active	2005	Good	Major	2035	Medium	Aggressive Monitoring
Zone 4 Pumping Station Carbon Steel 3000 Gallon Vacuum Tank	Active	2005	Good	Major	2035	Medium	Aggressive Monitoring
PS1 Vac Pump 1	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS1 Vac Pump 2	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS1 Vac Pump 3	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS1 Vac Pump 4	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS2 Vac Pump 1	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS2 Vav Pump 2	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS3 Vac Pump 1	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS3 Vac Pump 2	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS4 Vac Pump 1	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS4 Vac Pump 2	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS 1 Transfer #1 Pumps to 10" FM	Active	2005	Good	Major	2025	Medium	Aggressive Monitoring
PS 1 Transfer #2 Pump to 10"FM	Active	2005	Good	Major	2025	Medium	Aggressive Monitoring
PS 2 Transfer #1 Pumps to PS 1	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS 2 Transfer #2 Pumps to PS 1	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring

Asset	Asset Status	Installation / Purchase Year	Condition	Consequence of Failure	Estimated Replacement Year	Risk Factor Category	Action Based on Risk
PS 3 Transfer #1 Pumps to PS 4	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS 3 Transfer #2 Pumps to PS 4	Active	2005	Good	Moderate	2025	Medium	Aggressive Monitoring
PS 4 Transfer #1 Pumps to 8" FM	Active	2005	Good	Major	2025	Medium	Aggressive Monitoring
PS 4 Transfer #2 Pumps to 8" FM	Active	2005	Good	Major	2025	Medium	Aggressive Monitoring

Notes:

1. The Two force mains and their associated (2) submersible pumps in each station 1 and 4 are essential to sending wastewater to Brunswick County and are a point of criticality for the system.

2, The 4 Vacuum pumps at station 1 and the two vacuum pumps at the remaining stations are essential to collection of wastewater from the sewer system. If any of them fails a zone of the vacuum collection system will not operate.

3.The Carbon Steel tanks (4,500 gallons and 3000 gallons) are critical to the vacuum collection system. There is only one at each vacuum station. It is critical that the condition be assessed regularly for fatigue cracking and stress corrosion cracking. We understand that an X-ray Computed Tomography (CT) was performed for all tanks and the tanks were in good shape at that time. The replacement tank, if possible, should be replaced with a stainless tank. Again, this can be planned as a replacement item in the CIP for these critical assets.

6.3 Value of Assets and Replacement Costs

The assets listed in the above section have detailed the conditions of each major asset owned and operated by the Holden Beach Water System. The actual worth and replacement cost for those assets need to be defined and estimated based on current worth and estimates for future replacement based on current dollars. The current worth for several of the items is the cost of the items during the time of installation, such as water mains, tanks, and booster pumps minus depreciation Asset Assessment Checklist for each major item. Future costs will increase based on the increase in the utility construction and material costs.

6.4 Operator Knowledge and Training

There are 5.25 full time staff that operate the Holden Beach Water System. The Town's distribution system is currently classified as a Class "B" System, requiring the Town to have at least one Water Distribution Manager (WDM) (ORC) classified at a level equal to or higher (A is the highest classification in NC) than the water system's distribution system classification. The Director currently holds an "A" distribution and a Sewer Collection II License.

The Town's water system is also required to have a Cross-connection Control Specialist (CCS) responsible for the cross-connection control program and a have on staff or utilize a certified backflow assembly tester (BAT) for inspecting, testing and monitoring backflow prevention assemblies. Table 4-4 shows the current education and certifications for the staff.

Table 6-4. Operator Knowledge and Training Requirements

Training/Certification	Certification	Required	Trained
Water Distribution Manager (WDM)[1]	B - Distribution	1	2
Water Treatment Plant Operator (WTPO)[1]	N/A	0	0
Operator in Responsible Charge (ORC)	B – Distribution	1	2
Backup ORC	B-Dist	1	1
Cross Connection Control Specialist (CCS)	Backflow/Cross Connection Control	1	2
Backflow Assembly Tester (BAT)	Provided by Contractor[2]		

Notes:

1. WDM and WTPO may be the same person.
3. Current testing is provided by a contractor who is hired by private businesses or homeowners.

7. CAPITAL IMPROVEMENT PLAN (CIP)

7.0 CAPITAL IMPROVEMENTS PLAN (CIP)

The 10-year CIP is provided in **Appendix 4.** The CIP is the description of future capital project needs for the next 10 years and includes a description of recommended improvements, budget costs for recommended improvements, and a description of ongoing recurring equipment needs. Some systems also have a 20 year CIP for assets that require major planning, have a long regulatory or environmental approval process, are controversial, or are very costly and require major expenditures and potential large borrowing of capital. This would apply to the Main 12-inch AC water line along Ocean Boulevard and to the transmission lines (water and wastewater) across the inland waterway. This could also apply to Pump Stations 1 and 4.

Capital improvement projects generally create a new asset that previously did not exist, or they upgrade and improve an existing asset's capacity. The projects can result from growth or environmental needs, such as the following:

- Expenditure that purchases or creates a new asset or in any way improves an asset beyond its original design capacity.
- Upgrades that increase the capacity of the asset
- Construction designed to produce an improvement in the standard operation of the asset beyond its present capacity.

In addition to capital improvement projects, the CIP identifies recurring needs for vehicles and miscellaneous equipment, and renewal/rehabilitation. Renewal expenditure is anything that does not increase the asset's design capacity but restores an existing asset to its original capacity. Any improvement projects that require more than simply restoring an asset to its original capacity are deemed to be a renewal project, such as the following:

  - Activities that do not increase the capacity of the assets (i.e, upgrade and enhance the assets restoring them to their original size, condition, and capacity)
- Rehabilitation involves improvements and realignment or restores the assets to a new or fresh condition.

In making renewal decisions, the utility considered several categories other than the normally recognized physical, failure or breakage. Such renewal decisions include the following:

- Structural
- Capacity
- Level of service failures
- Outdated functionality
- Cost or economic impact

Because the expected needs of the utility will change each year, the CIP will be updated to reflect those changes.

8. OPERATION & MAINTENANCE PLAN

8.0 OPERATION AND MAINTENANCE (O&M) STRATEGY AND PLAN

Operation and maintenance (O&M) consist of preventative and emergency/reactive maintenance. Holden Beach Water System staff has in place O&M plans to ensure that the utility is achieving the level of service expected. The maintenance strategy focuses on the three areas listed below and will be revisited every year. The updated O&M plans are provided in **Appendix 5.**

8.1 Routine Operations and Preventive Maintenance

Routine operations and preventative maintenance is the day-to-day work necessary to keep assets operating properly, which includes the following:

1. Regular and ongoing daily, weekly, monthly and annual tasks necessary to keep the assets at their requested service level. (Commonly referred to as PM program)
2. Day-to-day and general upkeep and housekeeping are designed to keep the assets operating at the required levels of service.
3. Tasks that provide for the normal care and attention of the asset including repairs and minor replacements.

Preventative maintenance is carried out because of a planned maintenance program (such as regularly scheduled asset repairs) and historically problematic operations (such as blockages and root infestation). Equipment must be maintained according to the manufacturer's recommendations to achieve maximum return on investment. By simply following the manufacturer's suggested preventative maintenance, the useful life of equipment can be increased 2 to 3 times when compared to run till failure operations. Communities that have eliminated preventative maintenance practices from their operating budget can achieve positive returns from a relatively small additional investment.

8.2 Emergency/Reactive Maintenance

Reactive maintenance is often carried out because of customer requests or sudden asset failures. The required service and maintenance to fix the customer's issue(s) is identified by staff inspection.

8.3 Deferred Maintenance

Deferred maintenance is any maintenance, repair, restoration or replacement work that should have been accomplished before now, and that has not been performed. The utility plans to reduce overall deferred maintenance over the following 10 years by implementing the CIP.

APPENDIX 1. SUMMARY OF HORIZONTAL ASSETS

Asset Management Plan

Holden Beach Water System

2024

Appendix 1

Summary Spreadsheet

	Holden Beach Totals (Miles)	Percent of System
1"	0.07	0.3%
2"	3.42	15.3%
4"	0.29	1.3%
6"	9.48	42.5%
8"	0.29	1.3%
10"	0	0%
12"	8.77	39.3%
Total	22.32	100%

Hydrants, Valves, Blow-Offs, Meters	Total Number	Per 1000 feet of System
Hydrants	162	1.37 Avg every 730 ft)
Valves	291	2.47 (w/ hydrant valves)
Blow-Offs	15	0.13
Meters	3,260	27.7

Table 3.1.3 Holden Beach Meter Count by Size

Count of METER Type	
METER Type	Total
1 Inch	34
2 Inch	4
3/4 Inch	3360
Grand Total	3398

Facility	Address	Capacity (gallons)	Footing Elevation (ft)	Height to Overflow (ft)	Overflow Elevation (ft)	Tank Range (ft)
Tank 1	Brunswick Ave W. Holden Beach, NC	300,000	13.0	155.0	168.0	28.0
Tank 2 Future	Possible Future					

Pipe Size	Holden Beach Totals (Miles)	Percent of System
8" Force Main	1.37	26.1%
10" Force Main	3.88	73.9%
Total	5.25	100%
4" Vacuum SS	9.97	47.3%
6" Vacuum SS	4.25	20.2%
8" Vacuum SS	4.66	22.1%
10 Vacuum SS	2.18	10.4%
Total	21.06	100%

Sewer Valves. SS Valvepits	Total Number	Per 1000 feet of System
SS Valves	126	0.88
SS Valvepits	1492	13.4(serves 2 houses)

APPENDIX 2. ASSET ASSESSMENT CHECKLIST

Asset Management Plan

Holden Beach Water System

2024

Appendix 2

Asset Assessment Checklist

Green Engineering	303 Goldsboro Street East, PO Box 609, Wilson, NC 27894 · www.greeneng.com · Ph: 252.237.5365 · Fax: 252.243.7489	Town of Holden Beach Water and Wastewater System: Asset Assessment Checklist

Owner:	Date Performed:	Performed By:
Town of Holden Beach	February 2023	Gary Parker

Asset Name	Location	Asset Latitude
2-inch PVC	Various	Various
Associated Asset	**Associated Location**	**Asset Longitude**
		Various
Asset ID	**Asset Size**	**Acres of Land**
Storage Capacity in Days	**Capacity**	**Linear Feet**
	☐ Futurized ☐ Oversized ● Undersized	390 (0.07 miles)

Asset Category

☐ Source Pumping Facility Treatment ☐ Storage ● Distribution ☐ Other

Asset Status

● Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment ● Distribution ☐ Other

Can this asset be repaired? ● Yes ☐ No | Can this Asset be rehabilitated? ● Yes ☐ No

Asset Replaced (optional): | Show asset in schematic? ● Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing							•
Walk Ways							•
Signage							•
Doors							•
Hardware							•
Tank exterior							•
Tank interior							•
Building exterior							•
Building interior							•
Roof							•
Floor condition							•
Floor Drainage							•
Lighting							•
Exterior							•
Interior							•
Windows							•
Electrical							•
Conduit							•
Standby Generation							•
Man/ auto transfer							•
Motor Control Panel							•
VFD							•
Motors							•
Pumps							•
Pump Capacity							•
Telemetry							•
Intrusion Alarms							•
Chemical Storage							•
Chemical Type							•
Chemical Injection Point							•
Chemical Analyzer Equipment							•
Metering Facilities							•
Piping		4	3				•
Pipe and Fitting Supports							•
Hangers							•
Gate Valves							•
Check Valves							•
Pump Control Valves							•
Pressure Relief Valves							•
Altitude Valve							•
Gravity							•
Sump pump							•
Flood Potential							•
Safety Railing							•
Ventilation							•
Cooling							•
Heat							•
Cross Connection/Backflow							•
Visual Hazards							•
Safety Compliance							•
Safety Data Sheets							•
Tank Capacity							•
Eye Wash							•
Ladder Access							•
Vandal Guard							•
Safety Cable							•
Safety Harness/Belt							•
House Cleaning							•

PRIORITY SCORE	3.5	RISK FACTOR	MEDIUM - AGGRESSIVE MONITORING
Condition	Good		

% Useful Life Remaining 110%

Is the asset maintained according to manufacturer's recommendations? ● Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977 (Oldest Pipe)	13
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$28/ LF (2-6 inch PVC)	60 Years	14.3
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2038	7.6

Optional Information

Manufacturer	Address	Phone Number
NOT AVAILABLE		
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

2 inch replacement with PVC is ok when hydraulic capacity and pressures are adequate or adjacent lines are of similar size.

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Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Asset Name	Location	Asset Latitude
Associated Asset	Associated Location	Asset Longitude
Asset ID	Asset Size	Asset Level
Storage Capacity in Gals	Capacity	Asset Year

Asset Category: Source / Pumping Facility / Treatment / Storage / Distribution / Other

Asset Status: Active / Yes, to be Abandoned / Yes, to be Back Up / Future Investment / Distribution / Other

Can this asset be repaired? Yes / No — Can this asset be rehabilitated? Yes / No

Asset Treatment (chemical) — Show asset in schematic? Yes / No

Asset Type

	EXCELLENT (5)	GOOD (4)	AVG (3)	POOR (2)	VERY POOR (1)	NONE PRESENT (1)	REDUNDANCY	
Security Fencing							x	
Walk Ways							x	
Signage							x	
Doors							x	
Hardware							x	
Tank exterior							x	
Tank interior							x	
Building exterior							x	
Building interior							x	
Roof							x	
Floor condition							x	
Floor Drainage							x	
Lighting							x	
Exterior							x	
Interior							x	
Windows							x	
Electrical							x	
Conduit							x	
Standby Generation							x	
Main/ auto transfer							x	
Motor Control Panel							x	
VFD							x	
Motors							x	
Pumps							x	
Pump Capacity							x	
Telemetry							x	
Instrument Alarms							x	
Chemical Storage							x	
Chemical Type							x	
Chemical Injection Point							x	
Chemical Analyzer Equipment							x	
Metering Facilities							x	
Piping			x					
Pipe and Fitting Supports							x	
Hangers							x	
Gate Valves							x	
Check Valves							x	
Pump Control Valves							x	
Pressure Relief Valves							x	
Altitude Valve							x	
Gravity							x	
Sump pump							x	
Flood Potential							x	
Safety Railing							x	
Ventilation							x	
Cooling							x	
Heat							x	
Cross Connection/Backflow							x	
Visual Hazards							x	
Safety Compliance							x	
Safety Data Sheets							x	
Tank Capacity							x	
Eye Wash							x	
Ladder Access							x	
Vandal Guard							x	
Safety Cable							x	
Safety Harness/Belt							x	
House Cleaning							x	

PRIORITY SCORE 3.5 — **RISK FACTOR** — **MEDIUM - AGGRESSIVE MONITORING**

Condition: Good

% Useful Life Remaining: 110%

Is the asset maintained according to manufacturer's recommendations? x Yes / No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977 (Oldest Pipe)	13
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$28/ LF (2-6 inch PVC)	60 Years	14.3
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2038	7.6

Optional Information

Manufacturer	Address	Phone Number
NOT AVAILABLE		
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

6 inch only if hydrant desired and lines nearby support

2 inch replacement with PVC is ok when hydraulic capacity and pressures are adequate or adjacent lines are of similar size

Green Engineering
303 Goldsboro Street East
PO Box 609
Wilson, NC 27894
www.greenengineering.com
Ph: 252/237-5365
Fax: 252/243-7489

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach	Date Performed: February 2018	Performed by: Terry/Rodney
Asset Name: 6 inch PVC	**Location:** Ocean Street	**Asset Latitude:** Various
Associated Asset:	**Associated Location:**	**Asset Longitude:** Various
Asset ID:	**Asset Size:**	**Asset Elevation:**
Storage Capacity in Days:	**Capacity:** ☐ Full-sized ☐ Oversized ☒ Undersized	**Linear Feet:** 1,527 (0.29 miles)

Asset Category: ☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Distribution ☐ Other

Asset Status: ☒ Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment ☒ Distribution ☐ Other

Can this asset be repaired? ☒ Yes ☐ No — Can this asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional): — Show asset in schematic? ☒ Yes ☐ No

Asset Type:

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing						x	
Walk Ways						x	
Signage						x	
Doors						x	
Hardware						x	
Tank exterior						x	
Tank interior						x	
Building exterior						x	
Building interior						x	
Roof						x	
Floor condition						x	
Floor Drainage						x	
Lighting						x	
Exterior						x	
Interior						x	
Windows						x	
Electrical						x	
Conduit						x	
Standby Generation						x	
Man/ auto transfer						x	
Motor Control Panel						x	
VFD						x	
Motors						x	
Pumps						x	
Pump Capacity						x	
Telemetry						x	
Instrument Alarms						x	
Chemical Storage						x	
Chemical Type						x	
Chemical Injection Point						x	
Chemical Analyzer Equipment						x	
Metering Facilities						x	
Piping				x		x	
Pipe and Fitting Supports						x	
Hangers						x	
Gate Valves						x	
Check Valves						x	
Pump Control Valves						x	
Pressure Relief Valves						x	
Altitude Valve						x	
Gravity						x	
Sump pump						x	
Flood Potential						x	
Safety Railing						x	
Ventilation						x	
Cooling						x	
Heat						x	
Cross Connection/Backflow						x	
Visual Hazards						x	
Safety Compliance						x	
Safety Data Sheets						x	
Tank Capacity						x	
Eye Wash						x	
Ladder Access						x	
Vandal Guard						x	
Safety Cable						x	
Safety Harness/Belt						x	
House Cleaning						x	

PRIORITY SCORE 2.0 — **RISK FACTOR**: **MEDIUM - AGGRESSIVE MONITORING**

Condition Poor

% Useful Life Remaining 95%

Is the asset maintained according to manufacturer's recommendations? ☒ Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: **0% Backup** (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? **Minor** (Select one)

Condition Factor 4

Original Cost	**Installation Date**	**Estimated Remaining Useful Life (ERUL)**
$ -	1977 (Oldest Pipe)	-7
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$28/ LF (6 inch PVC)	40 Years	-6.7
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2017	10.0

Optional Information

Manufacturer	**Address**	**Phone Number**
NOT AVAILABLE		
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes: Replace if >40 Years /size. Oldest pipe is 41 years old or if high # breaks. Replace with 6 inch min when hydrants are desired or required. 4 inch replacement with PVC is ok when hydraulic capacity and pressures are adequate or adjacent lines are of similar size.

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Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Drawing: Holden Beach

Asset Name	Location		Asset Latitude
6 inch PVC	Within		Within
Associated Asset	Associated Location		Asset Longitude
			Within
Asset ID	Asset Size		Type of Land
Storage Capacity in Days	Capacity		Impervious
	Sufficient	Oversized	Undersized	87,065	13 miles
Asset Category					
Source	Pumping Facility	Treatment	Storage	Distribution	Other		
Asset Status							
Active	Not in Use-Abandoned	Not in Use-Back Up	Future Investment	Distribution	Other		
Can this asset be repaired?	Yes	No	Can this asset be rehabilitated?	Yes	No		
Asset Replaced (optional)		Does asset require Generator?		Yes	No		
Asset Type							

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing						x	
Walk Ways						x	
Signage						x	
Doors						x	
Hardware						x	
Tank exterior						x	
Tank Interior						x	
Building exterior						x	
Building Interior						x	
Roof						x	
Floor condition						x	
Floor Drainage						x	
Lighting						x	
Exterior						x	
Interior						x	
Windows						x	
Electrical						x	
Conduit						x	
Standby Generation						x	
Misc/ auto transfer						x	
Motor Control Panel						x	
VFD						x	
Motors						x	
Pumps						x	
Pump Capacity						x	
Telemetry						x	
Instrusion Alarms						x	
Chemical Storage						x	
Chemical Type						x	
Chemical Injection Point						x	
Chemical Analyzer Equipment						x	
Metering Facilities						x	
Piping				x			
Pipe and Fitting Supports						x	
Hangers						x	
Gate Valves						x	
Check Valves						x	
Pump Control Valves						x	
Pressure Relief Valves						x	
Altitude Valve						x	
Gravity						x	
Sump pump						x	
Flood Potential						x	
Safety Railing						x	
Ventilation						x	
Cooling						x	
Heat						x	
Cross Connection/Backflow						x	
Visual Hazards						x	
Safety Compliance						x	
Safety Data Sheets						x	
Tank Capacity						x	
Eye Wash						x	
Ladder Access						x	
Vandal Guard						x	
Safety Cable						x	
Safety Harness/Belt						x	
House Cleaning						x	

PRIORITY SCORE	2.0	RISK FACTOR	MEDIUM - AGGRESSIVE MONITORING
Condition	Poor		
% Useful Life Remaining	95%		
Is the asset maintained according to manufacturer's recommendations?		x Yes	No
Redundancy			
Does the asset have a back up system on its entirety	0% Backup	(Select one)	
Redundancy Factor	0		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Minor	(Select one)
Condition Factor	4		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977 (Oldest Pipe)	-7
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$28/ LF (6 inch PVC)	40 Years	-6.7
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2017	10.0

Optional Information

Manufacturer	Address	Phone Number
NOT AVAILABLE		
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes: Replace if >40 Years /4.0+. Oldest pipe is 47 years old or if high # breaks. Also note that this is by percentage the largest amount of pipe is 5%

Green Engineering
[illegible]
www.[illegible]
Ph: 252 237 [illegible]
Fax 252 [illegible]

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach	Date of Survey: February 2018
	Prepared by: [illegible]

Asset Name	Location	Asset Latitude
[illegible]	Various	Various
Associated Asset	**Associated Location**	**Asset longitude**
Various		Various
Asset ID	**Asset Size**	**Acres of Land**
Storage Capacity in Tank	**Capacity**	**Ownership**
	☒ Sufficient ☐ Oversized ☐ Undersized	Owner [illegible]

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Distribution ☐ Other

Asset Status

☒ Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment ☒ Distribution ☐ Other

Can this asset be repaired? ☒ Yes ☐ No — Can this Asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional): — Show asset in schematic? ☒ Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY	Notes
Security Fencing						x		
Walk Ways						x		
Signage						x		
Doors						x		
Hardware						x		
Tank exterior						x		
Tank interior						x		
Building exterior						x		
Building interior						x		
Roof						x		
Floor condition						x		
Floor Drainage						x		
Lighting						x		
Exterior						x		
Interior						x		
Windows						x		
Electrical						x		
Conduit						x		
Standby Generation						x		
Main/ auto transfer						x		
Motor Control Panel						x		
VFD						x		
Motors						x		
Pumps						x		
Pump Capacity						x		
Telemetry						x		
Intrusion Alarms						x		
Chemical Storage						x		
Chemical Type						x		
Chemical Injection Point						x		
Chemical Analyzer Equipment						x		
Metering Facilities						x		
Piping		x						[illegible]
Pipe and Fitting Supports						x		[illegible]
Hangers						x		
Gate Valves						x		
Check Valves						x		
Pump Control Valves						x		
Pressure Relief Valves						x		
Altitude Valve						x		
Gravity						x		
Sump pump						x		
Flood Potential						x		
Safety Railing						x		
Ventilation						x		
Cooling						x		
Heat						x		
Cross Connection/Backflow						x		
Visual Hazards						x		
Safety Compliance						x		
Safety Data Sheets						x		
Tank Capacity						x		
Eye Wash						x		
Ladder Access						x		
Vandal Guard						x		
Safety Cable						x		
Safety Harness/Belt						x		
House Cleaning						x		

PRIORITY SCORE	4.0	**RISK FACTOR**	**MEDIUM - AGGRESSIVE MONITORING**
Condition	Good		
% Useful Life Remaining	110%		
Is the asset maintained according to manufacturer's recommendations?		☒ Yes	☐ No
Redundancy			
Does the asset have a backup system in its entirety	0% Backup	(Select one)	
Redundancy Factor	0		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?	Minor	(Select one)	
Condition Factor:	4		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977 (Oldest Pipe)	28
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$28/ LF (6 inch PVC)	75 Years	30.8
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2055	5.9

Optional Information

Manufacturer	Address	Phone Number
NOT AVAILABLE		
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes: DI is according to original plans, but was not discovered in this project

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Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Town of Holden Beach

January 2020

Asset Name	Location		Asset Latitude
	Address		Asset Longitude
Associated Asset	Associated Location		
Asset ID	Asset Size		Asset Off Land
Storage Capacity in Tank	Capacity		Linear Feet
	X Installed	Committed	Undersized	1,320 (0.25 miles)
Asset Category	Source	Treatment	Storage	Distribution	Other		
Asset Status	Active	Out of Service	Will Be Back Up	Future Investment	Abandoned	Other
Can this asset be repaired?	Yes	No	Can this asset be rehabilitated?	Yes	No	
Asset Replaced (optional)		Show asset on schematic	Yes	No		

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing						x	
Walk Ways						x	
Signage						x	
Doors						x	
Hardware						x	
Tank exterior						x	
Tank interior						x	
Building exterior						x	
Building interior						x	
Roof						x	
Floor condition						x	
Floor Drainage						x	
Lighting						x	
Exterior						x	
Interior						x	
Windows						x	
Electrical						x	
Conduit						x	
Standby Generation						x	
Man/ auto transfer						x	
Motor Control Panel						x	
VFD						x	
Motors						x	
Pumps						x	
Pump Capacity						x	
Telemetry						x	
Intrusion Alarms						x	
Chemical Storage						x	
Chemical Type						x	
Chemical Injection Point						x	
Chemical Analyzer Equipment						x	
Metering Facilities						x	
Piping							
Pipe and Fitting Supports						x	
Hangers						x	
Gate Valves						x	
Check Valves						x	
Pump Control Valves						x	
Pressure Relief Valves						x	
Altitude Valve						x	
Gravity						x	
Sump pump						x	
Flood Potential						x	
Safety Railing						x	
Ventilation						x	
Cooling						x	
Heat						x	
Cross Connection/Backflow						x	
Visual Hazards						x	
Safety Compliance						x	
Safety Data Sheets						x	
Tank Capacity						x	
Eye Wash						x	
Ladder Access						x	
Vandal Guard						x	
Safety Cable						x	
Safety Harness/Belt						x	
House Cleaning						x	

PRIORITY SCORE 2.0 **RISK FACTOR** **MEDIUM - AGGRESSIVE MONITORING**

Condition Poor

% Useful Life Remaining 95%

Is the asset maintained according to manufacturer's recommendations? Yes No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977 (Oldest Pipe)	-7
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$60/ LF (8 inch PVC)	40 Years	-6.7
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2017	10.0

Optional Information

Manufacturer	Address	Phone Number
NOT AVAILABLE		
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes: Replace if >40 Years Age. Oldest pipe is 43 years old or if high # breaks

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach

Date Performed: [illegible] 2024

Asset Name	Location	Asset Latitude
[illegible]	Various	Various
Associated Asset	**Associated Location**	**Asset Longitude**
[illegible]		Various
Asset ID	**Asset Size**	**Acres of Land**
Storage Capacity in Days	**Capacity**	**Linear Feet**
	☒ Full Load ☐ Oversized ☐ Undersized	[illegible] miles

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Distribution ☐ Other

Asset Status

☒ Active ☐ Not in Use Abandoned ☐ Not in Use Back Up ☐ Future investment ☒ Distribution ☐ Other

Can this asset be repaired? ☒ Yes ☐ No — Can this Asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional) — Show asset in schematic? ☒ Yes ☐ No

Asset Type

Item	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing						x	
Walk Ways						x	
Signage						x	
Doors						x	
Hardware						x	
Tank exterior						x	
Tank interior						x	
Building exterior						x	
Building interior						x	
Roof						x	
Floor condition						x	
Floor Drainage						x	
Lighting						x	
Exterior						x	
Interior						x	
Windows						x	
Electrical						x	
Conduit						x	
Standby Generation						x	
Man/ auto transfer						x	
Motor Control Panel						x	
VFD						x	
Motors						x	
Pumps						x	
Pump Capacity						x	
Telemetry						x	
Intrusion Alarms						x	
Chemical Storage						x	
Chemical Type						x	
Chemical Injection Point						x	
Chemical Analyzer Equipment						x	
Metering Facilities						x	
Piping			x	x			
Pipe and Fitting Supports						x	
Hangers						x	
Gate Valves						x	
Check Valves						x	
Pump Control Valves						x	
Pressure Relief Valves						x	
Altitude Valve						x	
Gravity						x	
Sump pump						x	
Flood Potential						x	
Safety Railing						x	
Ventilation						x	
Cooling						x	
Heat						x	
Cross Connection/Backflow						x	
Visual Hazards						x	
Safety Compliance						x	
Safety Data Sheets						x	
Tank Capacity						x	
Eye Wash						x	
Ladder Access						x	
Vandal Guard						x	
Safety Cable						x	
Safety Harness/Belt						x	
House Cleaning						x	

PRIORITY SCORE 2.5 — **RISK FACTOR** — **HIGH - IMMEDIATE ATTENTION**

Condition Fair (Average)

% Useful Life Remaining 100%

Is the asset maintained according to manufacturer's recommendations? ● Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 8

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977 (Oldest Pipe)	3
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$100/ LF	50 Years	3
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2027	9.4

Optional Information

Manufacturer	Address	Phone Number
NOT AVAILABLE		
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes: [illegible]

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Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Asset Name	Location	Design Units:	
20 inch HDPE	Various	Various	
Associated Asset	Associated Location	Asset Longitude	
Various		Various	
Asset ID	Asset Size	Area of Asset	
Storage Capacity in Days	Capacity	Linear Feet	
	☒ Adequate ☐ Oversized ☐ Undersized	36000 ft (6.82 miles) Value this gauge	

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Distribution ☐ Other

Asset Status

☒ Active ☐ Not in Use Abandoned ☐ Non-Revenue ☐ Future Investment ☒ Distribution ☐ Other

Can this asset be repaired?	☒ Yes ☐ No	Can this asset be repaired (rated)?	☒ Yes ☐ No
Asset Replacement (optional)		Show asset on Schematic?	☒ Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing							x
Walk Ways							x
Signage							x
Doors							x
Hardware							x
Tank exterior							x
Tank Interior							x
Building exterior							x
Building Interior							x
Roof							x
Floor condition							x
Floor Drainage							x
Lighting							x
Exterior							x
Interior							x
Windows							x
Electrical							x
Conduit							x
Standby Generation							x
Man/ auto transfer							x
Motor Control Panel							x
VFD							x
Motors							x
Pumps							x
Pump Capacity							x
Telemetry							x
Instrument Alarms							x
Chemical Storage							x
Chemical Type							x
Chemical Injection Point							x
Chemical Analyzer Equipment							x
Metering Facilities							x
Piping							x
Pipe and Fitting Supports							x
Hangers							x
Gate Valves							x
Check Valves							x
Pump Control Valves							x
Pressure Relief Valves							x
Altitude Valve							x
Gravity							x
Sump pump							x
Flood Potential							x
Safety Railing							x
Ventilation							x
Cooling							x
Heat							x
Cross Connection/Backflow							x
Visual Hazards							x
Safety Compliance							x
Safety Data Sheets							x
Tank Capacity							x
Eye Wash							x
Ladder Access							x
Vandal Guard							x
Safety Cable							x
Safety Harness/Belt							x
House Cleaning							x

PRIORITY SCORE	4.0	RISK FACTOR	MEDIUM - AGGRESSIVE MONITORING
Condition	Good		
% Useful Life Remaining	110%		
Is the asset maintained according to manufacturer's recommendations?		☒ Yes ☐ No	
Redundancy			
Does the asset have a backup system in its entirety:	50% Backup	(Select one)	
Redundancy Factor	0.5		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Major	(Select one)
Condition Factor	8		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977 (Oldest Pipe)	13
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$120 / LF	60 Years	14.3
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2038	3.8

Optional Information

Manufacturer	Address	Phone Number
NOT AVAILABLE		
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes: The Town should begin the planning process 10 years before construction construction is needed

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Asset Name	Location		Asset Institute
Associated Asset	Associated Location		Asset Longitude
Asset ID	Asset Size		Asset Latitude
Storage Capacity in Days	Capacity		Current Year

Asset Category: ☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Distribution ☐ Other

Asset Status: ☒ Active ☐ Active Use Abandoned ☐ Not in Use/Back up ☐ Future Investment ☒ Distribution ☐ Other

Can this asset be managed? ☒ Yes ☐ No | Can this asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional): | Show asset in schematic? ☒ Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT (0)	REDUNDANCY
Security Fencing							x
Walk Ways							x
Signage							x
Doors							x
Hardware							x
Tank exterior							x
Tank interior							x
Building exterior							x
Building interior							x
Roof							x
Floor condition							x
Floor Drainage							x
Lighting							x
Exterior							x
Interior							x
Windows							x
Electrical							x
Conduit							x
Standby Generation							x
Main/ auto transfer							x
Motor Control Panel							x
VFD							x
Motors							x
Pumps							x
Pump Capacity							x
Telemetry							x
Intrusion Alarms							x
Chemical Storage							x
Chemical Type							x
Chemical Injection Point							x
Chemical Analyzer Equipment							x
Metering Facilities							x
Piping			x				
Pipe and Fitting Supports							x
Hangers							x
Gate Valves							x
Check Valves							x
Pump Control Valves							x
Pressure Relief Valves							x
Altitude Valve							x
Gravity							x
Sump pump							x
Flood Potential							x
Safety Railing							x
Ventilation							x
Cooling							x
Heat							x
Cross Connection/Backflow							x
Visual Hazards							x
Safety Compliance							x
Safety Data Sheets							x
Tank Capacity							x
Eye Wash							x
Ladder Access							x
Vandal Guard							x
Safety Cable							x
Safety Harness/Belt							x
House Cleaning							x

PRIORITY SCORE	4.0	RISK FACTOR	MEDIUM - AGGRESSIVE MONITORING
Condition	Good		
% Useful Life Remaining	118%		
Is the asset maintained according to manufacturer's recommendations?		☒ Yes	☐ No
Redundancy			
Does the asset have a backup system in its entirety	0% Backup	(Select one)	
Redundancy Factor	0		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Minor	(Select one)
Condition Factor	8		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1995 (Oldest Pipe)	31
Replacement Cost	Estimated Useful Life (EUL)	Remaining Useful Life (RUL)
$100 / LF	60 Years	34.1
Routine Annual Maintenance Costs	Replacement Year	Probability of Failure (POF)
$	2058	4.3

Optional Information

Manufacturer	Address	Phone Number
NOT AVAILABLE		
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes:

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Town of Holden Beach

Asset Name	Location		Asset/Attributes
Make/Mfg	Warranty Start Date		
Associated Asset	Associated Location		Asset Long Lat#
Asset ID	Asset Size		Town of Land
Storage Capacity in Days	Capacity		Lease Term
	☐ Adequate ☐ Oversized ☐ Undersized		

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☐ Distribution ☐ Other

Asset Status

☐ Active ☐ Water Use Abandoned ☐ Not in Use-Back Up ☐ Future Investment ☐ Distribution ☐ Other

Can this asset be repaired?	☐ Yes ☐ No	Can this asset be refurbished?	☐ Yes ☐ No
Asset Replaced (optional)		Drawings in attachment?	☐ Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	NOT APPLICABLE
Security Fencing							x
Walk Ways							x
Signage							x
Doors							x
Hardware							x
Tank Exterior							x
Tank Interior							x
Building Exterior							x
Building Interior							x
Roof							x
Floor Condition							x
Floor Drainage							x
Lighting							x
Exterior							x
Interior							x
Windows							x
Electrical							x
Conduit							x
Standby Generator							x
Manual/ auto transfer							x
Motor Control Panel							x
VFD							x
Motors							x
Pumps							x
Pump Capacity							x
Telemetry							x
Intrusion Alarms							x
Chemical Storage							x
Chemical Pipe							x
Chemical Injection Point							x
Chemical Analyzer Equip							x
Metering Facilities							x
Piping			3				
Pipe and Fitting Supports			3				
Hangers							x
Gate Valves				3			
Check Valves							x
Pump Control Valves							x
Pressure Relief Valves							x
Altitude Valve							x
Gravity							x
Sump pump							x
Flood Potential			4				x
Safety Railing							x
Ventilation							x
Cooling							x
Heat							x
Cross Connection/Backflow							x
Visual Hazards							x
Safety Compliance							x
Safety Data Sheets							x
Tank Capacity							x
Eye Wash							x
Ladder Access							x
Vandal Guard							x
Safety Cable							x
Safety Harness/Belt							x
House Cleaning							x

PRIORITY SCORE	3.3	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Fair (Average)		
% Useful Life Remaining	100%		
Is the asset maintained according to manufacturer's recommendations?		☐ Yes ☐ No	

Redundancy

Does the asset have a backup system in its entirety: 50% Backup (Select one)

Redundancy Factor: 0.5

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977	3
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	50 Years	3
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2027	4.7

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Location: Town of Holden Beach

Asset Name	Location		Asset Unit Number
Manufacturer	Warranty		
Associated Asset	Associated Location		Asset Serial Number
Asset ID	Asset Size		Area of Land
Storage Capacity in Days	Capacity		Current Year

Utilization: ☐ Underutilized ☒ Right-sized ☐ Overstressed

Asset Category: ☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Distribution ☐ Other

Asset Status: ☒ Active ☐ Not in Use-Abandoned ☐ Not in Use-Backup ☐ Future Investment ☐ Distribution ☐ Other

Can this asset be repaired? ☒ Yes ☐ No — Can the asset be retrofitted? ☒ Yes ☐ No

Asset Replaced (unused): — Show asset in schematic? ☒ Yes ☐ No

Asset Type:

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	NR/UNKNOWN	
Security Fencing							X	
Wall Mass							X	
Signage							X	
Doors							X	
Hardware							X	
Tank Exterior							X	
Tank Interior							X	
Building Exterior							X	
Building Interior							X	
Roof							X	
Floor Condition							X	
Floor Drainage							X	
Lighting							X	
Exterior							X	
Interior							X	
Windows							X	
Electrical							X	
Conduit							X	
Standby Generator							X	
Manual/ auto transfer							X	
Motor Control Panel							X	
VFD							X	
Motors							X	
Pumps							X	
Pump Capacity							X	
Telemetry							X	
Instrument Alarms							X	
Chemical Storage							X	
Chemical Type							X	
Chemical Injection Point							X	
Chemical Analyzer Equip							X	
Metering Facilities							X	
Piping							X	
Pipe and Fitting Supports							X	
Operational Condition			3	2				Mostly Weather wheels are good features, reparable and replaceable
Gate Valves			3					
Paint Condition			3	2				Some need painting (wheels), others are in good shape
Pump Control Valves						X		
Pressure Relief Valves						X		
Altitude Valve						X		
Gravity						X		
Sump pump						X		
Flood Potential						X		
Safety Railing						X		
Ventilation						X		
Cooling						X		
Heat						X		
Cross Connection/Backflow						X		
Visual Hazards						X		
Safety Compliance						X		
Safety Data Sheets						X		
Tank Capacity						X		
Eye Wash						X		
Ladder Access						X		
Vandal Guard						X		
Safety Cable						X		
Safety Harness/Belt						X		
House Cleaning						X		

PRIORITY SCORE 3.0 (1 per Average) — **RISK FACTOR** — **LOW - ROUTINE MAINTENANCE**

Condition

% Useful Life Remaining: 100%

Is the asset maintained according to manufacturer's recommendations? ☒ Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 100% Backup (Select one)

Redundancy Factor: 0.9

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977	3
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	50 Years	3
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2027	0.9

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

Green Engineering	101 Gallberry Street Court PO Box 609 Wallace, NC 28466 www.greenengineering.com Ph: 252/237-5365 Fax: 252/243-7489	Town of Holden Beach Water and Wastewater System Asset Assessment Checklist
	Owner: Town of Holden Beach	Date Performed: February 2018 Performed by: [illegible]

Asset Name	Location	Asset Latitude
Meters/Radium	Various	
Associated Asset	**Secondary Location**	**Asset Longitude**
Asset ID	**Asset Size**	**Parcel of Land**
Storage Capacity in Days	**Capacity**	**Linear Feet**
	X Adequate ☐ Overutilized ☐ Underutilized	

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage X Distribution ☐ Other

Asset Status

X Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment X Distribution ☐ Other

Can this asset be repaired? X Yes ☐ No — Can this Asset be rehabilitated? X Yes ☐ No

Asset Replaced (optional): — Show asset on schematic? X Yes ☐ No

Asset Type

Item	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY	Notes
Security Fencing						x		
Walk Ways						x		
Signage						x		
Doors						x		
Hardware						x		
Tank Exterior						x		
Tank Interior						x		
Building Exterior						x		
Building Interior						x		
Roof						x		
Floor Condition						x		
Floor Drainage						x		
Lighting						x		
Exterior						x		
Interior						x		
Windows						x		
Electrical						x		
Conduit						x		
Standby Generator						x		
Manual/ auto transfer						x		
Motor Control Panel						x		
VFD						x		
Motors						x		
Pumps						x		
Pump Capacity						x		
Telemetry						x		
Intrusion Alarms						x		
Chemical Storage						x		
Chemical Type						x		
Chemical Injection Point						x		
Chemical Analyzer Equip						x		
Metering Facilities						x		
Piping						x		
Pipe and Fitting Supports						x		
Operational Condition		x	x					Sensus reliable meters and [illegible] Radios [illegible] top of lid
Gate Valves						x		Holden Beach has a good supply of Replacement Meters and Radios
Paint Condition						x		Meter cut-off box excellent durability (Ford Meter box made in USA)
Pump Control Valves						x		
Pressure Relief Valves						x		
Altitude Valve						x		
Gravity						x		
Sump pump						x		
Flood Potential						x		
Safety Railing						x		
Ventilation						x		
Cooling						x		
Heat						x		
Cross Connection/Backflow						x		
Visual Hazards						x		
Safety Compliance						x		
Safety Data Sheets						x		
Tank Capacity						x		
Eye Wash						x		
Ladder Access						x		
Vandal Guard						x		
Safety Cable						x		
Safety Harness/Belt						x		
House Cleaning						x		

PRIORITY SCORE	3.5	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Good		

% Useful Life Remaining: 110%

Is the asset maintained according to manufacturer's recommendations? x Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 100% Backup (Select one)

Redundancy Factor: 0.9

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$	2015	6
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	15 Years	6.6
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2031	0.6

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach

Date of Assessment: January 2024

Asset Name	Location	Asset Latitude
Make / Model	Manufacturer	
Department Asset	Asset Specific Location	Asset Longitude
Asset ID	Asset Size	Acres of Land
Storage Capacity in Days	Capacity	Design Year
	☒ Published ☐ Oversized ☐ Undersized	
Asset Category		
☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Distribution ☐ Other		
Asset Status		
☒ Active ☐ Out of Use - Abandoned ☐ Out of Use - Back Up ☐ Future Investment ☒ Distribution ☐ Other		
Can this asset be repaired? ☒ Yes ☐ No	Can this asset be rehabilitated? ☒ Yes ☐ No	
Asset Replaced (Annual)	From asset schematic? ☒ Yes ☐ No	
Asset Type		

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REQUIRED/ NEEDS REPAIR	
Security Fencing							x	
Walk ways							x	
Signage							x	
Doors							x	
Hardware							x	
Tank Exterior							x	
Tank Interior							x	
Building Exterior							x	
Building Interior							x	
Roof							x	
Floor Condition							x	
Floor Drainage							x	
Lighting							x	
Exterior							x	
Interior							x	
Windows							x	
Electrical							x	
Conduit							x	
Standby Generator							x	
Manual/ auto transfer							x	
Motor Control Panel							x	
VFD							x	
Motors							x	
Pumps							x	
Pump Capacity							x	
Telemetry							x	
Instrusion Alarms							x	
Chemical Storage							x	
Chemical Type							x	
Chemical Injection Point							x	
Chemical Analyzer Equip							x	
Metering Facilities							x	
Piping							x	
Pipe and Fitting Supports							x	
Operational Condition			x					Various reliable meters and Master PRV Radios w/ antenna risk of fail
Gate Valves							x	Holden Beach has a good supply of Replacement Meters and Radios
Paint Condition							x	Meter cut-off are excellent durability (Ford Meter box made of ABS)
Pump Control Valves							x	
Pressure Relief Valves							x	
Altitude Valve							x	
Gravity							x	
Sump pump							x	
Flood Potential							x	
Safety Railing							x	
Ventilation							x	
Cooling							x	
Heat							x	
Cross Connection/Backflow							x	
Visual Hazards							x	
Safety Compliance							x	
Safety Data Sheets							x	
Tank Capacity							x	
Eye Wash							x	
Ladder Access							x	
Vandal Guard							x	
Safety Cable							x	
Safety Harness/Belt							x	
House Cleaning							x	

PRIORITY SCORE	3.0	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Fair (Average)		
% Useful Life Remaining	100%		
Is the asset maintained according to manufacturer's recommendations?		☒ Yes	☐ No
Redundancy			
Does the asset have a backup system or is entirety	100% Backup	(Select one)	
Redundancy Factor:	0.9		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Minor	(Select one)
Condition Factor:	4		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	2015	6
Replacement Cost	Estimated Useful Life (EUL)	Remaining Useful Life (RUL)
	15 Years	6
Routine Annual Maintenance Costs	Replacement Year	Probability of Failure (POF)
$	2030	0.6

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes

Green Engineering
[illegible] Street East
PO Box [illegible]
Wilson, NC [illegible]
www.greeneng.com
Ph: [illegible]
Fax: [illegible]

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach	Date: [illegible] 2024	Performed by: [illegible]
Asset Name	**Location**	**Asset Latitude**
Meters 2" inch	Various	
Associated Asset	**Associated Location**	**Asset Longitude**
Asset ID	**Asset Size**	**Borrower Land**
Storage Capacity in Days	**Capacity**	**Linear Feet**
	X Full sized ☐ Oversized ☐ Undersized	

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage X Distribution ☐ Other

Asset Status

X Active ☐ Not in Use-Abandoned ☐ Not in Use-Backup ☐ Future Investment X Distribution ☐ Other

Can this asset be repaired? X Yes ☐ No — Can this asset be rehabilitated? X Yes ☐ No

Asset Replaced (option al): — Show asset in schematic? X Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY	
Security Fencing						•		
Walk Ways						•		
Signage						•		
Doors						•		
Hardware						•		
Tank Exterior						•		
Tank Interior						•		
Building Exterior						•		
Building Interior						•		
Roof						•		
Floor Condition						•		
Floor Drainage						•		
Lighting						•		
Exterior						•		
Interior						•		
Windows						•		
Electrical						•		
Conduit						•		
Standby Generator						•		
Manual/ auto transfer						•		
Motor Control Panel						•		
VFD						•		
Motors						•		
Pumps						•		
Pump Capacity						•		
Telemetry						•		
Intrusion Alarms						•		
Chemical Storage						•		
Chemical Type						•		
Chemical Injection Point						•		
Chemical Analyzer Equip						•		
Metering Facilities						•		
Piping						•		
Pipe and Fitting Supports						•		
Operational Condition		•	•					Sensus reliable meters and Flexnet [illegible] Radios w/ antenna top of lid
Gate Valves						•		Holden Beach has a good supply of Replacement Meters and Radios
Paint Condition						•		Meter cut-off has excellent durability (Ford Meter box made in USA)
Pump Control Valves						•		
Pressure Relief Valves						•		
Altitude Valve						•		
Gravity						•		
Sump pump						•		
Flood Potential						•		
Safety Railing						•		
Ventilation						•		
Cooling						•		
Heat						•		
Cross Connection/Backflow						•		
Visual Hazards						•		
Safety Compliance						•		
Safety Data Sheets						•		
Tank Capacity						•		
Eye Wash						•		
Ladder Access						•		
Vandal Guard						•		
Safety Cable						•		
Safety Harness/Belt						•		
House Cleaning						•		

PRIORITY SCORE	3.5	**RISK FACTOR**	**LOW - ROUTINE MAINTENANCE**
Condition	Good		

% Useful Life Remaining: 110%

Is the asset maintained according to manufacturer's recommendations? x Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 100% Backup (Select one)

Redundancy Factor: 0.9

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	**Installation Date**	**Estimated Remaining Useful Life (ERUL)**
$ -	2015	6
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	15 Years	6.6
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2031	0.6

Optional Information

Manufacturer	**Address**	**Phone Number**
Supplier Name	**City, State, Zip**	**Fax Number**
Sensus		
Model Number	**Notes**	

Additional Notes:

Green Engineering	303 Goldsboro Street East, PO Box 609, Wilson, NC 27894 · www.greenengineering.com · Ph: 252.237.5365 · Fax: 252.243.7489	Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner	Date Performed	Performed by
Town of Holden Beach	[illegible]	[illegible]

Asset Name	Location	Asset Latitude
Tank 2 Elevated Storage Tank (Only One in System)	[illegible] Brunswick Avenue West and [illegible] St	[illegible] N
Associated Asset	**Secondary Location**	**Asset Longitude**
		78° [illegible] W
Asset ID	**Asset Size**	**Accuracy**
Tank 2	300,000 Gallons	
Storage Capacity in Days	**Capacity**	**Linear Feet**
	x Full-sized ☐ Oversized ☐ Undersized	

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment x Storage ☐ Distribution x Other

Asset Status

x Active ☐ Not in Use Abandoned ☐ Not in Use Back Up ☐ Future Investment x Distribution ☐ Other

Can this asset be repaired? x Yes ☐ No — Can this asset be rehabilitated? x Yes ☐ No

Asset Replaced (optional): — Show asset in schematic? x Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY	
Security Fencing		4						
Walk Ways						x		
Signage		4						On Tank
Doors						x		
Hardware						x		
Tank exterior		4						Utility Service Maintenance Contract
Tank interior								Utility Service Maintenance Contract/Not inspected
Building exterior						x		
Building interior						x		
Roof						x		
Floor condition						x		
Floor Drainage						x		
Lighting						x		
Exterior						x		
Interior						x		
Windows						x		
Electrical		4						
Conduit		4						
Standby Generator						x		[illegible] Maintenance Contract
Man/ auto transfer						x		
Motor Control Panel						x		
VFD						x		
Motors						x		
Pumps						x		
Pump Capacity						x		
Telemetry		4						Radio Telemetry, Custom Controls [illegible]
Intrusion Alarms						x		
Chemical Storage						x		
Chemical Type						x		
Chemical Injection Point						x		
Chemical Analyzer Equipment						x		
Metering Facilities						x		
Piping								Full of water [illegible]
Pipe and Fitting Supports								Full of water
Hangers						x		
Gate Valves								Full of water
Check Valves								Full of water
Pump Control Valves						x		
Pressure Relief Valves						x		
Altitude Valve								Full of water
Gravity Drains						x		
Sump pump			3					Full of water
Flood Potential				2				
Safety Railing						x		
Ventilation						x		
Cooling						x		
Heat						x		
Cross Connection/Backflow						x		
Visual Hazards						x		
Safety Compliance						x		
Safety Data Sheets						x		
Tank Capacity		4						300,000
Eye Wash						x		
Ladder Access		4						Inside Tank
Vandal Guard						x		
Safety Cable		4						
Safety Harness/Belt		4						
House Cleaning		4						

PRIORITY SCORE	3.8	RISK FACTOR	MEDIUM - AGGRESSIVE MONITORING
Condition	Good		

% Useful Life Remaining: 110%

Is the asset maintained according to manufacturer's recommendations? x Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Major (Select one)

Condition Factor: 8

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
	1977	53
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$ 1,100,000.00	100 Years	58.3
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2082	4.2

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Town of Holden Beach

Asset Name:	Location:		Asset Latitude:
Assessment Date:	Assessed By:		Asset Longitude:
Asset ID:	Asset Tag:		Acres of Land:
Tank Capacity in Days:	Capacity:		Linear Feet:

Asset Category: ☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☐ Distribution ☐ Other

Asset Status: ☐ Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment ☐ Distribution ☐ Other

Can this asset be repaired? ☐ Yes ☐ No | Can this asset be rehabilitated? ☐ Yes ☐ No | Asset replaced / removed: | Show asset in schematic? ☐ Yes ☐ No

Asset Type:

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing			4				
Walk Ways						4	
Signage						4	
Doors			3				
Hardware			4				
Tank exterior						4	
Tank interior						4	
Building exterior			4				
Building interior			4				
Roof			4				
Floor condition			4				
Floor Drainage						4	
Lighting				2			
Exterior						4	
Interior						4	
Windows						4	
Electrical			4				
Conduit			4				
Standby Generation					1		
Man / auto transfer				2			
Motor Control Panel						4	
VFD						4	
Motors						4	
Pumps						4	
Pump Capacity						4	
Telemetry			3				
Intrusion Alarms						4	
Chemical Storage						4	
Chemical Type						4	
Chemical Injection Point						4	
Chemical Analyzer Equipment						4	
Metering Facilities						4	
Piping						4	
Pipe and Fitting Supports						4	
Hangers						4	
Gate Valves						4	
Check Valves						4	
Pump Control Valves						4	
Pressure Relief Valves						4	
Altitude Valve						4	
Gravity Drains						4	
Sump pump						4	
Flood Potential						4	
Safety Railing						4	
Ventilation						4	
Cooling						4	
Heat						4	
Cross Connection/Backflow						4	
Visual Hazards						4	
Safety Compliance						4	
Safety Data Sheets						4	
Tank Capacity						4	
Eye Wash						4	
Ladder Access						4	
Vandal Guard						4	
Safety Cable						4	
Safety Harness/Belt						4	
House Cleaning		4					

PRIORITY SCORE	3.6	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Good		

% Useful Life Remaining: 110%

Is the asset maintained according to manufacturer's recommendations? ☐ Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ 15,000.00	2008	14
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
$ 80,000.00	30 Years	15.4
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2039	4.9

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes:

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Town of Holden Beach

Asset Name	Location	Asset Latitude
Manufacturer/Asset	Description/Location	Asset Longitude
Asset ID	Asset Type	Asset Additional
Storage Expenditure Class	Capacity	Usage Type

Asset Category: Source | Pumping Facility | Treatment | Storage | Distribution | Other

Asset Status: Active | Water Use Abandoned | Not in Use-Back Up | Future Investment | Distribution | Other

Can this asset be repaired? Yes | No | Can this asset be rehabilitated? Yes | No

Asset Replacement (optional) | Show asset in schematic? Yes | No

Asset Type:

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	NEGLIGIBLE/NA
Security Fencing							x
Walk Ways							x
Signage							x
Doors							x
Hardware							x
Tank Exterior							x
Tank Interior							x
Building Exterior							x
Building Interior							x
Roof							x
Floor Condition							x
Floor Drainage							x
Lighting							x
Exterior							x
Interior							x
Windows							x
Electrical							x
Conduit							x
Standby Generator							x
Manual/ auto transfer							x
Motor Control Panel							x
VFD							x
Motors							x
Pumps							x
Pump Capacity							x
Telemetry							x
Instrusion Alarms							x
Chemical Storage							x
Chemical Type							x
Chemical Injection Point							x
Chemical Analyzer Equip							x
Metering Facilities							x
Piping							x
Pipe and Fitting Supports							x
Operational Condition							x
Gate Valves		4	3	2	1		
Paint Condition							x
Pump Control Valves							x
Pressure Relief Valves							x
Altitude Valve							x
Gravity							x
Sump pump							x
Flood Potential							x
Safety Railing							x
Ventilation							x
Cooling							x
Heat							x
Cross Connection/Backflow							x
Visual Hazards							x
Safety Compliance							x
Safety Data Sheets							x
Tank Capacity							x
Eye Wash							x
Ladder Access							x
Vandal Guard							x
Safety Cable							x
Safety Harness/Belt							x
House Cleaning							x

PRIORITY SCORE 2.5 | **RISK FACTOR** | **LOW - ROUTINE MAINTENANCE**

Condition Fair (Average)

% Useful Life Remaining: 100%

Is the asset maintained according to manufacturer's recommendations? x Yes | No

Redundancy

Does the asset have a backup system or is entirety: 50% Backup (Select one)

Redundancy Factor: 0.5

Consequence of Failure

What is the effect on the system should the asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1977	3
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	50 Years	3
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2027	4.7

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach

Date/Time Assessed: February 2024

Performed By: Barry Price

Asset Name	Location	Asset Facility
Small Diameter PVC Sewer	Various	
Associated Asset	Associated Location	Asset Sub-Facility
Asset ID	Asset Size	Material/Lined
Storage Capacity in Days	Capacity	Linear Feet

Asset Condition: ☒ Excellent ☐ Average ☐ Below Average ☐ Poor (Unreliable)

Asset Category: ☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Collection ☐ Other

Asset Status: ☒ Active ☐ Not in Use-Abandoned ☐ Not in Use-Needs Rpr ☐ Future Investment ☒ Collection ☐ Other

Can this asset be repaired? ☒ Yes ☐ No | Can this asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional) | Show asset on schematic? ☒ Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing							x
Walk Ways							x
Signage							x
Doors							x
Hardware							x
Tank Exterior							x
Tank Interior							x
Building Exterior							x
Building Interior							x
Roof							x
Floor Condition							x
Floor Drainage							x
Lighting							x
Exterior							x
Interior							x
Windows							x
Electrical							x
Conduit							x
Standby Generator							x
Manual/ auto transfer							x
Motor Control Panel							x
VFD							x
Motors							x
Pumps							x
Pump Capacity							x
Telemetry							x
Intrusion Alarms							x
Chemical Storage							x
Chemical Type							x
Chemical Injection Point							x
Chemical Analyzer Equip							x
Metering Facilities							x
Piping							x
Pipe and Fitting Supports							x
Hangers							x
Gate Valves							x
Check Valves							x
Pump Control Valves							x
Pressure Relief Valves							x
Altitude Valve							x
Gravity							x
Sump pump							x
Flood Potential							x
Safety Railing							x
Ventilation							x
Cooling							x
Heat							x
Cross Connection/Backflow							x
Visual Hazards							x
Safety Compliance							x
Safety Data Sheets							x
Tank Capacity							x
Eye Wash							x
Ladder Access							x
Vandal Guard							x
Safety Cable							x
Safety Harness/Belt							x
House Cleaning							x

PRIORITY SCORE	3.5	RISK FACTOR	MEDIUM - AGGRESSIVE MONITORING
Condition	Good		
% Useful Life Remaining	110%		
Is the asset maintained according to manufacturer's recommendations?		☒ Yes	☐ No
Redundancy			
Does the asset have a backup system in its entirety	0% Backup	(Select one)	
Redundancy Factor:	0		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Moderate	(Select one)
Condition Factor:	6		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1994	33
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	60 Years	33
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2057	4.5

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes

Green Engineering

[illegible]

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach	Date Performed: February 2024	Performed By: [illegible]
Asset Name	**Location**	**Asset Latitude**
Direct/Vacuum Sewer	Various	
Associated Asset	**Associated Location**	**Asset Longitude**
Asset ID	**Asset Size**	**Acres of Land**
Storage Capacity in Gals	**Capacity**	**Linear Feet**
	☒ Sufficient ☐ Oversized ☐ Undersized	[illegible]

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Collection ☐ Other

Asset Status

☒ Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment ☒ Collection ☐ Other

Can this asset be repaired? ☒ Yes ☐ No — Can this Asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced-optional — Is the asset maintenance? ☒ Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing						x	
Walk Ways						x	
Signage						x	
Doors						x	
Hardware						x	
Tank Exterior						x	
Tank Interior						x	
Building Exterior						x	
Building Interior						x	
Roof						x	
Floor Condition						x	
Floor Drainage						x	
Lighting						x	
Exterior						x	
Interior						x	
Windows						x	
Electrical						x	
Conduit						x	
Standby Generator						x	
Manual/ auto transfer						x	
Motor Control Panel						x	
VFD						x	
Motors						x	
Pumps						x	
Pump Capacity						x	
Telemetry						x	
Instrument Alarms						x	
Chemical Storage						x	
Chemical Type						x	
Chemical Injection Point						x	
Chemical Analyzer Equip						x	
Metering Facilities						x	
Piping		x	x				
Pipe and Fitting Supports						x	
Hangers						x	
Gate Valves						x	
Check Valves						x	
Pump Control Valves						x	
Pressure Relief Valves						x	
Altitude Valve						x	
Gravity						x	
Sump pump						x	
Flood Potential						x	
Safety Railing						x	
Ventilation						x	
Cooling						x	
Heat						x	
Cross Connection/Backflow						x	
Visual Hazards						x	
Safety Compliance						x	
Safety Data Sheets						x	
Tank Capacity						x	
Eye Wash						x	
Ladder Access						x	
Vandal Guard						x	
Safety Cable						x	
Safety Harness/Belt						x	
House Cleaning						x	

PRIORITY SCORE	3.5	**RISK FACTOR**	**LOW - ROUTINE MAINTENANCE**
Condition	Good		

% Useful Life Remaining: 110%

Is the asset maintained according to manufacturer's recommendations? x Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: **0% Backup** (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? **Minor** (Select one)

Condition Factor: 4

Original Cost	**Installation Date**	**Estimated Remaining Useful Life (ERUL)**
$ -	1994	30
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	60 Years	33
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2057	4.5

Optional Information

Manufacturer	**Address**	**Phone Number**
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Add Local Notes

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Town of Holden Beach

Asset Name	Location		Asset Latitude
Associated Asset	Associated Location		Asset Longitude
Asset ID	Asset Size		Asset Unit
Storage Capacity in Days	Capacity		Asset Year
	Adequate	Overrated	Underrated	Unknown

Asset Category

Source | Pumping Facility | Treatment | Storage | Sewer Line | Other

Asset Status

Active | Water Use Abandoned | Water Use Backup | Future Investment | Sewer Force Main | Other

Can this asset be repaired? Yes | No

Can this asset be rehabilitated? Yes | No

Asset Replaced (optional)

Show asset in schematic? Yes | No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing							x
Walk Ways							x
Signage							x
Doors							x
Hardware							x
Tank Exterior							x
Tank Interior							x
Building Exterior							x
Building Interior							x
Roof							x
Floor Condition							x
Floor Drainage							x
Lighting							x
Exterior							x
Interior							x
Windows							x
Electrical							x
Conduit							x
Standby Generator							x
Manual/ auto transfer							x
Motor Control Panel							x
VFD							x
Motors							x
Pumps							x
Pump Capacity							x
Telemetry							x
Intrusion Alarms							x
Chemical Storage							x
Chemical Type							x
Chemical Injection Point							x
Chemical Analyzer Equip							x
Metering Facilities							x
Piping							x
Pipe and Fitting Supports							x
Hangers							x
Gate Valves							x
Check Valves							x
Pump Control Valves							x
Pressure Relief Valves							x
Altitude Valve							x
Gravity							x
Sump pump							x
Flood Potential							x
Safety Railing							x
Ventilation							x
Cooling							x
Heat							x
Cross Connection/BackFlow							x
Visual Hazards							x
Safety Compliance							x
Safety Data Sheets							x
Tank Capacity							x
Eye Wash							x
Ladder Access							x
Vandal Guard							x
Safety Cable							x
Safety Harness/Belt							x
House Cleaning							x

PRIORITY SCORE	3.0	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Fair (Average)		
% Useful Life Remaining	100%		

Is the asset maintained according to manufacturer's recommendations? Yes | No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1994	30
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	60 Years	30
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2054	5.0

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes

Green Engineering
[illegible] Street [illegible]
PO Box [illegible]
[illegible], NC [illegible]
[illegible]
Ph: [illegible]
Fax: [illegible]

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach

Date Performed: [illegible]

Performed By: [illegible]

Asset Name	**Location**	**Asset Latitude**
[illegible] Inch Vacuum [illegible] Sewer	[illegible] Vacuum PS	
Associated Asset	**Associated Location**	**Asset Longitude**
Asset ID	**Asset Size**	**Area of Land**
Storage Capacity in Days	**Capacity**	**Linear Feet**
	☒ Fill [illegible] ☐ Oversized ☐ Undersized	[illegible] ([illegible] miles)

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Collection ☐ Other

Asset Status

☒ Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment ☒ Collection ☐ Other

Can this asset be repaired?	☒ Yes	☐ No	Can this Asset be rehabilitated?	☒ Yes	☐ No
Asset Replaced (optional):			Show asset in schematic?	☒ Yes	☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing						x	
Walk Ways						x	
Signage						x	
Doors						x	
Hardware						x	
Tank Exterior						x	
Tank Interior						x	
Building Exterior						x	
Building Interior						x	
Roof						x	
Floor Condition						x	
Floor Drainage						x	
Lighting						x	
Exterior						x	
Interior						x	
Windows						x	
Electrical						x	
Conduit						x	
Standby Generator						x	
Manual/ auto transfer						x	
Motor Control Panel						x	
VFD						x	
Motors						x	
Pumps						x	
Pump Capacity						x	
Telemetry						x	
Intrusion Alarms						x	
Chemical Storage						x	
Chemical Type						x	
Chemical Injection Point						x	
Chemical Analyzer Equip						x	
Metering Facilities						x	
Piping			x				
Pipe and Fitting Supports						x	
Hangers						x	
Gate Valves						x	
Check Valves						x	
Pump Control Valves						x	
Pressure Relief Valves						x	
Altitude Valve						x	
Gravity						x	
Sump pump						x	
Flood Potential						x	
Safety Railing						x	
Ventilation						x	
Cooling						x	
Heat						x	
Cross Connection/Backflow						x	
Visual Hazards						x	
Safety Compliance						x	
Safety Data Sheets						x	
Tank Capacity						x	
Eye Wash						x	
Ladder Access						x	
Vandal Guard						x	
Safety Cable						x	
Safety Harness/Belt						x	
House Cleaning						x	

PRIORITY SCORE	3.0	**RISK FACTOR**	**LOW - ROUTINE MAINTENANCE**
Condition	Fair (Average)		

% Useful Life Remaining: 100%

Is the asset maintained according to manufacturer's recommendations? ☒ Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	**Installation Date**	**Estimated Remaining Useful Life (ERUL)**
$ -	1994	30
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	60 Years	30
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2054	5.0

Optional Information

Manufacturer	**Address**	**Phone Number**
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Town of Holden Beach

Asset Name	Location	Asset Latitude
Assessment Team	Associated Location	Asset Longitude
Asset ID	Asset Size	Asset Use
Storage Capacity in Days	Capacity	Linear Feet

Asset Condition: ☒ Excellent ☐ Good ☐ Moderate ☐ Poor (0.00% | 0.00 miles)

Asset Category: ☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Sewer Pipe ☐ Other

Asset Status: ☒ Active ☐ Out of Use-Abandoned ☐ Not in the Ground Yet ☐ Future Investment ☒ Sewer Pipe ☐ Other

Can this asset be repaired? ☒ Yes ☐ No | Can this Asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional) | Show asset in schematic? ☒ Yes ☐ No

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing						X	
Work Ways						X	
Signage						X	
Doors						X	
Hardware						X	
Tank Exterior						X	
Tank Interior						X	
Building Exterior						X	
Building Interior						X	
Roof						X	
Floor Condition						X	
Floor Drainage						X	
Lighting						X	
Exterior						X	
Interior						X	
Windows						X	
Electrical						X	
Conduit						X	
Standby Generator						X	
Manual / auto transfer						X	
Motor Control Panel						X	
VFD						X	
Motors						X	
Pumps						X	
Pump Capacity						X	
Telemetry						X	
Instrusion Alarms						X	
Chemical Storage						X	
Chemical Type						X	
Chemical Injection Point						X	
Chemical Analyzer Equip						X	
Metering Facilities						X	
Piping				X			
Pipe and Fitting Supports						X	
Hangers						X	
Gate Valves						X	
Check Valves						X	
Pump Control Valves						X	
Pressure Relief Valves						X	
Altitude Valve						X	
Gravity						X	
Sump pump						X	
Flood Potential						X	
Safety Railing						X	
Ventilation						X	
Cooling						X	
Heat						X	
Cross Connection/Backflow						X	
Visual Hazards						X	
Safety Compliance						X	
Safety Data Sheets						X	
Tank Capacity						X	
Eye Wash						X	
Ladder Access						X	
Vandal Guard						X	
Safety Cable						X	
Safety Harness/Belt						X	
House Cleaning						X	

PRIORITY SCORE	3.0	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Fair (Average)		
% Useful Life Remaining	100%		
Is the asset maintained according to manufacturer's recommendations?		☒ Yes	☐ No
Redundancy			
Does the asset have a backup system in its entirety	0% Backup	(Select one)	
Redundancy Factor	0		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Minor	(Select one)
Condition Factor	4		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1994	30
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	60 Years	30
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2054	5.0

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes

Green Engineering

[illegible]
Ph. [illegible]
Fax [illegible]

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach	Date of Assessment: January 2024	
Performed by: [illegible]	Data/Points: [illegible]	
Asset Name	**Location**	**Asset Latitude**
[illegible] Vacuum/PAC Sewer	PS [illegible]	
Associated Asset	**Associated Location**	**Asset Longitude**
Asset ID	**Asset Size**	**Acres of Land**
Storage Capacity in Gals	**Capacity**	**Linear Feet**
	☒ Buried ☐ Overhead ☐ Underground	☐ [illegible] ☐ [illegible]

Asset Category

☐ Source ☐ Pumping Facility ☐ Treatment ☐ Storage ☒ Collection ☐ Other

Asset Status:

Active: ☐ Not in Use-Abandoned ☒ Not in Use-Backup ☐ Future Investment ☒ Collection ☐ Other

Can this asset be repaired? ☒ Yes ☐ No — Can this Asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional): — Show asset in schematic? ☒ Yes ☐ No

Asset Type:

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing							*
Walk Ways							*
Signage							*
Doors							*
Hardware							*
Tank Exterior							*
Tank Interior							*
Building Exterior							*
Building Interior							*
Roof							*
Floor Condition							*
Floor Drainage							*
Lighting							*
Exterior							*
Interior							*
Windows							*
Electrical							*
Conduit							*
Standby Generator							*
Manual/ auto transfer							*
Motor Control Panel							*
VFD							*
Motors							*
Pumps							*
Pump Capacity							*
Telemetry							*
Instrusion Alarms							*
Chemical Storage							*
Chemical Type							*
Chemical Injection Point							*
Chemical Analyzer Equip							*
Metering Facilities							*
Piping				*			
Pipe and Fitting Supports							*
Hangers							*
Gate Valves							*
Check Valves							*
Pump Control Valves							*
Pressure Relief Valves							*
Altitude Valve							*
Gravity							*
Sump pump							*
Flood Potential							*
Safety Railing							*
Ventilation							*
Cooling							*
Heat							*
Cross Connection/Backflow							*
Visual Hazards							*
Safety Compliance							*
Safety Data Sheets							*
Tank Capacity							*
Eye Wash							*
Ladder Access							*
Vandal Guard							*
Safety Cable							*
Safety Harness/Belt							*
House Cleaning							*

PRIORITY SCORE	3.0	**RISK FACTOR**	**LOW - ROUTINE MAINTENANCE**
Condition	Fair (Average)		

% Useful Life Remaining: 100%

Is the asset maintained according to manufacturer's recommendations? ☒ Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety: 0% Backup (Select one)

Redundancy Factor: 0

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	**Installation Date**	**Estimated Remaining Useful Life (ERUL)**
$ -	1994	30
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	60 Years	30
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2054	5.0

Optional Information

Manufacturer	**Address**	**Phone Number**
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

Green Engineering
[illegible]
www.[illegible]
Ph: [illegible]
Fax: 252.[illegible]

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach | Date Performed: February 2024 | Performed By: [illegible]

Asset Name	Location	Asset Latitude
#11 Transfer, Above Ground, Entrance Shelter & Generator	#11	
Associated Asset	**Associated Location**	**Asset Longitude**
Asset ID	**Asset Size**	**Pressure/Land**
Storage Capacity in Tons	**Capacity**	**Linear Feet**
	☒ Utilized ☐ Oversized ☐ Undersized	

Asset Category

☐ Source ☒ Pumping Facility ☐ Treatment ☐ Storage ☒ Collection ☐ Other

Asset Status

☒ Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment ☒ Collection ☐ Other

Can this asset be repaired? ☒ Yes ☐ No — Can the Asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional) — Show asset in schematic? ☒ Yes ☐ No Original

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY	
Security Fencing		4						
Walk Ways		4						
Signage		4						
Doors			3					
Hardware			3					
Tank Exterior						*		
Tank Interior						*		
Building Exterior			3					
Building Interior			3					
Roof			3					
Floor Condition			3					
Floor Drainage						*		
Lighting				2				
Exterior						*		
Interior						*		
Windows			3					
Electrical			3					
Conduit			3					
Standby Generator			3					
Manual/ auto transfer			3					
Motor Control Panel			3					
VFD						*		
Motors			3					
Pumps			3					
Pump Capacity			3					
Telemetry						*		
Intrusion Alarms						*		
Chemical Storage						*		
Chemical Type						*		
Chemical Injection Point						*		
Chemical Analyzer Equip						*		
Metering Facilities			3					
Piping		4						
Pipe and Fitting Supports		4						
Hangers			3					
Gate Valves			3					
Check Valves						*		
Pump Control Valves						*		
Pressure Relief Valves						*		
Altitude Valve						*		
Gravity						*		
Sump pump			3					
Flood Potential				2				Highest Station at 14 ft msl
Safety Railing		4						
Ventilation			3					
Cooling						*		
Heat			3					
Cross Connection/Backflow						*		
Visual Hazards						*		
Safety Compliance			5					Watch Step at entrance
Safety Data Sheets						*		
Tank Capacity						*		
Eye Wash						*		
Ladder Access						*		
Vandal Guard						*		
Safety Cable						*		
Safety Harness/Belt						*		
House Cleaning		4						

PRIORITY SCORE	3.2	**RISK FACTOR**	**MEDIUM - AGGRESSIVE MONITORING**
Condition	Fair (Average)		
% Useful Life Remaining	100%		

Is the asset maintained according to manufacturer's recommendations? ☒ Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety? **100% Backup** (Select one)

Redundancy Factor: 0.9

Consequence of Failure

What is the effect on the system should this asset fail or shut down? **Minor** (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	1994	-10
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	20 Years	-10
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2014	10.0

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Town of Holden Beach

Asset Name:	Location:	Asset Latitude:	
PLC Number (Long):	HQ1		
Treatment Train:	Associated Location:	Asset Longitude:	
Asset ID:	Asset Size:	Acres of Land:	
Design Capacity (mGal):	Capacity:	Asset Age:	
	☒ Adequate ☐ Oversized ☐ Undersized		

Asset Category

☐ Source ☒ Pumping Facility ☐ Treatment ☐ Storage ☒ Collection ☐ Other

Asset Status

☒ Active ☐ Will Require Abandonment ☐ Will Require Back Up ☐ Future Investment ☐ Collection ☐ Other

Can this asset be cleaned? ☒ Yes ☐ No Can the asset be rehabilitated? ☒ Yes ☐ No

Asset Replaced (optional): Shown Asset on schematic? ☒ Yes ☐ No (Type #)

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	PHONE PRESENT	#REDUNDANCY
Security Fencing							0
Wash Bays							0
Signage							0
Doors							0
Hardware							0
Tank Exterior							0
Tank Interior							0
Building Exterior							0
Building Interior							0
Roof							0
Floor Condition							0
Floor Drainage							0
Lighting							0
Exterior							0
Interior							0
Windows							0
Electrical							0
Conduit							0
Standby Generator							0
Manual/ Auto transfer							0
Motor Control Panel							0
VFD							0
Motors			1				Have Back-up
Pumps			1				Have Back-up
Pump Capacity			1				
Telemetry						1	
Instrusion Alarms						1	
Chemical Storage						1	
Chemical Type						1	
Chemical Injection Point						1	
Chemical Analyzer Equip						1	
Metering Facilities						1	
Piping						1	
Pipe and Fitting Supports						1	
Hangers						1	
Gate Valves						1	
Check Valves						1	
Pump Control Valves						1	
Pressure Relief Valves						1	
Altitude Valve						1	
Gravity						0	
Sump pump						1	
Flood Potential						1	
Safety Railing						1	
Ventilation						1	
Cooling						1	
Heat						1	
Cross Connection/Backflow						1	
Vessel Hazards						1	
Safety Compliance						1	
Safety Data Sheets						1	
Tank Capacity						1	
Eye Wash						1	
Ladder Access						1	
Vandal Guard						1	
Safety Cable						1	
Safety Harness/Belt						1	
House Cleaning						1	

PRIORITY SCORE	3.0	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Fair (Average)		
% Useful Life Remaining	100%		
Is the asset maintained according to manufacturer's recommendations?		☒ Yes ☐ No	
Redundancy			
Does the asset have a backup system in its entirety	100% Backup	(Select one)	
Redundancy Factor	0.9		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Minor	(Select one)
Condition Factor	4		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	2005	1
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	20 Years	1
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2025	1.0

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach

Date Performed: February 2026

Asset Name	Location	Asset Latitude
PS1 Transfer Pump 2	PS1	
Associated Asset	Asset Longitude	
Asset ID	Asset Size	Asset Lat/Long
Storage Capacity in Gals.	Capacity	Linear Feet

☒ Gallons ☐ Cubic Feet ☐ Square Feet

Asset Category

☐ Source ☒ Pumping Facility ☐ Treatment ☐ Storage ☐ Collection ☐ Other

Asset Status

☐ Active ☐ Not in Use-Functional ☐ Not in Use-Back Up ☐ Future Investment ☒ Collection ☐ Other

Can this asset be repaired? ☒ Yes ☐ No | Can this asset be rehabilitated? ☒ Yes ☐ No

Asset failure consequence: | Allow asset to cascade? ☒ Yes ☐ No Critical:

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY	
Security Fencing							X	
Walk Ways							X	
Signage							X	
Doors							X	
Hardware							X	
Tank Exterior							X	
Tank Interior							X	
Building Exterior							X	
Building Interior							X	
Roof							X	
Floor Condition							X	
Floor Drainage							X	
Lighting							X	
Exterior							X	
Interior							X	
Windows							X	
Electrical							X	
Conduit							X	
Standby Generator							X	
Manual/ auto transfer							X	
Master Control Panel							X	
VFD							X	
Motors			X					Have Back-up
Pumps			X					Have Back-up
Pump Capacity			X					
Telemetry							X	
Intrusion Alarms							X	
Chemical Storage							X	
Chemical Type							X	
Chemical Injection Point							X	
Chemical Analyzer Equip							X	
Metering Facilities							X	
Piping							X	
Pipe and Fitting Supports							X	
Hangers							X	
Gate Valves							X	
Check Valves							X	
Pump Control Valves							X	
Pressure Relief Valves							X	
Altitude Valve							X	
Gravity							X	
Sump pump							X	
Flood Potential							X	
Safety Railing							X	
Ventilation							X	
Cooling							X	
Heat							X	
Cross Connection/Backflow							X	
Visual Hazards							X	
Safety Compliance							X	
Safety Data Sheets							X	
Tank Capacity							X	
Eye Wash							X	
Ladder Access							X	
Vandal Guard							X	
Safety Cable							X	
Safety Harness/Belt							X	
House Cleaning							X	

PRIORITY SCORE 3.0 | **RISK FACTOR** | **LOW - ROUTINE MAINTENANCE**

Condition: Fair (Average)

% Useful Life Remaining: 100%

Is the asset maintained according to manufacturer's recommendations? x Yes ☐ No

Redundancy

Does the asset have a backup system in its entirety? 100% Backup (Select one)

Redundancy Factor: 0.9

Consequence of Failure

What is the effect on the system should this asset fail or shut down? Minor (Select one)

Condition Factor: 4

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	2005	1
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	20 Years	1
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2025	1.0

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes:

Green Engineering

Town of Hidden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Hidden Beach

Date Performed: February, 2024

Asset Name:	Location:	Asset Latitude:
Associated Asset:	Associated Location:	Asset Longitude:
Asset ID:	Asset Size:	Asset Brand:
Storage Capacity in Tank:	Capacity: ☒ Adequate ☐ Oversized ☐ Undersized	Steam Rate:

Asset Category: ☐ Source ☒ Pumping Facility ☐ Treatment ☐ Storage ☐ Collection ☐ Other

Asset Status: ☒ Active ☐ Out of Use Abandoned ☐ Part of Backup ☐ Future Investment ☐ Inspection ☐ Other

Is this asset the primary? ☒ Yes ☐ No | Can this asset be rehabilitated? ☒ Yes ☐ No

Asset Replacement Material: | Know asset material? ☒ Yes ☐ No ☐ Original

Asset Type:

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY	
Security Fencing						x		
Walk Ways						x		
Signage						x		
Doors						x		
Hardware						x		
Tank Exterior						x		
Tank Interior						x		
Building Exterior						x		
Building Interior						x		
Roof						x		
Floor Condition						x		
Floor Drainage						x		
Lighting						x		
Exterior						x		
Interior						x		
Windows						x		
Electrical						x		
Conduit						x		
Standby Generator						x		
Manual/ auto transfer						x		
Motor Control Panel						x		
VFD						x		
Motors			x					Year Built-up
Pumps			x					Year Built-up
Pump Capacity			x					
Telemetry						x		
Intrusion Alarms						x		
Chemical Storage						x		
Chemical Type						x		
Chemical Injection Point						x		
Chemical Analyzer Equip						x		
Metering Facilities						x		
Piping						x		
Pipe and Fitting Supports						x		
Hangers						x		
Gate Valves						x		
Check Valves						x		
Pump Control Valves						x		
Pressure Relief Valves						x		
Altitude Valve						x		
Gravity						x		
Sump pump						x		
Flood Potential						x		
Safety Railing						x		
Ventilation						x		
Cooling						x		
Heat						x		
Cross Connection/Backflow						x		
Visual Hazards						x		
Safety Compliance						x		
Safety Data Sheets						x		
Tank Capacity						x		
Eye Wash						x		
Ladder Access						x		
Vandal Guard						x		
Safety Cable						x		
Safety Harness/Belt						x		
House Cleaning						x		

PRIORITY SCORE	3.0	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Fair(Average)		
% Useful Life Remaining	100%		
Is the asset maintained according to manufacturer's recommendations?		☒ Yes ☐ No	
Redundancy			
Does the asset have a backup system in its entirety?	100% Backup	(Select one)	
Redundancy Factor	0.9		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Minor	(Select one)
Condition Factor	4		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	2005	1
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	20 Years	1
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2025	1.0

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Town of Holden Beach

Asset Name	Location	Asset Latitude
PSA Inc Pump 1	WTP	
Associated Asset	Associated Location	Asset Longitude
Asset ID	Asset Size	Make and Model
Storage Capacity in Days	Capacity	Design Flow

Asset Utilization: ■ Utilized ☐ Overrated ☐ Underrated

Asset Category: ☐ Source ■ Pumping Facility ☐ Treatment ☐ Storage ☐ Collection ☐ Other

Asset Status: ■ Active ☐ Will be Utilized/Abandoned ☐ Not in Use-Backup ☐ Future Investment ☐ Collection ☐ Other

Can this asset be repaired? ■ Yes ☐ No | Can this asset be rehabilitated? ■ Yes ☐ No

Asset Replaced (optional) | Show asset in schematic? ■ Yes ☐ No Original

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing							x
Walk-ways							x
Signage							x
Doors							x
Hardware							x
Tank Exterior							x
Tank Interior							x
Building Exterior							x
Building Interior							x
Roof							x
Floor Condition							x
Floor Drainage							x
Lighting							x
Exterior							x
Interior							x
Windows							x
Electrical							x
Conduit							x
Standby Generator							x
Manual/ auto transfer							x
Motor Control Panel							x
VFD							x
Motors			x				Have Back-up
Pumps			x				Have Back-up
Pump Capacity			x				
Telemetry						x	
Intrusion Alarms						x	
Chemical Storage						x	
Chemical Type						x	
Chemical Injection Point						x	
Chemical Analyzer Equip						x	
Metering Facilities						x	
Piping						x	
Pipe and Fitting Supports						x	
Hangers						x	
Gate Valves						x	
Check Valves						x	
Pump Control Valves						x	
Pressure Relief Valves						x	
Altitude Valve						x	
Gravity						x	
Sump pump						x	
Fixed Potential						x	
Safety Railing						x	
Ventilation						x	
Cooling						x	
Heat						x	
Cross Connection/Backflow						x	
Visual Hazards						x	
Safety Compliance						x	
Safety Data Sheets						x	
Tank Capacity						x	
Eye Wash						x	
Ladder Access						x	
Vandal Guard						x	
Safety Cable						x	
Safety Harness/Belt						x	
House Cleaning						x	

PRIORITY SCORE	3.0	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Fair (Average)		
% Useful Life Remaining	100%		
Is the asset maintained according to manufacturer's recommendations?		■ Yes ☐ No	
Redundancy			
Does the asset have a backup system in its entirety	100% Backup	(Select one)	
Redundancy Factor	0.9		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Minor	(Select one)
Condition Factor	4		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	2005	1
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	20 Years	1
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2025	1.0

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes:

Green Engineering
[illegible]
www.[illegible].com
Ph: [illegible]
Fax: [illegible]

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach | Date Performed: February 2024 | Performed By: [illegible]

Asset Name	**Location**	**Asset Latitude**
PS2 Wet Pump 2	PS2	
Associated Asset	**Associated Location**	**Asset Longitude**
Asset ID	**Asset Size**	**Acres of Land**
Storage Capacity in Days	**Capacity**	**Linear Feet**
	X Full sized ☐ Oversized ☐ Undersized	

Asset Category
☐ Source X Pumping Facility ☐ Treatment ☐ Storage X Collection ☐ Other

Asset Status
X Active ☐ Not in Use-Abandoned ☐ Not in Use-Back Up ☐ Future Investment X Collection ☐ Other

Can this asset be repaired? X Yes ☐ No | Can this asset be rehabilitated? X Yes ☐ No
Asset Replaced (optional) | Show asset in schematic? X Yes ☐ No Original

Asset Type

Item	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY	
Security Fencing						X		
Walk Ways						X		
Signage						X		
Doors						X		
Hardware						X		
Tank Exterior						X		
Tank Interior						X		
Building Exterior						X		
Building Interior						X		
Roof						X		
Floor Condition						X		
Floor Drainage						X		
Lighting						X		
Exterior						X		
Interior						X		
Windows						X		
Electrical						X		
Conduit						X		
Standby Generator						X		
Manual/ auto transfer						X		
Motor Control Panel						X		
VFD						X		
Motors			X					Have Back-up
Pumps			X					Have Back-up
Pump Capacity			X					
Telemetry						X		
Instrumon Alarms						X		
Chemical Storage						X		
Chemical Type						X		
Chemical Injection Point						X		
Chemical Analyzer Equip						X		
Metering Facilities						X		
Piping						X		
Pipe and Fitting Supports						X		
Hangers						X		
Gate Valves						X		
Check Valves						X		
Pump Control Valves						X		
Pressure Relief Valves						X		
Altitude Valve						X		
Gravity						X		
Sump pump						X		
Flood Potential						X		
Safety Railing						X		
Ventilation						X		
Cooling						X		
Heat						X		
Cross Connection/Backflow						X		
Visual Hazards						X		
Safety Compliance						X		
Safety Data Sheets						X		
Tank Capacity						X		
Eye Wash						X		
Ladder Access						X		
Vandal Guard						X		
Safety Cable						X		
Safety Harness/Belt						X		
House Cleaning						X		

PRIORITY SCORE 3.0 | **RISK FACTOR** | **LOW - ROUTINE MAINTENANCE**
Condition Fair (Average)

% Useful Life Remaining 100%
Is the asset maintained according to manufacturer's recommendations? ☐ Yes ☐ No

Redundancy
Does the asset have a backup system in its entirety: 100% Backup (Select one)
Redundancy Factor: 0.9

Consequence of Failure
What is the effect on the system should this asset fail or shut down? Minor (Select one)
Condition Factor 4

Original Cost	**Installation Date**	**Estimated Remaining Useful Life (ERUL)**
$ -	2005	1
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	20 Years	1
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2025	1.0

Optional Information

Manufacturer	**Address**	**Phone Number**
Supplier Name	**City, State, Zip**	**Fax Number**
Model Number	**Notes**	

Additional Notes:

Green Engineering

Town of Holden Beach Water and Wastewater System

Asset Assessment Checklist

Owner: Town of Holden Beach

Date Performed: February, 2026

Performed By: Barry Yates

Asset Name	Location	Asset Latitude
Associated Asset	Associated Location	Asset Longitude
Asset ID	Asset Size	Area of Land
Storage Capacity in Tons	Capacity	Design Flow

Asset Category: Structure | *Pumping Facility | Treatment | Storage | Collection | Other

Asset Status: *Active | Within the Month/Year | Not in Use-Stick Up | Future Investment | Collection | Other

Current asset being replaced? *Yes | No | Can the Asset be rehabilitated? *Yes | No

Asset Replaced (optional): | Show asset improvements? *Yes | No | Original

Asset Type

	EXCELLENT (5)	GOOD (4)	FAIR (3)	POOR (2)	VERY POOR (1)	NONE PRESENT	REDUNDANCY
Security Fencing						x	
Walk Ways						x	
Signage						x	
Doors						x	
Hardware						x	
Tank Exterior						x	
Tank Interior						x	
Building Exterior						x	
Building Interior						x	
Roof						x	
Floor Condition						x	
Floor Drainage						x	
Lighting						x	
Exterior						x	
Interior						x	
Windows						x	
Electrical						x	
Conduit						x	
Standby Generator						x	
Manual/ auto transfer						x	
Master Control Panel						x	
VFD						x	
Blowers			3				New Back-up
Pumps			3				New Back-up
Pump Capacity			1				
Telemetry						x	
Instrument Alarms						x	
Chemical Storage						x	
Chemical Pipe						x	
Chemical Injection Point						x	
Chemical Analyzer Equip						x	
Metering Facilities						x	
Piping						x	
Pipe and Fitting Supports						x	
Hangers						x	
Gate Valves						x	
Check Valves						x	
Pump Control Valves						x	
Pressure Relief Valves						x	
Altitude Valve						x	
Gravity						x	
Sump pump						x	
Flood Potential						x	
Safety Railing						x	
Ventilation						x	
Cooling						x	
Heat						x	
Cross Connection/Backflow						x	
Visual Hazards						x	
Safety Compliance						x	
Safety Data Sheets						x	
Tank Capacity						x	
Eye Wash						x	
Ladder Access						x	
Vandal Guard						x	
Safety Cable						x	
Safety Harness/Belt						x	
House Cleaning						x	

PRIORITY SCORE	3.0	RISK FACTOR	LOW - ROUTINE MAINTENANCE
Condition	Fair (Average)		
% Useful Life Remaining	100%		
Is the asset maintained according to manufacturer's recommendations?		* Yes	No
Redundancy			
Does the asset have a back up system in its entirety	100% Backup	(Select one)	
Redundancy Factor	0.9		
Consequence of Failure			
What is the effect on the system should this asset fail or shut down?		Minor	(Select one)
Condition Factor	4		

Original Cost	Installation Date	Estimated Remaining Useful Life (ERUL)
$ -	2005	1
Replacement Cost	**Estimated Useful Life (EUL)**	**Remaining Useful Life (RUL)**
	20 Years	1
Routine Annual Maintenance Costs	**Replacement Year**	**Probability of Failure (POF)**
$	2025	1.0

Optional Information

Manufacturer	Address	Phone Number
Supplier Name	City, State, Zip	Fax Number
Model Number	Notes	

Additional Notes

APPENDIX 3. HYDRAULIC MODEL & HYDRANT TESTING

Hydraulic Model Results

For

Town of Holden Beach
Water Distribution System

Prepared for:

Holden Beach, North Carolina

Prepared by:

Thomas D. Dienes
Green Engineering, P.L.L.C.
NC Firm License: P-115
303 Goldsboro Street E.
Wilson, North Carolina 27893
(252) 237-5365

Green Engineering Project No. 23-001

Green Engineering

Table of Contents

Model Properties:

File Name:	23-001 – Holden Beach - WaterCad.dwg
File Location:	W:\HOLDEN\23001\Bentley
Model Construction:	The above model was created from a basemap prepared by Right Angle Engineering entitled Comprehensive Distribution Water System Map dated August 25, 2009. The diameters and extents of the water distribution mains were then confirmed against the Water Distribution System Asset Inventory and Assessment (AIA) completed by Green Engineering.

Scope of Work:

The goals of this analysis are to:

1. Determine if there are any deficiencies in Holden Beach's existing water distribution system.
2. Determine if there would be any deficiencies in the existing water distribution system at full system buildout.
3. Determine if the addition of a second elevated water storage tank would alleviate any deficiencies noted.

Model Setup:

The model includes approximately 400 lf of 1-inch, 18,000 lf of 2-inch, 1,500 lf of 4-inch, 50,200 lf of 6-inch, 1,500 lf of 8-inch and 45,600 lf of 12-inch diameter water mains and one (1) 300,000 gallon elevated water storage tank with an overflow elevation of 168.00' above mean sea level.

Junction elevations were input as approximate ground elevations from survey data points from the asset inventory.

The service area demand of Holden Beach's water distribution system, as shown on the Town's 2022 Local Water Supply Plan, is presently 0.4730 MGD. This demand was distributed throughout the model based on house counts from the latest satellite imagery of Holden Beach. A uniform average daily demand of 190 gpd was assigned to each home or business visible on the satellite imagery.

Model scenarios were run for the following conditions:

A. Average Daily Flow (190 gpd per developed lot)
B. Max Day Demand with Fire Flows (380 gpd per developed lot; 2.0 x ADF)
C. Peak Hour Demand (760 gpd per developed lot; 4.0 x ADF)

Note: For each scenario, the elevated tank was assumed to be 50% full to simulate a likely worst case condition.

To determine future system demands, the same per unit demand was allocated for each undeveloped lot that was visible on the satellite imagery.

Results (Existing Distribution System):

A. Average Daily Flow:

System Demand:	475,570 gpd
Range of System Pressures:	58 – 65 psi
Deficiencies noted:	NONE

B. Max Day Demand with Fire Flows:

System Demand:	951,140 gpd
Range of System Pressures:	58 – 64 psi
Range of Available Fire Flows:	536 – 3,500+ gpm
Deficiencies noted:	NONE

C. Peak Hour Demand:

System Demand:	1,902,280 gpd
Range of System Pressures:	50 – 64 psi
Deficiencies noted:	NONE

Existing Distribution System Summary:

No system deficiencies were noted in the various scenarios run on the existing water distribution system.

Results (At System Buildout):

A. Average Daily Flow:

System Demand:	568,100 gpd
Range of System Pressures:	58 – 65 psi
Deficiencies noted:	NONE

B. Max Day Demand with Fire Flows:

System Demand:	1,136,200 gpd
Range of System Pressures:	57 – 64 psi
Range of Available Fire Flows:	516 – 3,500+ gpm
Deficiencies noted:	NONE

C. Peak Hour Demand:

System Demand:	2,272,400 gpd
Range of System Pressures:	46 – 64 psi
Deficiencies noted:	NONE

Summary:

Hydraulically, no system deficiencies were noted in the various scenarios run on the existing water distribution system in its current state nor at system buildout. Therefore, for hydraulic purposes, assuming there are not any issues with the water supply mains from Brunswick County or any breaks on Holden Beach's distribution mains, a second elevated water storage tank is not required.

Tank Addition:

The Town recommends that if a second elevated tank is added, that it be constructed on town owned property east of the end of Heron Landing Wynd. A 12-inch diameter water main, approximately 1,300 linear feet in length would be required to connect to the nearest 12-inch diameter main along Ocean Boulevard W, a large portion of which will need to be directional bored.

Below are the range of system pressures and available fire flows with the addition of this second tank at system buildout conditions. The values in black are without the tank and the values in red are with the tank.

Results (With Second Tank at System Buildout):

A. **Average Daily Flow:**

Range of System Pressures: 58 – 65 psi (58 – 65 psi)

B. **Max Day Demand with Fire Flows:**

Range of System Pressures: 57 – 64 psi (58 – 65 psi)

Range of Available Fire Flows: 517 – 3,500+ gpm (659 – 3,500+ gpm)

C. **Peak Hour Demand:**

Range of System Pressures: 46 – 64 psi (58 – 64 psi)

Summary (With Second Tank):

Other than a marginal increase in available fire flows, hydraulically, a second elevated water storage tank provides little operational improvement to the distribution system.

Tri-Beach Volunteer Fire Department, Inc.

Supply, NC

This report was generated on 3/14/2024 1:12:51 PM

Hydrants Flow Tested for Date Range

Start Date: 03/01/2019 | End Date: 03/14/2024

HYD. ID	ADDRESS	LOCATION	TEST DATE	START TIME	END TIME	STATIC	RESIDUAL	DOWNSTREAM (HYD. ID)	FLOW @ DES. PRESS	PITOT PRESSURE	DISTRICT
Zone Book 1											
HB319	321 McCray ST		11/08/2021	11:36	14:36	68 PSI	52 PSI	993 GPM (Self)	1797 @ 20 PSI	35	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB320	Serenity LN	By the pool	11/08/2021	11:41	14:41	68 PSI	57 PSI	1138 GPM (Self)	2521 @ 20 PSI	46	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB321	348 Serenity LN		11/08/2021	11:40	14:40	68 PSI	57 PSI	1138 GPM (HB320)	2521 @ 20 PSI	46	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB322	Windswept WAY at Serenity LN		11/08/2021	11:38	14:39	68 PSI	66 PSI	1150 GPM (HB321)	2662 @ 20 PSI	47	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB323	Windswept WAY at Dunescape DR		11/08/2021	11:37	14:38	68 PSI	58 PSI	1150 GPM (HB322)	2662 @ 20 PSI	47	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB324	100 Dunescape		11/08/2021	11:34	14:35	68 PSI	58 PSI	993 GPM (HB323)	2316 @ 20 PSI	35	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB325	McCray ST at Ave. B		11/08/2021	11:32	14:33	68 PSI	46 PSI	2242 GPM (HB324)	3336 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB326	118 blockade runner		11/08/2021	11:27	14:28	68 PSI	53 PSI	949 GPM (HB743)	1778 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB327	234 Ocean BLVD E		11/08/2021	11:26	14:26	68 PSI	62 PSI	2242 GPM (HB325)	4057 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB328	mullet ST SW		11/08/2021	8:24	11:25	68 PSI	56 PSI	1138 GPM (Self)	2408 @ 20 PSI	46	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB329	204 Ocean BLVD E		11/08/2021	8:20	11:20	68 PSI	51 PSI	2175 GPM (HB327)	3903 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			

HYD. ID column sorts alphanumerically rather than strictly numerically because the Hydrant ID field can also contain letters and certain characters at the discretion of the Department entering the data.

HYD. ID	ADDRESS	LOCATION	TEST DATE	START TIME	END TIME	STATIC	RESIDUAL	DOWNSTREAM (HYD. ID)	FLOW @ DES. PRESS	PITOT PRESSURE	DISTRICT
HB330	123 conch ST SW		11/08/2021	8:21	11:23	68 PSI	51 PSI	2242 GPM (HB334)	3927 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB331	119 crab ST SW		11/08/2021	8:18	11:19	68 PSI	49 PSI	2242 GPM (HB334)	3808 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB332	194 Ocean BLVD E		11/08/2021	8:17	11:18	66 PSI	52 PSI	2370 GPM (HB329)	4606 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB333	119 Shrimp ST		11/08/2021	8:12	11:13	68 PSI	48 PSI	2242 GPM (HB334)	3697 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB334	shrimp ST SW at Canal DR		11/08/2021	8:15	11:16	68 PSI	48 PSI	2242 GPM (HB330)	3697 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB335	Ferry RD SW at Golden dune WAY		11/08/2021	7:59	11:00	68 PSI	50 PSI	2242 GPM (HB334)	3807 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB336	Golden dune		11/08/2021	8:01		68 PSI	37 PSI	2719 GPM (Self)	3443 @ 20 PSI	25	Station 2
Flow Test Results: No Data Provided		Remarks:						TESTED BY: Burris, Steven M			
HB337	Ocean BLVD E at Ferry RD		11/08/2021	7:41	10:42	66 PSI	52 PSI	2560 GPM (HB343)	4847 @ 20 PSI	22	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB338	150 Ocean BLVD E		11/08/2021	7:39	10:40	66 PSI	54 PSI	2370 GPM (HB337)	4896 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB339	130 Ocean BLVD E		11/08/2021	7:37	10:39	66 PSI	55 PSI	2242 GPM (HB338)	4864 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB340	102 Ocean BLVD E		11/08/2021	7:36	10:37	66 PSI	56 PSI	2609 GPM (HB339)	5945 @ 20 PSI	23	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB341	Brunswick AVE E at quinton ST		11/08/2021	7:43	10:44	68 PSI	55 PSI	2106 GPM (HB342)	4203 @ 20 PSI	15	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB342	Brunswick AVE E at Halsted ST		11/08/2021	7:45	10:46	68 PSI	50 PSI	1719 GPM (HB343)	2919 @ 20 PSI	10	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB343	152 Brunswick AVE E		11/08/2021	7:48	10:51	68 PSI	50 PSI	1719 GPM (Self)	2919 @ 20 PSI	10	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			

HYD. ID column sorts alphanumerically rather than strictly numerically because the Hydrant ID field can also contain letters and certain characters at the discretion of the Department entering the data.

HYD. ID	ADDRESS	LOCATION	TEST DATE	START TIME	END TIME	STATIC	RESIDUAL	DOWNSTREAM (HYD. ID)	FLOW @ DES. PRESS	PITOT PRESSURE	DISTRICT
HB344	Quinton ST at South shore DR		11/08/2021	7:53	10:54	68 PSI	47 PSI	2175 GPM (HB346)	3398 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB345	155 South shore DR		11/08/2021	7:57	10:58	68 PSI	47 PSI	1530 GPM (Self)	2403 @ 20 PSI	8	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB346	South Shore DR at Halstead ST		11/08/2021	7:55	10:56	68 PSI	47 PSI	1536 GPM (HB345)	2403 @ 20 PSI	8	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB347	Brunswick AVE E at Cole ST		11/04/2021	10:11	13:13	67 PSI	61 PSI	2307 GPM (HB366)	7010 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB348	114 Ocean BLVD W		11/08/2021	7:34	10:35	66 PSI	55 PSI	2432 GPM (HB340)	6266 @ 20 PSI	20	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB349	125 Ocean BLVD W		10/28/2021	3:59		65 PSI	57 PSI	2492 GPM (360)	6333 @ 20 PSI	21	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB350	131 Ocean BLVD W		10/28/2021	4:00		67 PSI	57 PSI	2084 GPM (351)	6144 @ 20 PSI	24	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB351	159 Ocean BLVD W		10/28/2021	4:03		71 PSI	57 PSI	2492 GPM (362)	6008 @ 20 PSI	21	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB352	187 Ocean BLVD W		10/29/2021	4:05		72 PSI	60 PSI	2492 GPM (363)	6600 @ 20 PSI	21	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB353	205 Ocean BLVD W		10/28/2021	4:10		75 PSI	60 PSI	2719 GPM (354)	6484 @ 20 PSI	29	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB354	235 Ocean BLVD W		10/28/2021	4:12		74 PSI	58 PSI	2492 GPM (355)	4806 @ 20 PSI	21	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB355	267 Ocean BLVD W		10/28/2021	4:30		75 PSI	57 PSI	2660 GPM (356)	4661 @ 20 PSI	22	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB356	295 Ocean BLVD W		10/28/2021	4:31		70 PSI	55 PSI	2432 GPM (357)	4660 @ 20 PSI	20	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB357	323 Ocean BLVD W		10/28/2021	4:32		68 PSI	50 PSI	2370 GPM (358)	5010 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			

HYD. ID column sorts alphanumerically rather than strictly numerically because the Hydrant ID field can also contain letters and certain characters at the discretion of the Department entering the data.

HYD. ID	ADDRESS	LOCATION	TEST DATE	START TIME	END TIME	STATIC	RESIDUAL	DOWNSTREAM (HYD. ID)	FLOW @ DES. PRESS	PITOT PRESSURE	DISTRICT
HB358	351 Ocean BLVD W		10/28/2021	4:33		71 PSI	55 PSI	2370 GPM (377)	4432 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB359	333 Brunswick AVE W		10/31/2020	16:35	19:35	70 PSI	64 PSI	1007 GPM (360)	3164 @ 20 PSI	36	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB359	333 Brunswick AVE W		10/28/2021	3:57		72 PSI	58 PSI	787 GPM (373)	1698 @ 20 PSI	22	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB360	315 Brunswick AVE W		10/31/2020	16:34	19:34	70 PSI	60 PSI	976 GPM (359)	2332 @ 20 PSI	34	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB360	315 Brunswick AVE W		05/13/2022	16:32	17:33	69 PSI	57 PSI	868 GPM (HB369)	1698 @ 20 PSI	28	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Cornelius, Jordan			
HB361	Brunswick AVE W at Neptune DR		10/31/2020	16:29	19:29	70 PSI	66 PSI	1007 GPM (360)	3491 @ 20 PSI	36	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB361	Brunswick AVE W at Neptune DR		10/28/2021	3:45	6:46	73 PSI	62 PSI	868 GPM (369)	2076 @ 20 PSI	28	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB362	263 Brunswick AVE W		10/28/2021	3:44		74 PSI	60 PSI	1007 GPM (361)	2997 @ 20 PSI	36	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB363	Brunswick AVE W at Roger ST		11/04/2021	10:31	13:32	67 PSI	57 PSI	2370 GPM (HB370)	6466 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks: Flow Tested.						TESTED BY: Burris, Steven M			
HB364	171 Brunswick AVE W		11/04/2021	10:30	13:31	70 PSI	56 PSI	2370 GPM (HB363)	4712 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks: Flow Tested.						TESTED BY: Burris, Steven M			
HB365	Brunswick AVE W at Rothschild ST		11/04/2021	10:18	13:19	67 PSI	60 PSI	2034 GPM (HB364)	6667 @ 20 PSI	14	Station 2
Flow Test Results: Pass		Remarks: Flow Tested.						TESTED BY: Burris, Steven M			
HB366	109 Davis ST		11/04/2021	10:15	13:16	67 PSI	61 PSI	2307 GPM (347)	7010 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks: Flow Tested.						TESTED BY: Burris, Steven M			
HB367	160 Yacht Watch DR		11/04/2021	10:35	13:35	70 PSI	60 PSI	2034 GPM (HB368)	4660 @ 20 PSI	14	Station 2
Flow Test Results: Pass		Remarks: Flow Tested.						TESTED BY: Burris, Steven M			
HB368	Roger ST at Lois AVE		10/28/2021	3:40	6:41	75 PSI	60 PSI	1538 GPM (369)	3102 @ 20 PSI	8	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			

HYD. ID column sorts alphanumerically rather than strictly numerically because the Hydrant ID field can also contain letters and certain characters at the discretion of the Department entering the data.

HYD. ID	ADDRESS	LOCATION	TEST DATE	START TIME	END TIME	STATIC	RESIDUAL	DOWNSTREAM (HYD. ID)	FLOW @ DES. PRESS	PITOT PRESSURE	DISTRICT
HB369	Boyd ST at Lois AVE		10/28/2021	3:42	6:42	74 PSI	47 PSI	1631 GPM (369)	2371 @ 20 PSI	9	Station 2
Flow Test Results: Pass		Remarks: Test from hyd 370 was used and down stream was 369						TESTED BY: Todd, William K.			
HB370	Brunswick AVE W at Boyd ST		11/04/2021	10:33	13:34	68 PSI	55 PSI	2307 GPM (HB362)	4670 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Burris, Steven M			
HB371	Sandpiper LN at Sandspur LN		10/31/2020	16:30	19:32	70 PSI	48 PSI	949 GPM (372)	1476 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB371	Sandpiper LN at Sandspur LN		10/28/2021	3:47		72 PSI	48 PSI	804 GPM (372)	1220 @ 20 PSI	23	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB372	Sandspur LN at Sand Dune LN		10/31/2020	16:33	19:33	70 PSI	44 PSI	919 GPM (End)	1308 @ 20 PSI	30	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB372	Sandspur LN at Sand Dune LN		10/28/2021	3:53		72 PSI	48 PSI	804 GPM (372)	1220 @ 20 PSI	23	Station 2
Flow Test Results: Pass		Remarks: Used same results as 371.						TESTED BY: Todd, William K.			
HB373	332 Marker 55 DR		10/31/2020	16:37	19:37	70 PSI	44 PSI	919 GPM (360)	1308 @ 20 PSI	30	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB373	332 Marker 55 DR		10/28/2021	3:58		72 PSI	58 PSI	787 GPM (373)	1690 @ 20 PSI	22	Station 2
Flow Test Results: Pass		Remarks: Used flow from hyd 359						TESTED BY: Todd, William K.			
HB374	129 Highpoint ST		10/31/2020	16:38	19:38	70 PSI	54 PSI	856 GPM (376)	1581 @ 20 PSI	26	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB374	129 Highpoint ST		10/28/2021	4:36		73 PSI	64 PSI	712 GPM (376)	1238 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB375	153 Highpoint ST		10/31/2020	16:39	19:39	70 PSI	48 PSI	855 GPM (376)	1331 @ 20 PSI	26	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB375	153 Highpoint ST		10/28/2021	4:36		70 PSI	41 PSI	671 GPM (376)	900 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB376	183 Highpoint ST		10/31/2020	16:40	19:39	70 PSI	50 PSI	919 GPM (End)	1607 @ 20 PSI	30	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB376	183 Highpoint ST		10/28/2021	4:37		70 PSI	41 PSI	671 GPM (376)	900 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks: Used same results from 375						TESTED BY: Todd, William K.			

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HYD. ID	ADDRESS	LOCATION	TEST DATE	START TIME	END TIME	STATIC	RESIDUAL	DOWNSTREAM (HYD. ID)	FLOW @ DES. PRESS	PITOT PRESSURE	DISTRICT
HB377	367 Ocean BLVD W		10/28/2021	4:40		72 PSI	54 PSI	2307 GPM (379)	4091 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			
HB378	115 Lumberton ST		10/31/2020	16:41	19:40	70 PSI	50 PSI	949 GPM (379)	1666 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB378	115 Lumberton ST		10/28/2021	4:41		72 PSI	45 PSI	888 GPM (same)	1265 @ 20 PSI	28	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			
HB379	379 Ocean BLVD W		11/01/2021	4:42		68 PSI	50 PSI	2307 GPM (381)	4080 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			
HB380	117 Fayetteville ST		10/31/2020	16:41	19:41	72 PSI	60 PSI	1061 GPM (End)	1666 @ 20 PSI	40	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB380	117 Fayetteville ST		10/28/2021	4:42		72 PSI	54 PSI	934 GPM (same)	1656 @ 20 PSI	31	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			
HB381	397 Ocean BLVD W		10/28/2021	4:43		68 PSI	52 PSI	2370 GPM (383)	4280 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			
HB382	123 Raleigh ST		10/31/2020	16:42	19:42	72 PSI	46 PSI	949 GPM (End)	1379 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB382	123 Raleigh ST		10/28/2021	4:44		68 PSI	44 PSI	888 GPM (same)	1291 @ 20 PSI	28	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			
HB383	411 Ocean BLVD W		10/28/2021	4:45		72 PSI	52 PSI	2307 GPM (365)	3864 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			
HB384	123 Sanford ST		10/31/2020	16:43	19:43	70 PSI	48 PSI	949 GPM (End)	1410 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB385	423 Ocean BLVD W		10/28/2021	4:46		72 PSI	52 PSI	2370 GPM (367)	3970 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			
HB386	125 Salibury ST		10/31/2020	16:44	19:44	72 PSI	46 PSI	949 GPM (End)	1379 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB386	125 Salibury ST		10/28/2021	4:47		73 PSI	42 PSI	855 GPM (same)	1142 @ 20 PSI	26	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K			

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HYD. ID	ADDRESS	LOCATION	TEST DATE	START TIME	END TIME	STATIC	RESIDUAL	DOWNSTREAM (HYD. ID)	FLOW @ DES. PRESS	PITOT PRESSURE	DISTRICT
HB387	435 Ocean BLVD W		10/28/2021	4:48		74 PSI	52 PSI	2307 GPM (390)	3746 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB388	127 Burlington ST		10/31/2020	18:45	19:46	70 PSI	40 PSI	903 GPM (End)	1189 @ 20 PSI	29	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB388	127 Burlington ST		10/28/2021	4:49		75 PSI	41 PSI	707 GPM (same)	1020 @ 20 PSI	22	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB389	123 Durham ST		10/31/2020	18:46		72 PSI	44 PSI	0 GPM (End)	0 @ 20 PSI	0	Station 2
Flow Test Results: No Data Provided		Remarks:						TESTED BY: Swaim, Justin C			
HB389	123 Durham ST		10/28/2021	4:50		70 PSI	41 PSI	839 GPM (same)	1125 @ 20 PSI	25	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB390	441 Ocean BLVD W		10/28/2021	4:50		70 PSI	60 PSI	2370 GPM (391)	3867 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB391	467 Ocean BLVD W		10/28/2021	4:51		71 PSI	49 PSI	2307 GPM (393)	3632 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB392	125 Charlotte ST		10/31/2020	18:48	19:48	70 PSI	40 PSI	919 GPM (End)	1210 @ 20 PSI	30	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB392	125 Charlotte ST		10/28/2021	4:52		70 PSI	39 PSI	787 GPM (same)	1018 @ 20 PSI	22	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Todd, William K.			
HB393	481 Ocean BLVD W		10/26/2020	21:28	0:28	70 PSI	61 PSI	1438 GPM (394)	3630 @ 20 PSI	7	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB394	130 Greensboro ST		10/26/2020	21:30	0:30	70 PSI	50 PSI	731 GPM (395)	1198 @ 20 PSI	19	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB395	162 Greensboro ST		10/26/2020	21:34	0:35	70 PSI	38 PSI	712 GPM (396)	906 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB396	192 Greensboro ST		10/26/2020	21:32	0:32	70 PSI	28 PSI	602 GPM (396)	732 @ 20 PSI	17	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB397	513 Ocean BLVD W		10/26/2020	21:37	0:37	70 PSI	52 PSI	2307 GPM (398)	4005 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			

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HB398	543 Ocean BLVD W		10/26/2020	21:39	0:39	70 PSI	58 PSI	1438 GPM (399)	3107 @ 20 PSI	7	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB399	133 Scotch Bonnet DR		10/26/2020	21:41	0:41	72 PSI	50 PSI	787 GPM (400)	1252 @ 20 PSI	22	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB400	157 Scotch Bonnet DR		10/26/2020	21:42	0:42	74 PSI	32 PSI	780 GPM (400)	869 @ 20 PSI	20	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB401	557 Ocean BLVD W		10/26/2020	21:43	0:43	72 PSI	62 PSI	1538 GPM (402)	3746 @ 20 PSI	8	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB402	129 Lions Paw DR		10/30/2020	10:45	13:45	68 PSI	40 PSI	855 GPM (402)	1143 @ 20 PSI	26	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB403	571 Ocean BLVD W		10/30/2020	4:38	7:38	70 PSI	60 PSI	1438 GPM (404)	3429 @ 20 PSI	7	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB404	131 Starfish DR		10/30/2020	4:33	7:33	70 PSI	40 PSI	855 GPM (404)	1126 @ 20 PSI	26	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB405	585 Ocean BLVD W		10/30/2020	4:32	7:32	70 PSI	60 PSI	1438 GPM (406)	3429 @ 20 PSI	7	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB406	132 Sandollar DR		10/30/2020	4:30	7:31	71 PSI	48 PSI	750 GPM (407)	1152 @ 20 PSI	20	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB407	160 Sandollar DR		10/30/2020	4:29	7:29	71 PSI	30 PSI	712 GPM (407)	801 @ 20 PSI	18	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB408	615 Ocean BLVD W		10/30/2020	4:54	7:54	71 PSI	62 PSI	1061 GPM (405)	2707 @ 20 PSI	40	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB409	637 Ocean BLVD W		10/30/2020	4:53	7:53	70 PSI	62 PSI	1061 GPM (408)	2654 @ 20 PSI	40	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB410	661 Ocean BLVD W		10/30/2020	4:51	7:51	70 PSI	62 PSI	1048 GPM (409)	2619 @ 20 PSI	39	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB411	689 Ocean BLVD W		10/30/2020	4:50	7:50	70 PSI	61 PSI	1061 GPM (410)	2678 @ 20 PSI	40	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			

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HB412	721 Ocean BLVD W		10/30/2020	4:49	7:49	72 PSI	62 PSI	1034 GPM (411)	2515 @ 20 PSI	38	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB413	753 Ocean BLVD W		10/30/2020	4:47	7:47	72 PSI	62 PSI	1048 GPM (412)	2552 @ 20 PSI	39	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB414	785 Ocean BLVD W		10/30/2020	4:43	7:43	71 PSI	63 PSI	1034 GPM (413)	2511 @ 20 PSI	38	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB415	817 Ocean BLVD W		10/30/2020	4:42	7:42	71 PSI	63 PSI	1034 GPM (414)	2511 @ 20 PSI	38	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB416	851 Ocean BLVD W		10/30/2020	4:37	7:37	71 PSI	62 PSI	1067 GPM (415)	2773 @ 20 PSI	42	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB417	878 Ocean BLVD W		10/30/2020	4:24	7:24	71 PSI	66 PSI	1038 GPM (418)	2978 @ 20 PSI	8	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB418	125 Swordfish DR		10/30/2020	4:23	7:22	72 PSI	50 PSI	750 GPM (419)	1199 @ 20 PSI	20	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB419	155 Swordfish DR		10/30/2020	4:21	7:21	71 PSI	42 PSI	606 GPM (420)	820 @ 20 PSI	13	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB420	175 Swordfish DR		10/28/2020	21:57	0:57	71 PSI	28 PSI	650 GPM (420)	887 @ 20 PSI	15	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB421	Heron Landing Wynd	End of road	10/30/2020	4:19	7:19	70 PSI	33 PSI	822 GPM (421)	987 @ 20 PSI	24	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB422	864 Heron Landing Wynd		10/30/2020	4:20	7:20	69 PSI	46 PSI	822 GPM (421)	1236 @ 20 PSI	24	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB423	890 Ocean BLVD W		10/26/2020	21:56	0:56	70 PSI	60 PSI	1210 GPM (424)	2899 @ 20 PSI	5	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB424	141 Dolphin DR		10/26/2020	21:52	0:52	70 PSI	36 PSI	769 GPM (424)	947 @ 20 PSI	21	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			
HB425	904 Ocean BLVD W		10/26/2020	21:51	0:51	70 PSI	56 PSI	1438 GPM (426)	2890 @ 20 PSI	7	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY: Thomas, John J			

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HB426	139 Tuna DR		10/26/2020	21:50	0:50	70 PSI	35 PSI	934 GPM (429)	1132 @ 20 PSI	31	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY:	Thomas, John J		
HB427	918 Ocean BLVD W		10/26/2020	21:49	0:49	70 PSI	60 PSI	1438 GPM (428)	3429 @ 20 PSI	7	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY:	Thomas, John J		
HB428	139 Marlin DR		10/26/2020	21:47	0:47	70 PSI	36 PSI	839 GPM (428)	1033 @ 20 PSI	25	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY:	Thomas, John J		
HB429	930 Ocean BLVD W		10/26/2020	21:46	0:46	70 PSI	58 PSI	1438 GPM (430)	3107 @ 20 PSI	7	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY:	Thomas, John J		
HB430	139 Tarpon DR		10/23/2020	17:08	20:09	70 PSI	38 PSI	822 GPM (431)	1012 @ 20 PSI	24	Station 2
Flow Test Results: Pass		Remarks: flow Tested						TESTED BY:	Swaim, Justin C		
HB431	946 Ocean BLVD W		10/23/2020	17:11	20:12	70 PSI	64 PSI	1007 GPM (432)	3184 @ 20 PSI	36	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY:	Swaim, Justin C		
HB432	140 Sailfish DR		05/03/2019	14:28	16:05	72 PSI	46 PSI	671 GPM (HB437)	975 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY:	Todd, Roy D		
HB432	140 Sailfish DR		10/23/2020	17:13	20:13	70 PSI	46 PSI	671 GPM (433)	997 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY:	Swaim, Justin C		
HB433	176 Sailfish DR		05/03/2019	14:32	16:05	72 PSI	46 PSI	671 GPM (dead end)	975 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY:	Todd, Roy D		
HB433	176 Sailfish DR		10/23/2020	17:14	20:15	70 PSI	28 PSI	650 GPM (Dead End)	696 @ 20 PSI	16	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY:	Swaim, Justin C		
HB434	976 Ocean BLVD W		10/23/2020	17:16	20:16	70 PSI	56 PSI	2108 GPM (435)	4551 @ 20 PSI	15	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY:	Swaim, Justin C		
HB435	1004 Ocean BLVD W		10/23/2020	17:18	20:18	70 PSI	44 PSI	2034 GPM (436)	2695 @ 20 PSI	14	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY:	Swaim, Justin C		
HB436	1036 Ocean BLVD W		10/23/2020	17:20	20:21	70 PSI	42 PSI	2034 GPM (437)	2761 @ 20 PSI	14	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY:	Swaim, Justin C		
HB437	1068 Ocean BLVD W		05/03/2019	14:36	16:05	73 PSI	61 PSI	1007 GPM (HB438)	2246 @ 20 PSI	36	Station 2
Flow Test Results: Pass		Remarks:						TESTED BY:	Cornelius, Jordan		

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HB437	1068 Ocean BLVD W		10/23/2020	17:30	20:31	70 PSI	40 PSI	2106 GPM (436)	2774 @ 20 PSI	15	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB438	1080 Ocean BLVD W at Seaside DR		10/23/2020	17:32	20:33	70 PSI	50 PSI	2034 GPM (439)	3336 @ 20 PSI	14	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB439	109 Deal ST		10/23/2020	17:34	20:35	68 PSI	46 PSI	949 GPM (Dead End)	1446 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB440	1100 Ocean BLVD W		10/23/2020	17:35	20:37	70 PSI	52 PSI	2106 GPM (444)	3666 @ 20 PSI	15	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB441	130 Sea Gull		10/23/2020	17:41	20:41	70 PSI	46 PSI	949 GPM (Unnamed)	1410 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB442	118 Sea Gull		10/23/2020	17:38	20:40	70 PSI	46 PSI	949 GPM (Dead End)	1410 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB443	118 Frigate DR		10/23/2020	17:43	20:44	70 PSI	44 PSI	949 GPM (Unnamed)	1350 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB444	1116 Ocean BLVD W		10/23/2020	17:45	20:47	70 PSI	50 PSI	2034 GPM (447)	3336 @ 20 PSI	14	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB445	114 By The Sea DR		10/23/2020	17:48	20:49	70 PSI	46 PSI	949 GPM (Dead End)	1410 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB446	Marsh Walk		10/23/2020	17:51	20:52	70 PSI	48 PSI	949 GPM (Dead End)	1410 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB447	1136 Ocean BLVD W		10/23/2020	17:52	20:53	70 PSI	52 PSI	2106 GPM (450)	3656 @ 20 PSI	15	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB448	113 Clippership DR		10/23/2020	17:54	20:54	70 PSI	46 PSI	949 GPM (Dead End)	1410 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB449	114 Sunshine		10/23/2020	17:55	20:56	70 PSI	46 PSI	885 GPM (Dead End)	1319 @ 20 PSI	28	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB450	1162 Ocean BLVD W		10/23/2020	17:56	20:57	70 PSI	42 PSI	2106 GPM (462)	2890 @ 20 PSI	15	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			

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HB451	116 Schooner DR		10/23/2020	17:57	20:58	68 PSI	46 PSI	949 GPM (Dead End)	1446 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB452	1186 Ocean BLVD W		10/23/2020	17:59	20:59	70 PSI	48 PSI	2106 GPM (463)	3280 @ 20 PSI	15	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB453	1200 Ocean BLVD W		10/23/2020	18:00	21:00	70 PSI	52 PSI	978 GPM (464)	1697 @ 20 PSI	34	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB454	1218 Ocean BLVD W		10/23/2020	18:02	21:03	70 PSI	50 PSI	949 GPM (455)	1656 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB455	1242 Ocean BLVD W		10/23/2020	18:03	21:04	70 PSI	60 PSI	1007 GPM (456)	2401 @ 20 PSI	36	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB456	1258 Ocean BLVD W		10/23/2020	18:04	21:05	70 PSI	60 PSI	1034 GPM (457)	2466 @ 20 PSI	38	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB457	1270 Ocean BLVD W		10/23/2020	18:05	21:06	70 PSI	60 PSI	1034 GPM (458)	2466 @ 20 PSI	38	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB458	1288 Ocean BLVD W		10/23/2020	18:07	21:07	70 PSI	60 PSI	978 GPM (459)	2332 @ 20 PSI	34	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB459	1304 Ocean BLVD W		10/23/2020	18:08	21:09	70 PSI	52 PSI	1007 GPM (460)	1746 @ 20 PSI	36	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB460	1324 Ocean BLVD W		10/23/2020	18:09	21:10	70 PSI	52 PSI	1007 GPM (461)	1746 @ 20 PSI	36	Station 2
Flow Test Results: Pass		Remarks: Flow tested						TESTED BY: Swaim, Justin C			
HB461	1335 Ocean BLVD W		10/23/2020	18:10	21:11	70 PSI	50 PSI	978 GPM (462)	1804 @ 20 PSI	34	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB462	1345 Ocean BLVD W		10/23/2020	18:11	21:12	70 PSI	44 PSI	978 GPM (463)	1392 @ 20 PSI	34	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB463	1359 Ocean BLVD W		10/23/2020	18:12	21:13	70 PSI	44 PSI	978 GPM (464)	1392 @ 20 PSI	34	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB464	1365 Ocean BLVD W		10/23/2020	18:13	21:14	70 PSI	38 PSI	855 GPM (End)	1066 @ 20 PSI	26	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			

HYD. ID column sorts alphanumerically rather than strictly numerically because the Hydrant ID field can also contain letters and certain characters at the discretion of the Department entering the data.

HYD. ID	ADDRESS	LOCATION	TEST DATE	START TIME	END TIME	STATIC	RESIDUAL	DOWNSTREAM (HYD. ID)	FLOW @ DES. PRESS	PITOT PRESSURE	DISTRICT
HB465	1031 Tide Ridge DR		10/23/2020	17:25	20:25	70 PSI	50 PSI	1081 GPM (466)	1740 @ 20 PSI	40	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB466	Tide Ridge DR	Left side of Point West	10/23/2020	17:26	20:27	70 PSI	46 PSI	822 GPM (Dead End)	1221 @ 20 PSI	24	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
HB743	blockade runner	End of street	11/08/2021	11:29	14:30	68 PSI	53 PSI	949 GPM (Self)	1778 @ 20 PSI	32	Station 2
Flow Test Results: Pass		Remarks: Flow tested.						TESTED BY: Burris, Steven M			
HB848	Pointe West DR at Coquina Holden Beach, NC 28462		10/23/2020	17:22	20:23	70 PSI	46 PSI	919 GPM (465)	1365 @ 20 PSI	30	Station 2
Flow Test Results: Pass		Remarks: Flow Tested						TESTED BY: Swaim, Justin C			
Zone Book 2											
HYD-1510	2337 Blackbeard DR SW		04/13/2021	11:25	14:22	58 PSI	40 PSI	919 GPM (1511)	1376 @ 20 PSI	30	Station 3
Flow Test Results: Pass		Remarks: Flow Tested Per NFPA						TESTED BY: Watts, Bailey A			
HYD-1511	2307 Jolly Roger DR SW		04/13/2021	11:26	14:23	58 PSI	38 PSI	868 GPM (1512)	1291 @ 20 PSI	28	Station 3
Flow Test Results: Pass		Remarks: Flow Tested Per NFPA						TESTED BY: Watts, Bailey A			
HYD-1512	2359 Jolly Roger DR SW		04/13/2021	11:27	14:24	58 PSI	40 PSI	868 GPM (1528)	1376 @ 20 PSI	28	Station 3
Flow Test Results: Pass		Remarks: Flow Tested Per NFPA						TESTED BY: Watts, Bailey A			
HYD-1513	John AVE SW at Alan TRL SW		04/13/2021	11:37	14:34	68 PSI	40 PSI	919 GPM (1532)	1229 @ 20 PSI	30	Station 3
Flow Test Results: Pass		Remarks: Flow Tested Per NFPA						TESTED BY: Watts, Bailey A			
HYD-1514	2951 Darrell DR SW		04/13/2021	11:36	14:33	68 PSI	46 PSI	949 GPM (1513)	1446 @ 20 PSI	32	Station 3
Flow Test Results: Pass		Remarks: Flow Tested Per NFPA						TESTED BY: Watts, Bailey A			
HYD-1515	Seashore RD SW at Jolly Roger DR SW		04/13/2021	11:40	14:37	60 PSI	48 PSI	671 GPM (1517)	1182 @ 20 PSI	16	Station 3
Flow Test Results: Pass		Remarks: Flow Tested Per NFPA						TESTED BY: Watts, Bailey A			
HYD-1516	2411 South ridge DR SW		04/21/2021	10:55	13:56	68 PSI	46 PSI	1034 GPM (1519)	1575 @ 20 PSI	36	Station 3
Flow Test Results: Pass		Remarks:						TESTED BY: Testby not Assigned			
HYD-1517	S Boonesboro RD SW at Stockade ST SW NE		04/21/2021	10:39	13:45	68 PSI	48 PSI	1007 GPM (1518)	1519 @ 20 PSI	36	Station 3
Flow Test Results: Pass		Remarks:						TESTED BY: Purnell, Elizabeth K			
HYD-1518	2313 N Boonesboro RD SW		04/13/2021	11:43	14:40	60 PSI	40 PSI	919 GPM (1521)	1336 @ 20 PSI	30	Station 3
Flow Test Results: Pass		Remarks: Flow Tested Per NFPA						TESTED BY: Watts, Bailey A			
HYD-1519	2366 N Boonesboro RD SW		04/13/2021	11:42	14:39	60 PSI	42 PSI	919 GPM (1518)	1414 @ 20 PSI	30	Station 3

HYD. ID column sorts alphanumerically rather than strictly numerically because the Hydrant ID field can also contain letters and certain characters at the discretion of the Department entering the data.

APPENDIX 4. 1977 TANK PLANS

WATER DISTRIBUTION SYSTEM

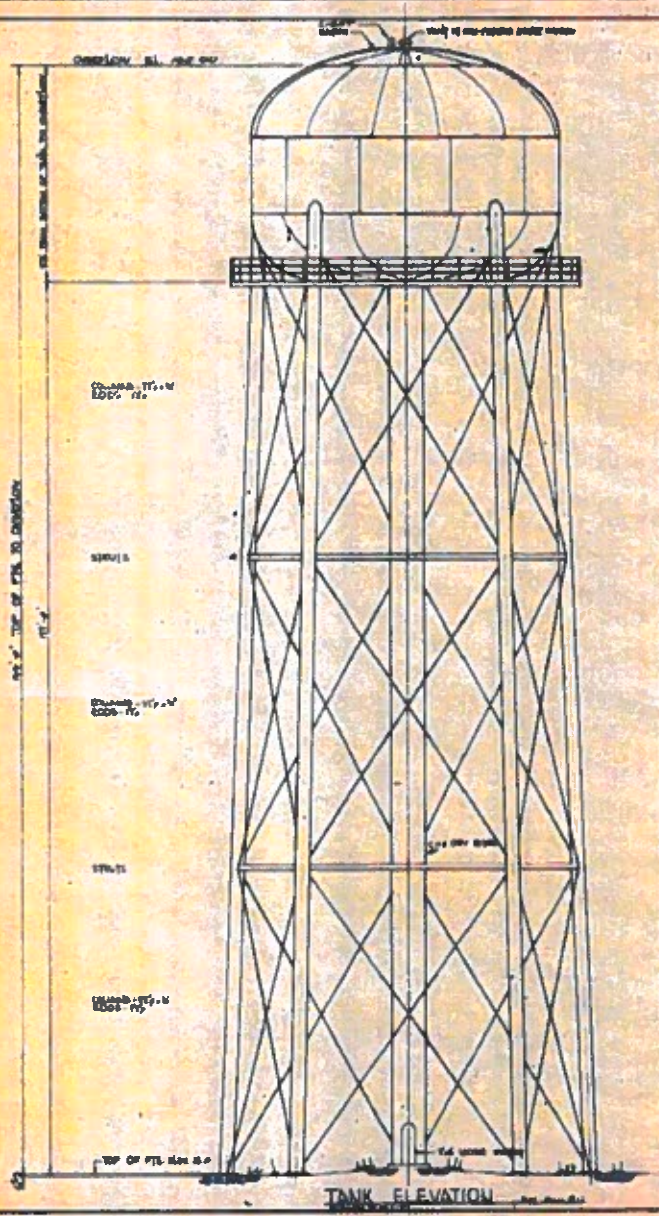
FOR THE

TOWN OF

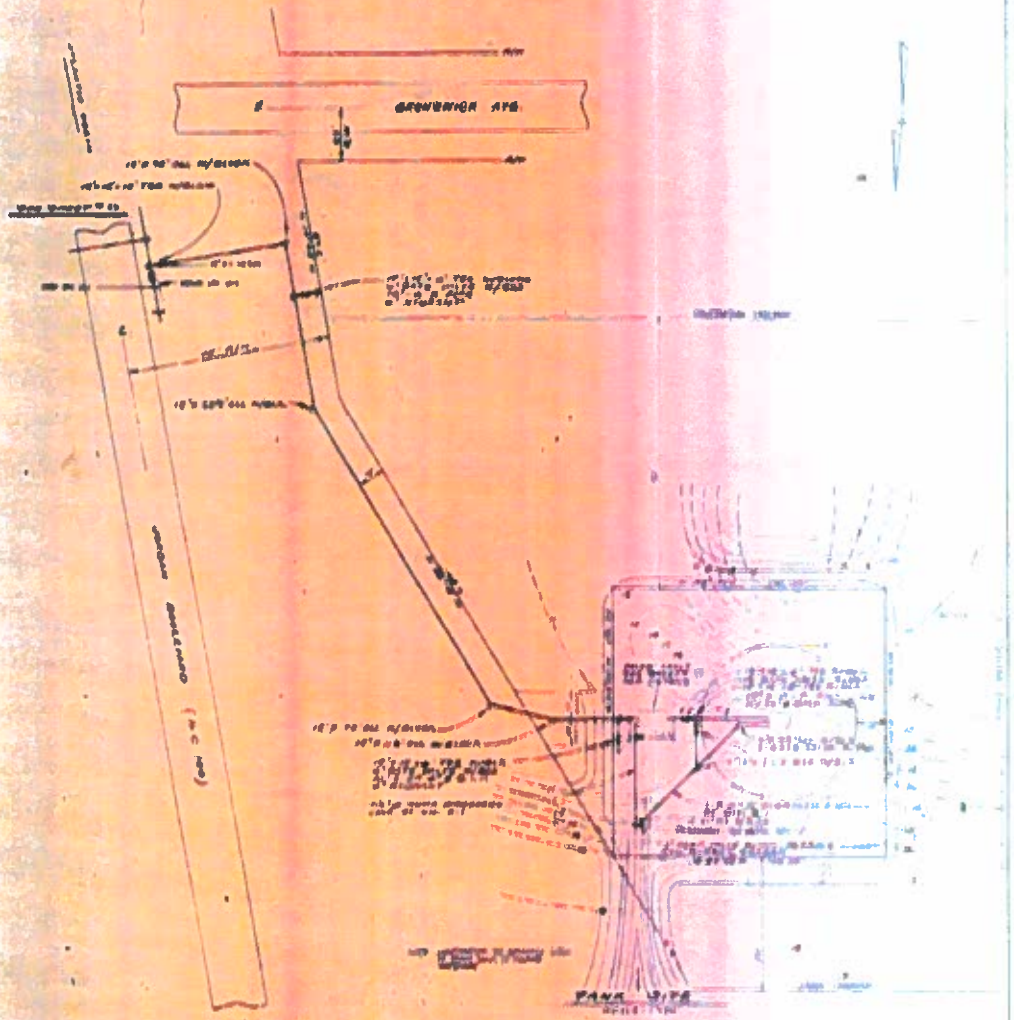
HOLDEN BEACH, N. C.

1977

DIVISION A-1 WATER MAINS
DIVISION B-1 TANK FOUNDATION
DIVISION C-1 300,000 GALLON ELEVATED WATER TANK

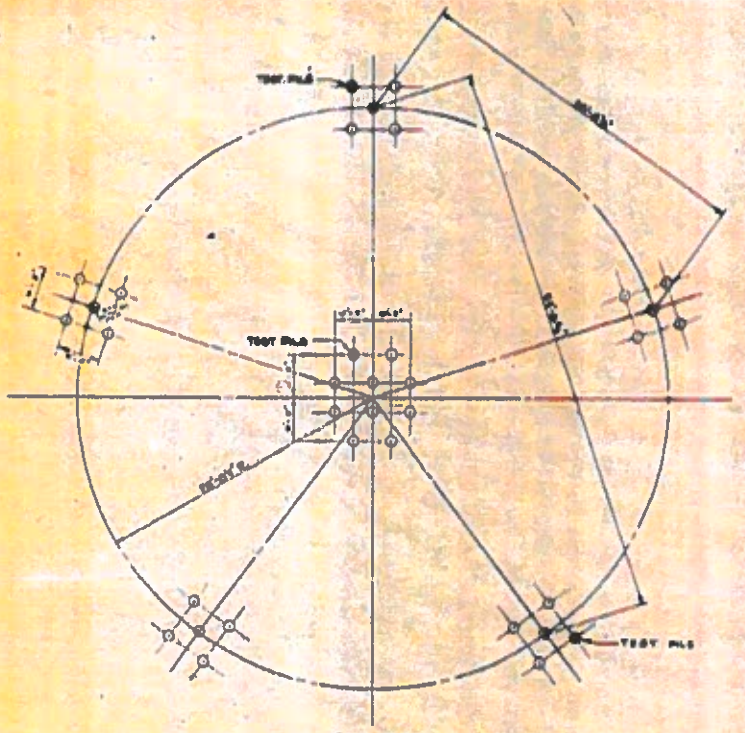


TANK ELEVATION

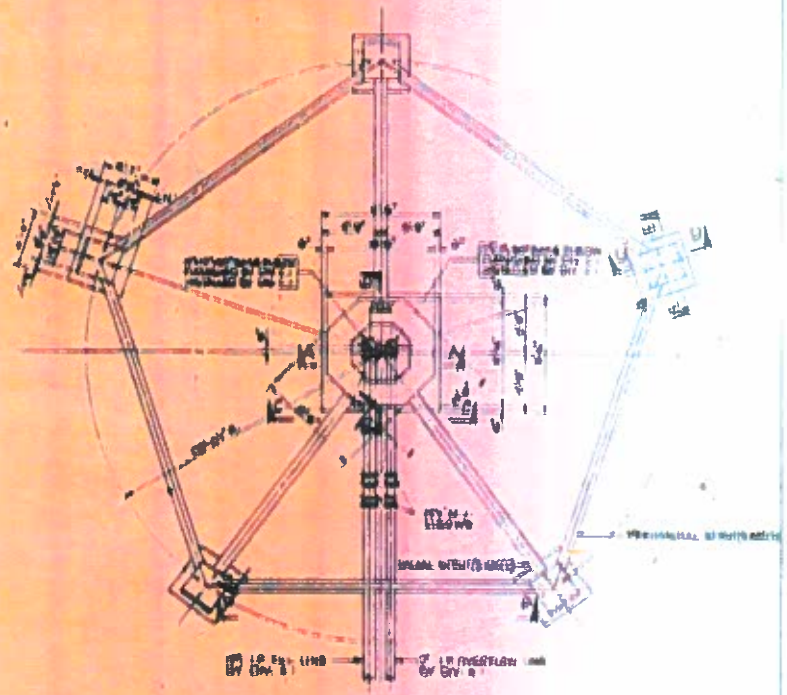


PARK SITE

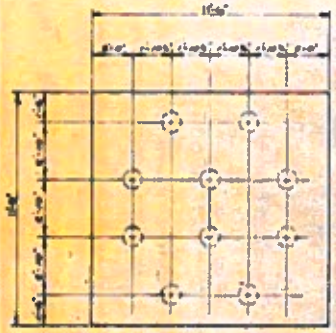
PURSER & WHITMAN



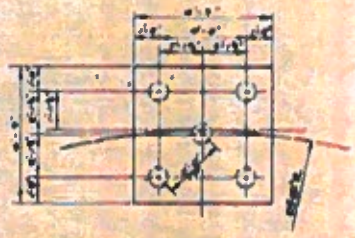
PILE PLAN



PIER PLAN

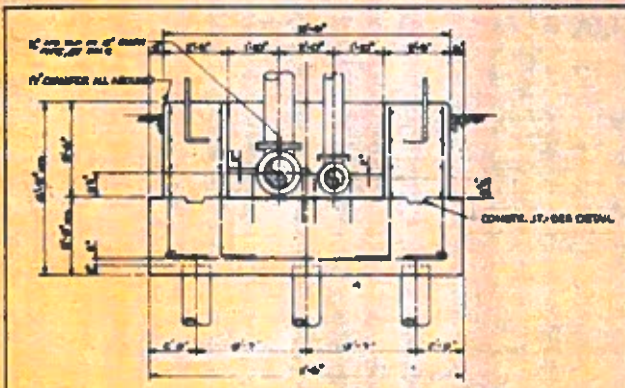


CENTER PILE CAP PLAN

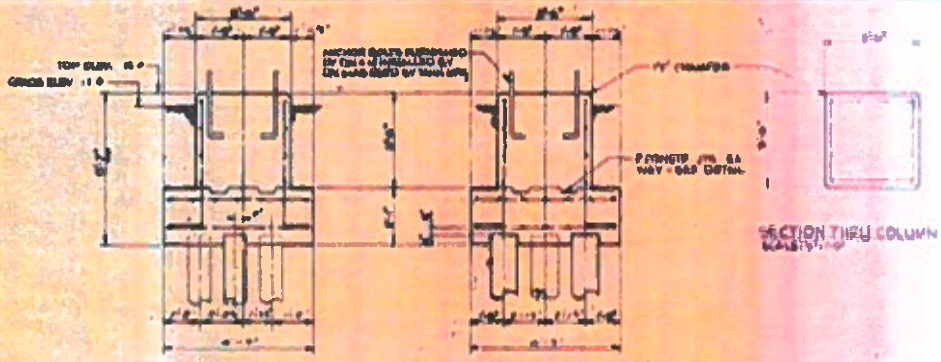


COLUMN PIER PILE CAP PLAN

GENERAL NOTES



SECTION A-A



SECTION C-C

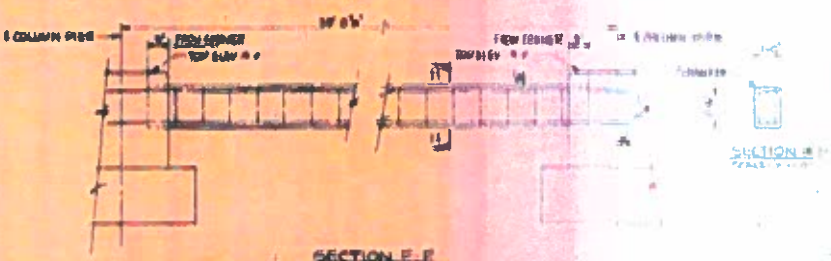
SECTION D-D

SECTION E-E

SECTION THRU COLUMN PIER (TYP.)

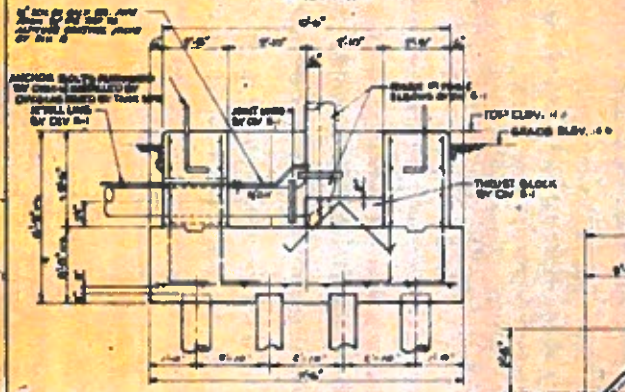
COLUMN PIER DETAILS - 5 REQ'D

TYP. CONSTRUCTION JOINT

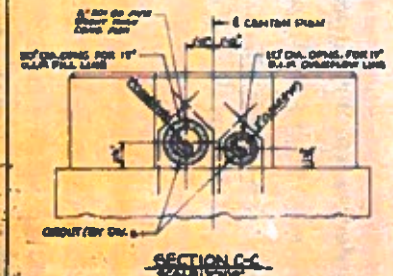


SECTION F-F

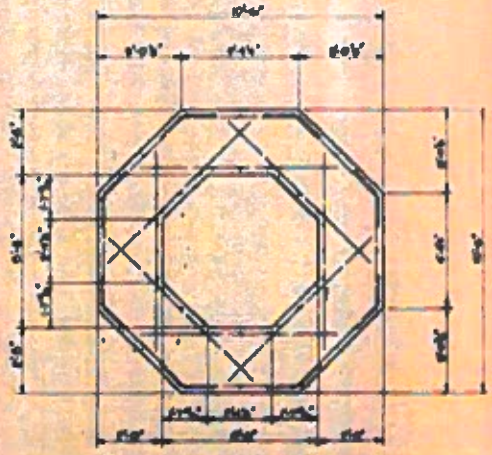
PERIPHERAL STRUT DETAILS - 2 REQ'D



SECTION B-B

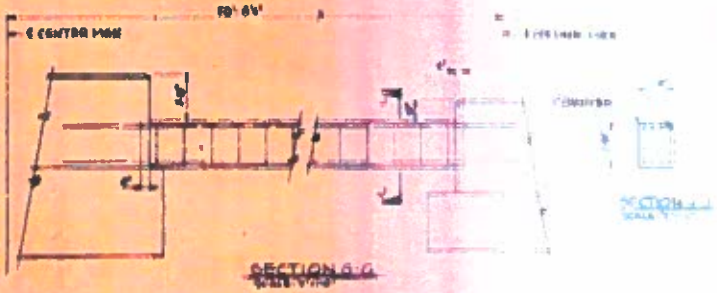


SECTION C-C



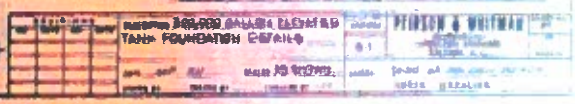
SECTION THRU CENTER PIER SHOWING

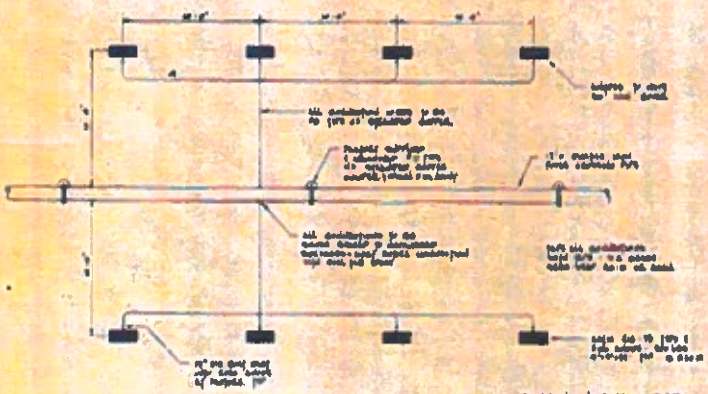
CENTER PIER DETAILS - 1 REQ'D

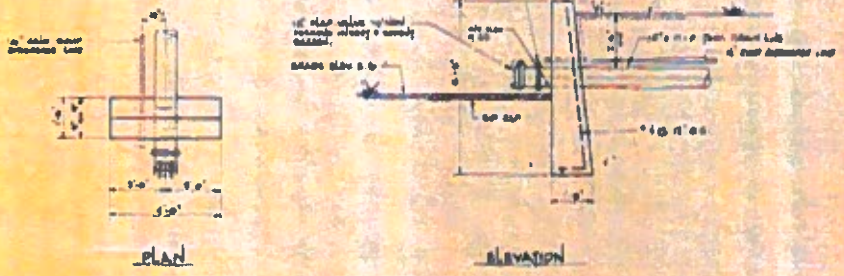


SECTION G-G

RADIAL STRUT DETAILS - 2 REQ'D



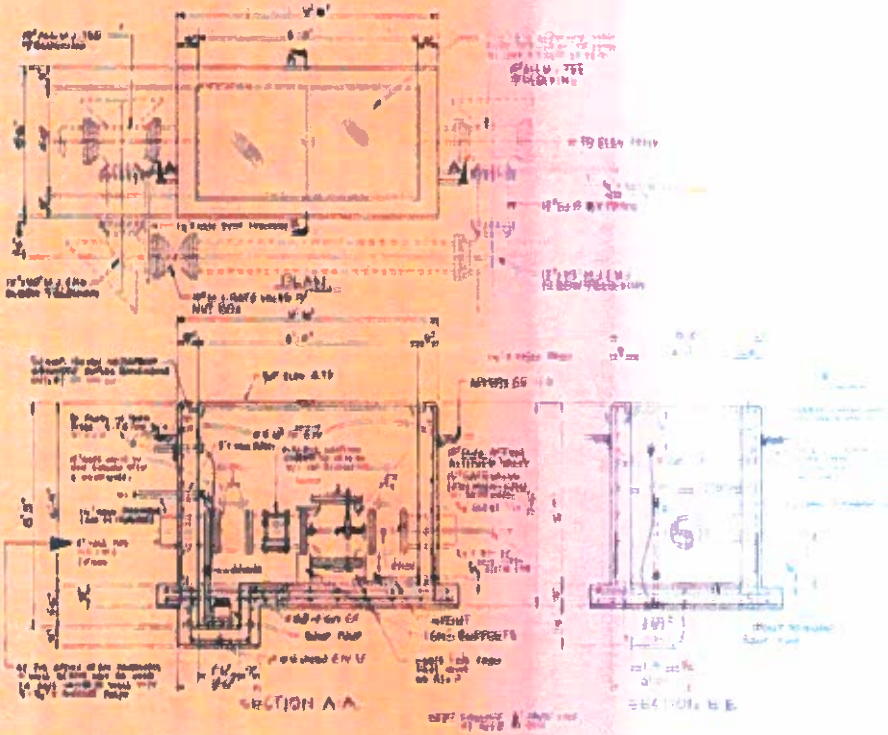




PLAN

ELEVATION

HEADWALL DETAIL @ TANK SITE

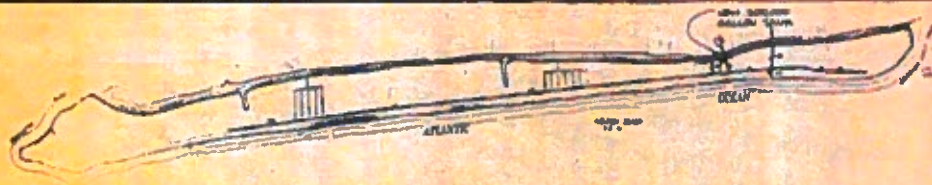


PLAN

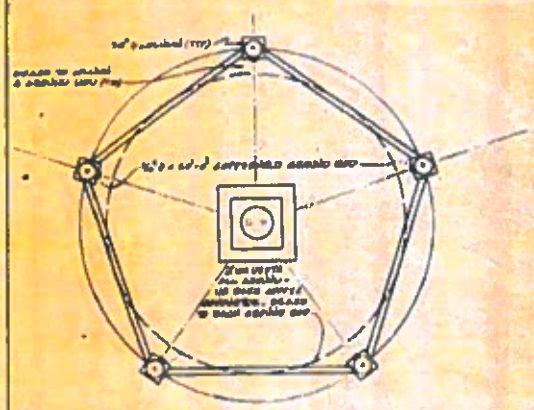
SECTION A-A

ALTITUDE VALVE VAULT

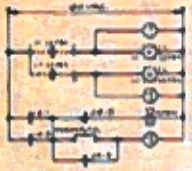
PETERSON & WHITMAN



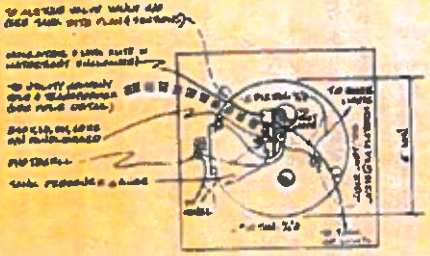
VICINITY MAP



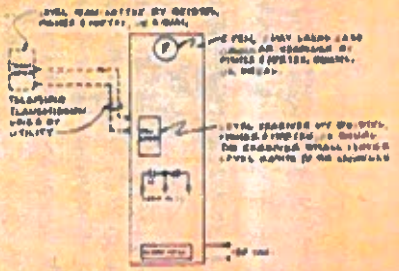
TANK CROWN DETAIL



ALARM CONTROL UNIT



DRY RISER EQUIPMENT DETAIL



ELEVATED TANK [illegible] DIAGRAM

ELEVATED TANK [illegible]

APPENDIX 5. WATER QUALITY REPORT BRUNSWICK COUNTY

Brunswick County 2022 Water Quality Report

IMPORTANT PHONE NUMBERS

Billing Questions
910-253-2655 Option 2

WATER EMERGENCIES
8 a.m. to 4:30 p.m.
910-253-2657
Option 1

AFTERHOURS
4:30 p.m. to 8 a.m.
910-371-3490

211 WATER PLANT
910-454-0512

ALTERNATE
910-755-7921

EPA SAFE DRINKING WATER HOTLINE
1-800-426-4791

Brunswick County Public Utilities is pleased to share its 2022 annual water quality report. Our water system has had unprecedented growth over the past several years and we are proud to serve the wonderful community that we work and live in. Brunswick County Public Utilities has met and/or exceeded all water quality standards. Our dedicated staff continually tests water from the source to your tap to ensure its quality. During the 2022 calendar year, staff sampled over 200 constituents in the water supply. Compounds, such as GenX and other per- and polyfluoroalkyl substances (PFAS), have become a more significant issue as regulations continue to develop and more is understood regarding their health impacts. In March 2023, EPA took a key step to protect public health by proposing maximum contaminant levels or MCLs for six PFAS known to occur in drinking water, PFOA and PFOS at 4 parts per trillion and PFNA, PFHxS, PFBS, HFPO-DA(GenX) combined as a hazard index of 1.0. Approval of these proposed MCLs is expected to occur in December 2023. More information can be found by visiting epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas.

Brunswick County Public Utilities is in the third year of construction building a Low-pressure Reverse Osmosis (LPRO) water treatment addition at the Northwest Water Treatment Plant which will be able to meet and/or exceed the requirements of future PFAS regulations. LPRO is the most advanced treatment technology available to remove GenX and other unregulated contaminants from the water supply. For more information about the LPRO plant addition currently under construction, visit brunswickcountync.gov/nwtp.

Please take note of the billing phone number and emergency afterhours phone numbers in the left margin, water quality data on pages 6-9, and water-saving tips and the best times to irrigate your lawn on page 12.

As always, we are here to serve, so please reach out if you have any questions or comments.

Regards,

John Nichols, Director of Public Utilities

Glenn Walker, Water Resources Manager

BRUNSWICK COUNTY 2022 WATER QUALITY REPORT

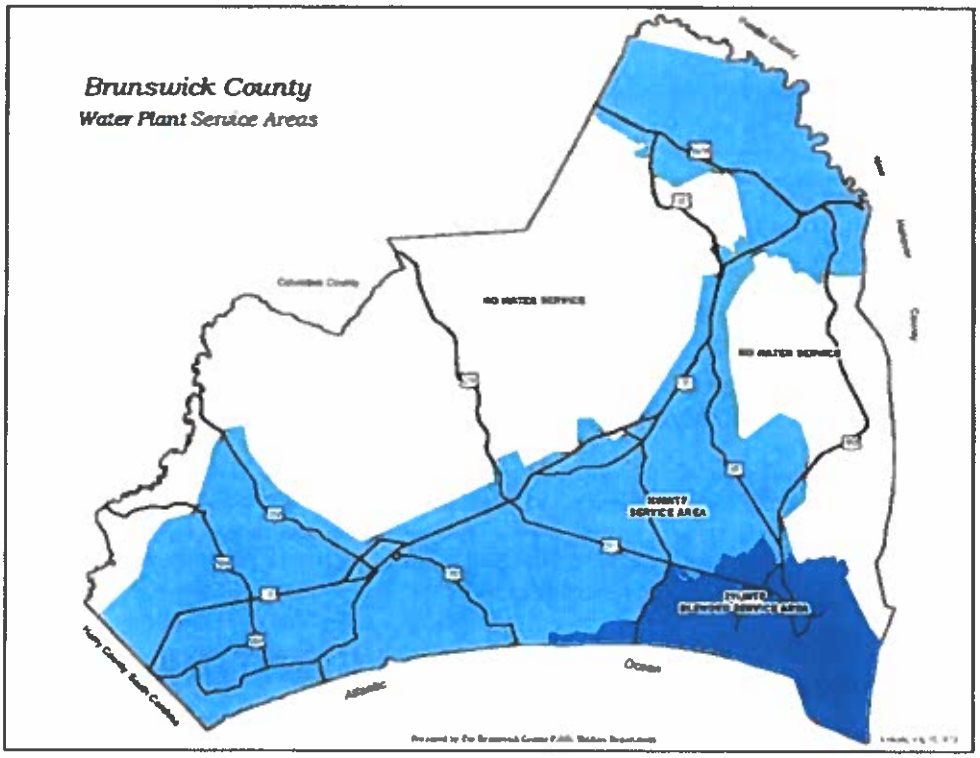
The Brunswick County Public Utilities Department is here to serve you 24 hours a day. If you plan to dig, then call 811 or log on to NC811.org to request utility locates. If you have billing questions, call Customer Service at 910-253-2655 Option 2. If you have water quality concerns or questions about the function of your meter, contact our office at 910-253-2657 and ask for option 1; we will be glad to work with you to solve any water issues. If you have questions about your backflow device or need it inspected, call us at 910-253-2683.

INTERESTING FACTS

- Total Brunswick County Water System Capacity: 30 million gallons per day (MGD)
- The Greatest One Day System Demand of the Year for 2022 was 29.234 MGD on June 25, 2022

Find Your Service Area

All of Brunswick County's water customers and wholesale water customers* receive either all or part of their water from the Northwest Water Treatment Plant. Within the Southport, St. James, Oak Island, and Caswell Beach areas, water from the Northwest Water Treatment is blended with water from the Highway 211 Water Treatment Plant to serve customers. The Highway 211 Water Treatment Plant sources its water from groundwater wells. Bald Head Island has its own treatment plant, but supplementary water is supplied by the 211 Water Treatment Plant, or blended water from both county plants. All other customers in the County receive their water solely from the Northwest Water Treatment Plant.



As of the publication of this report, Brunswick County's current wholesale customers include Bald Head Island, Holden Beach, Brunswick Regional Water and Sewer (H2Go), Oak Island, Ocean Isle Beach, Shallotte, and Southport.

Sources of Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, *radioactive material*, and can pick up substances resulting from the presence of animals or from human activity. Contaminants are anything in the water other than the water molecule. Contaminants that may be present in source water include *microbial contaminants*, such as viruses and bacteria, which may come from wildlife, sewage treatment plants, septic systems, and agricultural livestock operations; *inorganic contaminants*, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, *radioactive material* from oil and gas production, mining, or farming; *pesticides and herbicides*, which typically come from agricultural operations; and *chemicals*, which are often by-products of industrial processes.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

The NC Source Water Assessment Program (SWAP)

The North Carolina Department of Environmental Quality (DEQ), Public Water Supply (PWS) Section, Source Water Assessment Program (SWAP) conducted assessments for all drinking water sources across North Carolina. The purpose of the assessments was to determine the susceptibility of each drinking water source (well or surface water intake) to Potential Contaminant Sources (PCSs). The results of the assessment are available in SWAP Assessment Reports that include maps, background information, and a relative susceptibility rating of Higher, Moderate, or Lower.

The relative susceptibility rating of each source for Brunswick County was determined by combining the contaminant rating (number and location of PCSs within the assessment area) and the inherent vulnerability rating (i.e., characteristics or existing conditions of the well or watershed and its delineated assessment area). The most recent assessment findings (September 2020) are summarized in the table below.

Susceptibility of Sources to Potential Contaminant Sources (PCSs)

Source Name	Susceptibility Rating	SWAP Report Date
CAPE FEAR RIVER	Moderate	Sept. 10, 2020
WELL # 1, 2, 15, 16, 17	Lower	Sept. 10, 2020
WELL # 3 ,8, 11,12,12A,18 ,19	Moderate	Sept. 10, 2020
WELL # 5,6A	Higher	Sept.10,2020

The complete SWAP Assessment Report for the Brunswick County Water System may be viewed on the Web by typing the following address into your browser <https://www.ncwater.org/?page=600> then enter 0410045. To obtain a printed copy of this report contact the Source Water Assessment Staff by phone at 919-707-9098.

It is important to understand that a susceptibility rating of *higher* does not imply poor water quality, only the systems' potential to become contaminated by PCSs in the assessment area.

211 Water Treatment Plant

The 211 Water Treatment Plant is a six (6) million gallon a day groundwater treatment plant. The raw water is sourced from fourteen (14) water supply wells drilled to approximately 175 feet into the Castle Hayne Aquifer. The facility utilizes a lime softening process to remove excess calcium and iron from the well water. A photo of the claircone up-flow lime softening process is below.

We would like to congratulate water treatment plant operator Jesse Burgess for attaining his A-Well certification. The facility would also like to welcome Aaron Biagiotti, Tracy Flack, and Shane Manual as new water treatment plant operators.

The Brunswick County Planning Department and County Utilities Staff have developed a Wellhead Protection Area (WPA) Overlay District. The purpose of the WPA overlay district is to protect public water supply wells in the area by minimizing man-made impacts to the soils above the aquifer.

Northwest Water Treatment Plant

The Northwest WTP takes water from the Cape Fear River above Lock and Dam #1 in Bladen County through a contract with Lower Cape Fear Water and Sewer Authority (LCFWASA). Brunswick County Public Utilities, Cape Fear Public Utilities and Pender County Public Utilities are all customers of LCFWASA. Brunswick County Public Utilities is the contract operator of the raw water pump station at LCFWASA.

Area Wide Optimization Program (AWOP): The Northwest WTP participates in this program designed to optimize water system operations and water quality by closely monitoring filter effluent turbidity and microbial results in the WTP. NC-DEQ and the EPA have established a turbidity goal of <0.10 ntu, this is one third of the mandated 0.3 ntu required by the Safe Drinking Water Act. The water treatment plant has met this goal four times.

Staff Certifications: Congratulations to Mary Wilson for attaining the B-Surface Water Treatment certification. The facility would like to welcome Jason Ashcraft and Daniel Boyden as new water treatment operators.

Northwest Water Treatment Plant Expansion and Reverse Osmosis Treatment Upgrades: Brunswick County Public Utilities continues to work with CDM Smith to advance the construction of needed water treatment plant improvements for the removal of PFAS contaminants. Oscar Renda Contracting company is currently working on upgrades and plant construction. Major elements are: expansion of the existing treatment process from 24 million gallons a day (MGD) to 48 MGD and the addition of 36 MGD of low-pressure reverse osmosis (LPRO), plus the necessary ancillary equipment to ensure it all works together. An overhead shot of the construction site is below.

More detailed information about the LPRO design, water quality results, and steps we are taking to secure our water future can be found on the Brunswick County website: brunswickcountync.gov/genx. Learn more about the Northwest Water Treatment Plant project at brunswickcountync.gov/nwtp.

Water Quality Results for 2022

Terms and abbreviations used in the tables below:

- **Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- **Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water as set by the EPA. MCLs are set as close to the MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- **Action Level (AL):** The concentration of a contaminant which, when exceeded, triggers treatment or other requirements which a water system must follow.
- **Locational Running Annual Average (LRAA):** The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters under the Stage 2 Disinfectants and Disinfection Byproducts Rule.

N/A: not applicable
ppm-mg/L: parts per million or milligrams per liter
ppt-ng/L: parts per trillion or nanograms per liter
MGD: million gallons a day
ntu: nephelometric turbidity unit (cloudiness)
ppb-ug/L: parts per billion or micrograms per liter
pCi/l: Picocuries per liter (a measure of radiation)
Y/N: Yes No

Northwest Water Treatment Plant Analysis

Listed below are the results of water quality sampling performed from January 1, 2022, to December 31, 2022.

Questions and Comments: Contact Thaddeus Hill Water Resources Superintendent, 910-371-3490 or Thad.Hill@brunswickcountync.gov

REGULATED ORGANIC CHEMICALS	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low	Range High	Violation Y/N	Source of Contaminant
Turbidity	Treatment Technique Limit of 1.0 ntu	N/A	% of samples ≤ 0.3 ntu	99.5%		N	Soil Runoff
			sample range	0.06	0.79		
Raw Water TOC	Treatment Technique Removal Ratio ≥1 (Step 1)	N/A	TOC Removal Ratio Avg = 1.074	0.894	1.266	N	Naturally Present in the Environment
Finish Water TOC		N/A					
Total Organic Carbon (TOC)		N/A					
pH	6.8 - 8.5	N/A	7.6	7.5 - 7.9		N	By-Product of Caustic Addition
REGULATED INORGANIC CHEMICALS	**EPA's MCL**	**EPA's MCLG**	**Brunswick County Samples (Avg)**	**Range Low**	**Range High**	**Violation Y/N**	**Source of Contaminant**
Chlorite	1.0 ppm	0.8 ppm	0.50 ppm	0.44	0.59	N	By-Product of Disinfection
Chlorine Dioxide	0.8 ppm	0.8 ppm	0.027 ppm	0.0	0.31	N	Water Additive Used to Control Microbes
Fluoride	4 ppm	4 ppm	0.68 ppm	0.0	.88	N	Water Additive which Promotes Strong Teeth
Orthophosphate	17 ppm	N/A	1.43 ppm	1.35	1.8	N	Water Additive Used to Control Corrosion
Total Chlorine	4 ppm	4 ppm	3.0 ppm	2.90	3.2	N	Water Additive Used to Control Microbes
Monochloramine Disinfectant Residual	4 ppm	4 ppm	2.89 ppm	0.0	3.16	N	Water Additive Used to Control Microbes
UNREGULATED SUBSTANCES	**EPA's MCL**	**EPA's MCLG**	**Brunswick County Samples (Avg)**	**Range Low**	**Range High**	**Violation Y/N**	**Source of Contaminant**
1, 4 Dioxane	Non Regulated	N/A	1.406 ppb	.24	2.9	N	Purifying Agent in Pharmaceuticals and By-Product of PET Plastic Production
Hardness	Non Regulated	N/A	28 ppm	24	40	N	Part of the Treatment Process, Erosion of Natural Deposits
Iron	Non Regulated	N/A	0.01 ppm	0.01	0.11	N	Part of the Treatment Process, Erosion of Natural Deposits
Manganese	Non Regulated	N/A	0.01 ppm	0.01	0.06	N	Part of the Treatment Process, Erosion of Natural Deposits
Free Ammonia	Non Regulated	N/A	0.10 ppm	0.0	0.17	N	Water Additive Used to Control Microbes
Sodium	Non Regulated	N/A	23.118	N/A		N	Part of the Treatment Process, Erosion of Natural Deposits
CRYPTOSPORIDIUM - Cape Fear River 2017		N/A	0.0 oocyst	0		N	Naturally Present in the Environment

**Unregulated contaminants are those which EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist EPA in determining the occurrence of unregulated contaminants in drinking water and whether future regulations are warranted.*

Finished Water PFAS Results for 2022

PFAS SUBSTANCES (UNREGULATED) *	EPA's MCL	EPA's MCLG	Brunswick County Samples (Avg) ppt	Low (ppt)	High (ppt)	Violation Y/N	Source of Contaminant
PFBA	Non Regulated	N/A	5.215	2.39	10.9	N	By-Product of Chemical Manufacturer
PFPeA	Non Regulated	N/A	10.340	2.98	27.5	N	By-Product of Chemical Manufacturer
PFHxA	Non Regulated	N/A	7.9558	2.55	17.7	N	By-Product of Chemical Manufacturer
PFHpA	Non Regulated	N/A	3.487	1.51	6.54	N	By-Product of Chemical Manufacturer
PFOA	Non Regulated	N/A	5.533	3.4	8.98	N	By-Product of Chemical Manufacturer
PFNA	Non Regulated	N/A	0.751	0.395	1.25	N	By-Product of Chemical Manufacturer
PFDA	Non Regulated	N/A	0.413	0.138	0.808	N	By-Product of Chemical Manufacturer
PFUnDA	Non Regulated	N/A	0.123	0.0166	0.234	N	By-Product of Chemical Manufacturer
PFDoDA	Non Regulated	N/A	0.036	0.00136	0.145	N	By-Product of Chemical Manufacturer
PFTrDA	Non Regulated	N/A	0.052	0.00611	0.11	N	By-Product of Chemical Manufacturer
PFTeDA	Non Regulated	N/A	0.012	0.00179	0.0395	N	By-Product of Chemical Manufacturer
PFBS	Non Regulated	N/A	5.255	1.78	11.7	N	By-Product of Chemical Manufacturer
PFPeS	Non Regulated	N/A	0.743	0.409	1.32	N	By-Product of Chemical Manufacturer
PFHxS	Non Regulated	N/A	4.330	2.51	8.76	N	By-Product of Chemical Manufacturer
PFHpS	Non Regulated	N/A	0.226	0.0079	0.444	N	By-Product of Chemical Manufacturer
PFOS	Non Regulated	N/A	9.909	5.9	17.4	N	By-Product of Chemical Manufacturer
PFNS	Non Regulated	N/A	0.038	0.0009	0.0759	N	By-Product of Chemical Manufacturer
PFDS	Non Regulated	N/A	0.035	0.0038	0.0508	N	By-Product of Chemical Manufacturer
4:2 FTS	Non Regulated	N/A	0.020	0.0024	0.0951	N	By-Product of Chemical Manufacturer
6:2FTS	Non Regulated	N/A	0.733	0.0232	9.56	N	By-Product of Chemical Manufacturer
8:2 FTS	Non Regulated	N/A	0.053	0.0196	0.0877	N	By-Product of Chemical Manufacturer
PFOSA	Non Regulated	N/A	0.088	0.0022	0.324	N	By-Product of Chemical Manufacturer
N-MeFOSAA	Non Regulated	N/A	0.079	0.0189	0.279	N	By-Product of Chemical Manufacturer
N-EtFOSAA	Non Regulated	N/A	0.053	0.0066	1.58	N	By-Product of Chemical Manufacturer
HFPO-DA	Non Regulated	N/A	5.290	1.37	12.7	N	By-Product of Chemical Manufacturer
PFMOAA	Non Regulated	N/A	35.709	5.8	85.6	N	By-Product of Chemical Manufacturer
PFMOPrA	Non Regulated	N/A	0.091	0.0351	0.156	N	By-Product of Chemical Manufacturer
PFO2HxA	Non Regulated	N/A	5.818	0.682	16.2	N	By-Product of Chemical Manufacturer
PFO3OA	Non Regulated	N/A	1.658	0.358	4.31	N	By-Product of Chemical Manufacturer
PFO4DA	Non Regulated	N/A	0.509	0.0933	1.37	N	By-Product of Chemical Manufacturer
Nafion Byproduct 1	Non Regulated	N/A	0.036	0.0155	0.0772	N	By-Product of Chemical Manufacturer
ADONA	Non Regulated	N/A	0.024	0.0151	0.0344	N	By-Product of Chemical Manufacturer
9Cl-PF3ONS	Non Regulated	N/A	0.0689	0.0604	0.0788	N	By-Product of Chemical Manufacturer
11Cl-PF3OUdS	Non Regulated	N/A	0.0522	0.0195	0.103	N	By-Product of Chemical Manufacturer
10:2FTS	Non Regulated	N/A	0.1084	0.0208	0.188	N	By-Product of Chemical Manufacturer
EVE Acid	Non Regulated	N/A	0.0298	0.0015	0.245	N	By-Product of Chemical Manufacturer
PBSA	Non Regulated	N/A	0.7662	0.128	1.97	N	By-Product of Chemical Manufacturer
Hydro-EVE Acid	Non Regulated	N/A	0.2923	0.0041	0.892	N	By-Product of Chemical Manufacturer
Hydrolyzed PSDA	Non Regulated	N/A	8.953	0.703	29.3	N	By-Product of Chemical Manufacturer
Nafion Byproduct 2	Non Regulated	N/A	0.408	0.111	1.41	N	By-Product of Chemical Manufacturer
N-EtFOSA	Non Regulated	N/A	0.05	0.049	0.0507	N	By-Product of Chemical Manufacturer
N-EtFOSE	Non Regulated	N/A	0			N	By-Product of Chemical Manufacturer
NFDHA	Non Regulated	N/A	0			N	By-Product of Chemical Manufacturer
N-MeFOSA	Non Regulated	N/A	0.018	0.0174	0.0187	N	By-Product of Chemical Manufacturer
N-MeFOSE	Non Regulated	N/A	0.033	0.033	0.033	N	By-Product of Chemical Manufacturer
NVHOS	Non Regulated	N/A	4.37	0.856	13.7	N	By-Product of Chemical Manufacturer
PEPA	Non Regulated	N/A	2.731	0.401	7.74	N	By-Product of Chemical Manufacturer
PFECA-G	Non Regulated	N/A	0.069	0.0258	0.117	N	By-Product of Chemical Manufacturer
PFEESA	Non Regulated	N/A	0.079	0.0081	0.287	N	By-Product of Chemical Manufacturer
PFHxDA	Non Regulated	N/A	0.024	0.0064	0.132	N	By-Product of Chemical Manufacturer
PFMOBA	Non Regulated	N/A	0			N	By-Product of Chemical Manufacturer
PFOSDA	Non Regulated	N/A	0.1106	0.0227	0.437	N	By-Product of Chemical Manufacturer
PMPA	Non Regulated	N/A	7.0783	2.35	15.3	N	By-Product of Chemical Manufacturer
R-EVE Acid	Non Regulated	N/A	10.309	1.12	95.9	N	By-Product of Chemical Manufacturer
R-PSDA	Non Regulated	N/A	15.233	2.87	42.6	N	By-Product of Chemical Manufacturer
R-PSDCA	Non Regulated	N/A	0.0807	0.0109	0.221	N	By-Product of Chemical Manufacturer

Cryptosporidium Monitoring: The Northwest WTP monitored for Cryptosporidium in 2017 and did not detect any oocysts in 12 samples from our raw water supply. Cryptosporidium is a microbial parasite which is found in surface water throughout the United States. Although Cryptosporidium can be removed by filtration, the most commonly used filtration methods cannot guarantee 100 percent removal. Our previous monitoring of the source water has indicated the presence of these organisms. Current test methods do not enable us to determine if the organisms are dead or if they are capable of causing disease. The Northwest WTP takes precautions to kill and remove Cryptosporidium oocyst by using chlorine dioxide as a pre-oxidant disinfectant in our raw water supply line and again just before filtration. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals overcome the disease within a few weeks. However, immunocompromised people have more difficulty and are at greater risk of developing severe, life-threatening illnesses. Immunocompromised individuals are encouraged to consult their doctor regarding appropriate precautions to take to prevent infection. Cryptosporidium must be ingested for it to cause disease, and it may be spread through means other than drinking water.

HWY 211 Groundwater Treatment Plant Analysis

Questions and Comments: Contact Jeremy Sexton, Water Resources Superintendent, 910-253-2488 or jeremy.sexton@brunswickcountync.gov

	EPA's MCL	EPA's MCLG	Brunswick County Amount Detected	Range Low	Range High	Violation Y/N	Source of Contaminant
UNREGULATED SUBSTANCES							
Turbidity	Non Regulated	N/A	Average 0.62 ntu	0.08	5.4	N	Part of the Treatment Process, Erosion of Natural Deposits
pH	Non Regulated	N/A	—	6.9	9.2	N	Part of the Treatment Process
CO2	Non Regulated	N/A	7.6	3.0	20	N	Part of the Treatment Process
Alkalinity	Non Regulated	N/A	43	26	160	N	Part of the Treatment Process, Erosion of Natural Deposits
Hardness	Non Regulated	N/A	122	82	235	N	Part of the Treatment Process, Erosion of Natural Deposits
Iron	Non Regulated	N/A	0.05	0	.50	N	Part of the Treatment Process, Erosion of Natural Deposits
Chloride	Non Regulated	N/A	22	18	26	N	Part of the Treatment Process, Erosion of Natural Deposits
Free Ammonia	Non Regulated	N/A	0.04	0	0.18	N	Water Additive Used to Control Microbes
REGULATED INORGANIC CHEMICALS			**Brunswick County Amount Detected**	**Range Low**	**Range High**	**Violation Y/N**	**Source of Contaminant**
Fluoride	4ppm	4ppm	0.83	0.2	1.2	N	Water Additive Used to Promote Strong Teeth
Orthophosphate	17ppm	N/A	1.2	0.3	2.3	N	Water Additive Used to Control Corrosion
Total Chlorine	4ppm	4ppm	2.7	1.2	3.8	N	Water Additive Used to Control Microbes
Monochloramine	4ppm	4ppm	3	2.1	3.6	N	Water Additive Used to Control Microbes

Distribution System Analysis

Questions and Comments: Contact Parul Bararwal,Phd Water quality program manager, 910-253-7567 or Parul.Bararwal@brunswickcountync.gov

LEAD AND COPPER	Action Level (AL)	MCLG	Brunswick County Amount Detected	# of Samples above the AL	Exceedance of the Action Level? Y/N	
Copper 90th percentile 6/1/20 - 8/30/20	1.3 ppm	1.3 ppm	0.1211 ppm	0	N	Corrosion of Household Plumbing
Lead 90th percentile 6/1/20 -8/30/20	0.015 ppm	0 ppm	.003 ppm	0	N	Corrosion of Household Plumbing
ORGANIC CHEMICALS TTHM and HAA	**EPA's MCL**	**EPA's MCLG**	**Brunswick County Amount Detected**	**Range Low High**	**Violation Y/N**	**Source of Contaminant**
Location B01 TTHM	LRAA 80 ppb	N/A	48.4 ppb	33 - 58	N	By-product of Disinfection
Location B02 TTHM	LRAA 80 ppb	N/A	45.6 ppb	32 - 56	N	By-product of Disinfection
Location B03 TTHM	LRAA 80 ppb	N/A	48.6 ppb	34 -65	N	By-product of Disinfection
Location B04 TTHM	LRAA 80 ppb	N/A	46 ppb	30 - 64	N	By-product of Disinfection
Location B05 TTHM	LRAA 80 ppb	N/A	44.8 ppb	34 - 52	N	By-product of Disinfection
Location B06 TTHM	LRAA 80 ppb	N/A	42.4 ppb	33 - 52	N	By-product of Disinfection
Location B07 TTHM	LRAA 80 ppb	N/A	43.2 ppb	34 -54	N	By-product of Disinfection
Location B08 TTHM	LRAA 80 ppb	N/A	43.6 ppb	33 -53	N	By-product of Disinfection
Location B01 HAA	LRAA 60 ppb	N/A	21.7 ppb	18 - 25	N	By-product of Disinfection
Location B02 HAA	LRAA 60 ppb	N/A	19.8 ppb	15 - 26	N	By-product of Disinfection
Location B03 HAA	LRAA 60 ppb	N/A	20.75 ppb	17 -31	N	By-product of Disinfection
Location B04 HAA	LRAA 60 ppb	N/A	22.5 ppb	14 -33	N	By-product of Disinfection
Location B05 HAA	LRAA 60 ppb	N/A	20.5 ppb	17 -27	N	By-product of Disinfection
Location B06 HAA	LRAA 60 ppb	N/A	18.25 ppb	14 - 24	N	By-product of Disinfection
Location B07 HAA	LRAA 60 ppb	N/A	18.25 ppb	17 - 20	N	By-product of Disinfection
Location B08 HAA	LRAA 60 ppb	N/A	19.5 ppb	16 - 27	N	By-product of Disinfection
REGULATED INORGANIC CHEMICALS	**EPA's MCL**	**EPA's MCLG**	**Brunswick County Amount Detected**	**Range Low High**	**Violation Y/N**	**Source of Contaminant**
Chlorite	1.0 ppm	0.8 ppm	Average 0.58 ppm	0.44 0.59	N	By-product of Disinfection
Nitrate	10 ppm	10 ppm	1.09 ppm	N/A	N	By-product of Disinfection
PESTICIDES, VOLATILE, & SYNTHETIC ORGANIC CHEMICALS	There Were No Regulated Pesticides, Volatile or Synthetic Organic Chemicals Detected in the Distribution System (Beyond those listed above) for the 2022 Sample Period					
Microbiological contaminants	**EPA's MCL**	**EPA's MCLG**	**Number of pos itive/present samples**	**Range Low High**	**Violation Y/N**	**source of contamination**
Total Coliforms Bacteria presence or absent	TT*	N/A	1	N/A	N	natural present in the environment

* If a system collecting 40 or more samples per month finds greater than 5%of monthly samples are positive in one month,an assessment is required.

Did You Know?

BRUNSWICK COUNTY WANTS YOU TO KNOW ABOUT POTENTIAL HOUSEHOLD LEAD & COPPER CONTAMINATION

Although there is no Maximum Contaminant Level (MCL) established for lead or copper, the federal government establishes an *action level* (AL) that prompts specific measures by the water supplier. The AL is determined based on the 90th percentile, requiring that 90 percent of the samples fall at or below the designated AL. For copper, the AL is set at 1.3 parts per million (ppm), while for lead, it is 15 parts per billion (ppb).

The consumption of lead-contaminated water by infants and children may result in hindered physical or cognitive development. In children, it can lead to minor impairments in both physical and mental growth, including potential limitations in attention span and learning capabilities. Prolonged consumption of such water by adults may contribute to the development of kidney issues or hypertension.

LEAD

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Brunswick County Public Utilities provides high-quality drinking water but cannot control the variety of materials used in plumbing components. When your tap water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes, before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (800-426-4791) or at epa.gov/safewater/lead.

COPPER

Although copper is an essential nutrient, individuals who consume water with copper levels exceeding the designated action level within a relatively short period may encounter gastrointestinal discomfort. Moreover, prolonged consumption of water surpassing the action level for copper over many years could potentially lead to liver or kidney damage. If you have Wilson's Disease, it is advisable to consult your personal doctor. If you have concerns about copper levels in your water, it is recommended to consider testing it. The safe drinking water hotline at 1 (800) 426-4791 or the website epa.gov/safewater/lead can provide information regarding copper in drinking water, testing methods, and steps you can take to minimize exposure.

HOW DOES BRUNSWICK COUNTY PREVENT AND MONITOR FOR LEAD & COPPER IN DRINKING WATER?

- We don't use lead service lines between the distribution pipes and our water meters
- We have an active corrosion control and prevention plan that requires us to feed a corrosion inhibitor (orthophosphate) and to monitor the residual daily at the water plants and weekly in the distribution system
- Brunswick County building codes have required plumbing materials to be low or free of lead since 1987
- We monitor lead and copper in homes that were built before 1987 and may be at higher risk for exposure due to susceptible plumbing materials (copper pipe with lead solder joints) at least every three years

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. Drinking water, whether from tap or bottled sources, originates from a variety of natural sources such as rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water flows across the land's surface or seeps through the ground, it naturally acquires minerals and, in certain instances, radioactive elements through dissolution. Additionally, it may accumulate substances introduced by animal or human activities.

Potential impurities found in the source water encompass various categories: **Microbial contaminants** like viruses and bacteria, may originate from sewage treatment plants, septic systems, agricultural livestock operations, stormwater runoff and wildlife. **Inorganic contaminants** such as salts and metals, can either be naturally occurring or arise from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming. **Pesticides and herbicides** can stem from diverse sources such as agriculture, urban stormwater runoff, and residual land applications. **Organic chemical contaminants**, including synthetic and volatile organic chemicals result from industrial processes, petroleum production, gas stations, urban stormwater runoff, and septic systems. Lastly, **radioactive contaminants** can occur naturally or arise from oil and gas production and mining activities.
More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Water Quality in the Home

Remove and flush faucet aerators regularly. This helps to keep debris such as pipe solder and sediment from clogging aerator screens, as well as provide the best quality water possible.

What about Home Filtration Systems? Brunswick County Public Utilities does not recommend whole house filtration systems when connected to public water systems because whole house filtration tends to remove the disinfection properties of the water and may waste a significant amount of water. The removal of disinfection chemicals in turn will allow bacteria to grow in your household plumbing. If you must use a filtration system purchase one that goes under the counter, attaches to the kitchen faucet, or is a part of your refrigerator. This allows the disinfected water to remain in the plumbing system, preventing bacterial growth.

Ways You Can Conserve Water

Brunswick County Public Utilities asks that you use water wisely. By following the recommendations outlined below, you may be able to reduce the amount of water you use and save money on your water bill.

IRRIGATE DURING OFF PEAK HOURS

Peak demand for water is between 5 a.m. to 10 a.m. and 4 p.m. to 7 p.m. If irrigation is necessary, irrigate during off peak times. This will help to ensure proper water pressure for more efficient irrigating.

REDUCE IRRIGATION FREQUENCY

For established lawns, daily irrigation is not required. Irrigate every other day and only when there is no moisture in the root zone.

IRRIGATE ON DAYS BASED ON YOUR ADDRESS

Brunswick County Public Utilities has established irrigation policies that affect everyone during times of drought, water shortages and emergencies. It is recommended that you set your irrigation system NOW to match the County's water shortage response requirements. You will more than likely save money on your water bill and lessen the chance of over-irrigating your lawn.

- **If your home has an ODD numbered address:** You should irrigate on **Tuesday, Thursday, and/or Saturday**
- **If your home has an EVEN numbered address:** You should irrigate on **Wednesday, Friday, and/or Sunday**
- **No irrigation on MONDAYS:** This is a high demand day, and your irrigation system may not function properly due to low available water pressure

WHEN PURCHASING NEW OR REPLACEMENT APPLIANCES AND FAUCETS

Look for the Energy Star compliant symbol and the EPA's Water Sense symbol. These ensure the appliances are both energy and water efficient.

ENERGY STAR

EPA WaterSense

APPENDIX 6. CAPITAL IMPROVEMENT PLAN

CIP

Holden Beach Water System

2024

Supporting Narrative

Item 1) Vacuum Lift Station #2: The improvements proposed in this project are modifications that the Town has standardized on relative to the elevations of the vacuum pumps and electrical gear above the 500-year flood elevation. They are similar to the designs of the modifications made to pump stations 4 and 3 in 2016 and 2019, except for some minor revisions relative to specific site conditions. The original top slab of pump station #2 was constructed at elevation 8.67 feet above mean sea level. The top of the floor slab of the elevated structure that will house the vacuum pumps and electrical gear has been set to 18.62 feet above mean sea level which will provide 6.62 feet of freeboard above the base flood elevation (100-yr) of 12 feet and 0.62 feet of freeboard over the 500-year flood elevation of 18 feet. The new construction will be placed on top of the existing ground floor slab and the capacity of the pumping station will remain the same with no expansion.

Item 2) Elevated Water Tower 2: A full explanation of the need for a future elevated water tank and when it is recommended for construction is included in the Asset Management Plan on pages 7-19. Items reviewed include:

a) Current water tank information
b) Current demand averages and maximums, emergency storage reserve, Public Water Supply Standards, and comparisons with other communities
c) Growth projections in water demand based on available land for development currently and based on DWR water use growth projections through 2070.
d) Graphs for average annual demand growth, storage projections for max day and max month and after second tank added, and water system water turnover with and without a tank.
e) Potential for loss of service from Brunswick County, assets within Brunswick County, distances, storage capacities both on ground and elevated, and potential for partial loss of water.
f) Five alternatives for Mitigation of risks and an evaluation of each option including cost estimates.
g) The current cost estimate for construction of a second 300,000-gallon tank.

Item 3) Billing Software is needed as part of a standard replacement cycle as software is outdated and improved.

Item 4) Billing computers are replaced on a normal cycle unless they are leased.

Item 5) The generator at the EOC building should be replaced on a routine basis to ensure 100% reliability. This generator is nearing the end of its life cycle and should be replaced.

Item 6) Mobile generators and trailers are critical to the operation of the vacuum pumping and transfer stations during a power outage. It is critical that they be maintained, operated, and replaced on a routine basis in this salt air environment. Replacing one every two years creates an eight-year replacement cycle for the four stations.

Item 7) A 0.56-mile parallel line along Ocean Boulevard from Seagull Drive to Skimmer Court will provide redundancy of service if the existing 12-inch line failed for approximately 2/3 of the customers west of Sea Gull Drive. (page 18 of the Asset Management Plan) and 100% redundancy to the west end of the island if the break occurs in this 0.56-mile area of Ocean Boulevard.

Item 8) Small 6-inch water lines should be replaced before their expected life span of 60 years or less. This will begin the process of replacing all the 1978 original AC water lines which are currently nearing the end of their service life.

Item 9) Ocean Boulevard parallel and replacement Phase I: Begin design phase to replace and or parallel the main AC backbone of the water system. This 1978 AC line is critical to the distribution system for the Town of Holden Beach. Like the 6-inch lines, this major line should be replaced or paralleled in phases to reduce system and customer impact and to spread out costs for the replacement.

Item 10) Backhoe replacement is needed for a 2014 backhoe as part of a routine replacement schedule after 12 years to ensure reliability of this essential piece of equipment.

Item 11) Mini excavator replacement is needed for a 2016 mini excavator as part of a routine replacement schedule after 12 years to ensure reliability of this essential piece of equipment.

Item 12) Vacuum Truck replacement is needed for a 2019 vacuum truck as part of a routine replacement schedule after 10 years to ensure reliability of this essential piece of equipment. This truck is used for all vacuum excavations in the Town and is needed due to the proximity of all lines and services to each other.

Item 13) Replacement of service trucks are essential to the maintenance of the water and sewer system. The Public Works Director requests that one of the five trucks be replaced each year, which would be a five-year replacement cycle. The Town may want to consider standardizing the replacement based on 100,000 miles of service or based on cost of repair for the vehicle unless other standards are desired such as a 5-year replacement cycle.

Holden Beach Capital Improvement Plan

EXPENDITURES

Project Name	Total Cost FY 2024-25	Total Cost FY 2025-26	Total Cost FY 2026-27	Total Cost FY 2027-28	Total Cost FY 2028-29	Total Cost FY 2029-30	Total Cost FY 2030-31	Total Cost FY 2031-32	Total Cost FY 2032-33	Total Cost FY 2033-34	Totals
Lift Station 2 (Greensboro) Hazard Mitigation	$3,093,000	$2,000,000									$5,093,000
Water Tower Two							$1,300,000	$1,200,000			$2,500,000
Billing Software upgrade				$25,000					$25,000		$50,000
Billing computors and printer replacements				$15,000					$15,000		$30,000
Generator Maintenance Building (EOC)					$80,000						$80,000
Generator Replacement Vacuum PS	$75,000		$75,000		$75,000		$75,000		$75,000		$375,000
Ocean Boulevard Parallel Seagull to Skimmer Court Design and Construct				$100,000	$400,000	$450,000					$1,000,000
Small Water Line Replacements AC 6 inch									$200,000	$200,000	$400,000
Ocean Boulevard parallel and replacement design Phase I										$250,000	$250,000
Backhoe Replacement			$105,000								$105,000
Mini Excavator Replacement				$45,000							$45,000
Vacuum Truck Replacement						$450,000					$450,000
Truck replacement	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$300,000
Totals	**$3,198,000**	**$2,030,000**	**$210,000**	**$215,000**	**$615,000**	**$930,000**	**$1,405,000**	**$1,230,000**	**$345,000**	**$480,000**	**$10,658,000**

APPENDIX 7. OPERATIONS & MAINTENANCE PLAN

Town of Holden Beach Operations and Maintenance Plan

1.0 WATER SYSTEM MANAGEMENT AND PERSONNEL

1.1 General Policies

The Town of Holden Beach's general policies are established by a mayor and a five-member Board of Commissioners based on the priorities of the protection of public health and welfare, regulatory compliance, and sound fiscal management of the Town. One member serves as Mayor Pro Tem. The water system must comply with the Safe Drinking Water Act as established by EPA and must comply with the North Carolina Rules Governing Public Water Supplies NCAC 15A Subchapter 18C.

1.1.1 Components of the Water System:

The Town of Holden Beach has approximately 21 miles of distribution system, and one elevated storage tank with a total of 300,000 gallons capacity for the Town. The water supply is from two different sources. The Northeast Cape Fear River (above lock and dam #1) and groundwater from the Castle Hayne Aquifer. The Northwest Water Treatment Plant in Leland treats the water from the Northeast Cape Fear River and is capable of treating 24 million gallons a day. Our second water plant is the 211 Water Treatment Plant (capable of 7mgd) in Southport. It treats groundwater from 15 different wells all tapped into the Castle Hayne Aquifer approximately 175 feet below the ground surface.

1.1.2 Management Structure

The Town consists of several departments, including the Public Works Department. This department functions under the direction of the Public Works Director who reports to the Town Manager. Within the Public Works Department is the Water Division, which is divided into Operations, and Billings and Collections. There are 5.25 Full Time Equivalents (FTEs) in the water (and wastewater) department total including one individual primarily responsible for billing on the administrative side. The water system policies and rules are evaluated annually and amended.

1.2 Operations and Maintenance

Routine daily operations are supervised by the Director. Additional tasks include all water system water quality monitoring - reporting and implementation of the Cross-connection Control Program by the ORC (operator in responsible charge). The Utility Billing Specialist handles billing functions. Construction and repairs are managed by the department head. All financial transactions are run through the finance department as a support service. The Public Works Department also operates the Vacuum Sewer system for the Town.

Routine daily maintenance of the Town's water system and facilities is supervised by the department director. The Maintenance Section (Including the water and sewer supervisor, the crew leader, and the public services technicians) is responsible for all tasks necessary to maintain the distribution system, including pipelines, valves, hydrants, meters, telemetry control and service to customers. Maintenance also assists Operations in maintaining all system facilities and equipment.

1.2.1 Meter Reading and Meter Maintenance

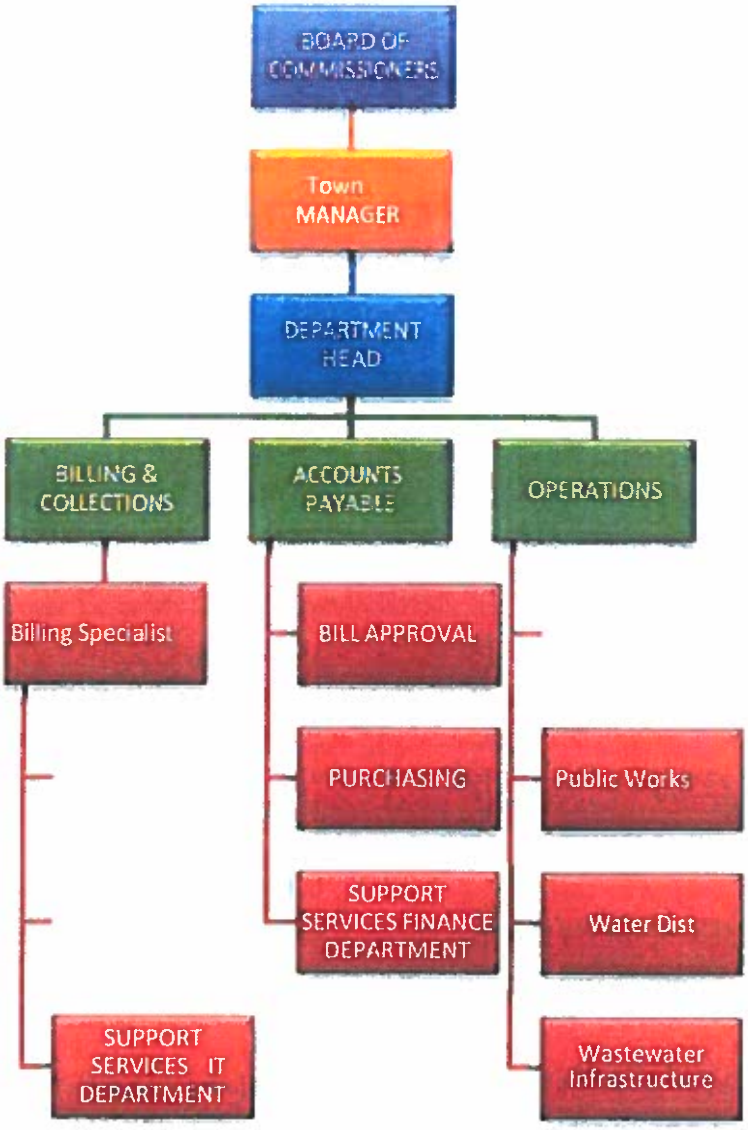
Meter Connections 2022

3,173
¾ -2 inch in size

The Town utilizes a Sensus Fixed Base AMR system for reading meters and read rate percentages have been excellent for the life of the system. This is favorable for the Town, as many systems installed in other communities have not been as trouble free. This may be because Sensus has a stronger signal than other manufacturers and because the billing software has been updated as needed. Staff are to be commended for keeping this operating at a high level.

The water meters are read monthly, and billing provides the water department with maintenance requests for replacement due to damage or failure of the meter. They do not have a meter-testing program, but larger meters are replaced or repaired when required. Failed or inaccurate meters and transmitters are replaced as soon as possible or every 15 years whichever occurs first. All the meter locations are now on GIS from a field survey conducted by Green Engineering.

Town of Holden Beach Public Works / Water / Wastewater Org Chart



1.3 Operator Certification

The Town's distribution system is currently classified as a "B" Class System, requiring the Town to have at least one Water Distribution Manager (WDM) classified at a level equal to or higher than the water system's classification, based upon the NC Administrative Code 15A-18C. The operator in charge during an operating shift shall have a minimum classification of one level lower than the classification of the distribution system. The Director currently holds an A certification in Distribution Management. The Water and Sewer System Supervisor holds a class B certification.

The Town's water system is also required to have a Cross-connection Control Specialist (CCS) responsible for the cross-connection control program and a certified backflow assembly tester (BAT) for inspecting, testing, and monitoring backflow prevention assemblies. **Table 1.3** shows the current certifications of the Town's Operations and Maintenance staff. The Town supports the scheduling and training necessary to ensure that all applicable Operations and Maintenance staff meet professional growth requirements.

Table 1.3 Water Division Personnel, Certificates

Personnel	Position	Certification	Responsibilities
Chris Clemmons	Director Public Works	A-Distribution Cross Connection Sewer Collections II.	Manager & Chief ORC
Scott Cunningham	Water and Sewer Supervisor Back-up ORC	B Distribution and Collections II	Supervisor Distribution Collections and Vacuum Pump Stations
Maxton Horne	Crew Leader	C-Distribution Collections I	Equipment Operator and CDL driver

1.4 Staff Training/ Management Training:

1.4.1 To stay current with advanced utility practices and current regulatory requirements for managing and operating a public water system, water department personnel is required to obtain at least six (6) hours of continuing education for each water or wastewater certification held.

1.4.2 The Town of Holden Beach Water System staff participate in training events various times of the year. Membership of management in a utility professional organization is not required.

Management attends training classes and seminars as they become available. In• house training is also conducted whenever possible.

2.1 Staffing

The Town employs permanent, full-time staff to deal with routine operations and preventative maintenance. Staffing for routine operations includes 5.25 Full-Time Equivalents (FTEs) in the budget. Current Maintenance staff for infrastructure operations is only 4.25 people, but these individuals must also operate the wastewater collection system and the 4 vacuum pump stations.

2.2 Routine Operations

Routine operations involve the analysis, formulation, and implementation of procedures to ensure that the facilities are functioning efficiently, and meeting required system pressure and water quality requirements, and other demands of the system. The Town's maintenance procedures are good, with repairs being made promptly so customers receive high quality water service.

The Town strives to maximize the operating efficiency and life of all production and distribution system components through a prescribed preventive maintenance program.

The Town regularly performs unidirectional flushing of the distribution system as needed. The Town also conducts preventative hydrant and valve maintenance as part of the prescribed preventive maintenance program.

The distribution system elevated storage tank is inspected externally daily. Defects of appurtenances such as ladders, hatches and vents are repaired as needed. Draining, cleaning, and inspecting of interior coating systems are completed every 2 to 5 years on a rotating basis. The Town currently is under a continual tank maintenance contract with a vendor. The Town also always has staff on call to respond to distribution system failures and customer inquiries.

More Details are listed in the following sections:

2.2.1 Mapping

Our Town maps outline the water system to include type and size of pipe, valve locations, and hydrant locations. As built maps of new developments and maps of the older parts of the system are stored in the Town Water Department offices. Recently the entire water system was surveyed, and the system put in GIS for future modification. Employees were trained to geo locate all their assets utilizing a Leica Zeno FLX100 Plus antenna and Leica Zeno Mobile application on the provided tablet, with an engineering provided utility database created in ArcMap. This can now be used for all assets on the water system and the sewer valves and boxes as well when needed.

2.2.2 Meters

The water meters are read monthly, and billing and staff provide the water department with maintenance requests for replacement due to damage or failure of the meter. The town does not have a meter-testing program, but larger meters are replaced or repaired when required. Failed or inaccurate meters and transmitters are replaced as soon as possible or every 15 years whichever occurs first. All meter locations are on GIS from a survey conducted by Green Engineering in 2023.

2.2.3 Valves

The Town replaces older valves in the system as needed and installs new valves to better isolate areas in the older sections of the system. All new extensions are required to have valves installed at each intersection to provide this isolation capability. Spare valves are kept in the yard to replace valves when necessary. Valves 4 inches and below should be considered for replacement every 50 years and large valves 60-75 years. All valve locations are on GIS from a survey conducted by Green Engineering in 2023.

2.2.4 Blow offs

The Town of (Holden Beach) Water Department flushes dead end lines and hydrants based on water testing chlorine levels and scheduled maintenance. This flushing process clears quality problems and raises the chlorine residual. Scheduled flushing is advertised in the local paper when necessary, in order to cause as little inconvenience to customers as possible. All blow-off locations are on GIS from a survey conducted by Green Engineering in 2023.

2.2.5 Hydrants

The hydrants are flow tested or flushed by the Public Works Department or Fire Department. The Town of (Holden Beach) replaces old hydrants yearly and installs valves at the hydrant, if none existed prior to the replacement. Spare hydrants are kept on the yard at the Public Works Garage on Sabbath Home Road. Hydrants should be considered for replacement when obsolete and parts are not available or when 75 years old or more. All hydrant locations are on GIS from a survey conducted by Green Engineering in 2023.

2.2.6 Backflow Devices

The Water Department installs and replaces 3/4" and 1" dual check valves at the meter on a Town standard home services. Special devices or larger devices are installed and maintained by the customer. The installation is required and inspected by the (Holden Beach) Public Works Department. The Town of (Holden Beach) requires the installation of backflow assemblies on all services and requires specifications from new businesses that include backflow prevention devices they plan to install. These plans are then reviewed for compliance. The Town Cross-Connection Ordinance is in force and will be revised as necessary.

2.2.7 Elevated Storage Tank

The Town presently has one elevated storage tank which is 300,000 gallons and is located behind the Town Hall. The Town has entered into a contract with Utility Services, Inc. to inspect the tank yearly, clean, repair and paint the tanks when necessary. Repair work is to be scheduled to minimize down time. A copy of that contract is available in the Finance Director's office. Brunswick County will be notified when the tank is drained for servicing. This is to ensure they keep their tanks as full as possible during this time and are aware that our tank is out of service.

2.3 Operations Support Contractors

The Town of Holden Beach utilizes support staff for maintenance services outside their technical capacity for Tank Maintenance and for SCADA services. These contractors are on 24-hour call and make themselves readily available.

Tank Service

Utility Service Co Inc200 Old Covered Bridge Road (Tanks)
NC, Madison 27025
(336) 337-7074 www.utilityservice.com/

SCADA

Custom Controls Unlimited LLC (Instrumentation, SCADA)
2600 Garner Station Blvd, Raleigh, NC 27603
(919) 661-5556

2.4 Available Equipment

The Town has several types of equipment available for daily routine O&M of the water system that is stored at the Water Maintenance and EOC. If additional equipment is required for specific projects, the Town will rent the needed equipment or contract with a local contractor for the services needed. A stock of supplies in sufficient quantities for normal system O&M and short-term emergencies is stored at the Maintenance Center. The system maintains a detailed inventory of parts and supplies that assist in ensuring normally necessary parts are available when needed. A list of major equipment available for use by the Towns's Water Division to perform the normal operation of the water system is shown in **Table 2.4**

Table 2.4 Equipment and Vehicle List

Quantity	Equipment / Vehicle
1	Backhoes
1	Dump Trucks
4	Service Truck
2	Trailer
1	Air Compressor
1	Boring Rig
3	Trash Pumps
3	Tapping Machines
1	Mud Hog
3	Mini Excavators

The Town utilizes several different types of communications equipment to ensure a reliable and redundant means of communication between staff. All O&M staff are equipped with cell phones.

2.5 Preventive Maintenance

Preventative maintenance is based on regular and frequent visits to the various facilities with scheduled routine inspections and tasks performed as part of the maintenance program. Information is recorded and any necessary work is noted and scheduled accordingly. Materials required for maintenance are managed by the Town's purchasing department, the water department, or put out to bid depending on the material. Maintenance schedules that meet or exceed manufacturer's recommendations have been established for all critical components in the water system.

The following schedule is used as a minimum for preventive maintenance. Manufacturer's recommendations should be followed where conflict exists.

Storage Facilities

Daily	Visually check security and inspect facilities for proper operation.
Annually	Check interior condition, vents, hatches, etc., on tanks.
As Needed	Clean and/or repaint interior and exterior as needed on tanks (approximate ten-to-twelve-year frequency).

Distribution System

Water Mains	
Annually or As Needed	Leak survey of approximately 10 percent of the main inventory.

Annually	Flush.
Engine Generator Sets	
Monthly	Operate to achieve normal operating temperatures; observe output.
Semi-Annually	Routine maintenance in accordance with manufacturer's recommendations.
As Needed	Replace fluids and filters in accordance with manufacturers recommendations (or more frequently depending on amount of use).
As Needed	Perform tune-up; replace parts, as necessary.
Isolation Valves	
Annually	Operate fully open/closed; uncover where buried; clean out valve boxes and repair, as necessary. Repair and/or install valve marker posts as necessary. Goal is to complete system valve exercise every 3 years.
Hydrants	
Annually	Check for leakage and visual damage. Operate and flush; check drain rate; lubricate as necessary; measure pressure; paint as necessary. Check nozzle and cap threads, clean and lubricate per manufacturer's recommendations. Replace lost and damaged gaskets. Check and operate auxiliary valves in accordance with the valve maintenance schedule. Leave in open position. Inspect drain system to ensure proper drainage and protection from freezing weather. Tag hydrants with asset number.
Meters	
2 to 20-Year Intervals	Time and measure volume of meter-delivered flow; dismantle, clean, and inspect all parts; replace worn or defective parts; retest meter for accuracy. Frequency varies based on meter size.
Customer Meters	
15-Year Intervals	Maintenance tests and meter exchanges are performed on a scheduled routine basis. The average age of residential meters is 6 years. Meter sizes 1-1/2 to 2 inches are tested as needed

Telemetry and Control System

Daily	Backup program and data. Review alarms and reports; ensure problems are corrected.
Monthly	Visually inspect cabinets and panels for damage, dust, and debris.

Semi-Annually	Inspect the inside of cabinets and panels for damage, dust, and debris. Vacuum clean all modules. Test alarm indicator units. Clean and flush all pressure sensitive devices. Visually inspect all meters to coordinate remote stations.
Annually	Check master and RTU's for proper operation; repair as necessary.
Quarterly	Calibrate tank, well and booster level settings.

Tools and Equipment

Rolling Stock	
Weekly	Check all fluid levels and brakes. Fluid levels and brakes are checked each time the equipment is used if less than weekly.
As Needed	Replace fluids and filters in accordance with manufacturer's recommendations (or more frequently depending on type of use); preventive maintenance per manufacturer's recommendation.
Tools	
As Needed	Clean after each use; lubricate and maintain as necessary; inspect for damage and wear before each use; preventive maintenance performed per manufacturer's recommendation.

3.0 WATER LOSS REDUCTION AND WATER AUDITS

Unaccounted for water for the Town of Holden Beach is currently less than 10% based on a comparison of water purchased to water sold. This is excellent and is within the AWWA recommended levels for all water systems. The town should continue to compare these records to ensure that water losses are kept to a minimum in the future.

4.0 WATER QUALITY MONITORING

The town performs water quality monitoring in the distribution system as required by the North Carolina Department of Environmental Quality Drinking Water Regulations.

4.1 Routine Procedures

4.1.1 Source Monitoring

Monitoring is required at each of Brunswick County's two sources of water. Holden Beach is fed solely by the Northwest Treatment Facility. They test for regulated organics (OC), regulated inorganic chemicals (IOC), for unregulated substances, for THMs and HAAs, and for unregulated PFAS compounds (every year). They also test for radionuclides (every 9 years). Nitrate monitoring must be performed annually. They also test lead and copper every 3 years, and for regulated inorganics, pesticides, and synthetic organic chemicals on an annual basis. The Town tests for Asbestos every 9 years, for lead and copper every 3 years, and performs annual quarterly testing

for THMs and HAAs, along with all required microbiological testing for Coliforms which are required monthly.

4.1.2 Coliform Monitoring

A Coliform Monitoring Plan has been prepared by the Town including a map of the sites and it has been revised as required. The Town's ORC supervises the revisions of the Coliform Monitoring Plan, which includes sampling protocol and locations. Sampling protocol involves collecting per 15A NCAC 18C .1539 the required number based on population of the system of routine coliform samples each month in the distribution system at specified locations. The current requirement is 7 samples per month. If a sample tested by the laboratory is unsatisfactory (positive, coliforms present), the lab will contact the Town and the Town will collect repeat samples at specified locations per the **Violation Procedures** section that follows. At various frequencies, coliform samples are also taken at house taps in response to customer complaints, at locations of new construction or system repairs.

4.1.3 Disinfectant Residual Concentration Monitoring

The Town monitors residual disinfectant concentrations in the distribution system at the same time and locations as routine coliform monitoring.

4.1.4 Disinfectants/Disinfection By-products Monitoring

The Town currently performs quarterly monitoring at 2 sample locations for total trihalomethanes (TTHMs) and haloacetic acids (HAA5s) four times per year.

4.1.5 Lead and Copper Monitoring

Currently, 20 or more samples are taken every 3 years as required for the Town. Samples are taken at customer taps from June through September. The Town most recently performed lead and copper monitoring June 1-September 30, 2022 and will be required to sample for lead and copper again in 2025.

4.1.6 Asbestos Monitoring

Asbestos monitoring is performed by the Town once every nine years. The most recent sample was taken January 9, 2022, and the results were "not-detected". The next sample will be required in nine years in 2031 unless regulations change.

4.2 Violation Procedures

Water Quality Standards and follow-up procedures are stated in NCAC 15A: 18C.1500. If an MCL or MRDL is exceeded, the Town will take follow-up action in accordance with NCAC 15A: 18C.1500. In general, when a primary standard violation occurs, the County will: 1) provide notification to the NC Water Supply in accordance with NCAC 15A: 18C.1500; 2) provide notification to consumers in accordance with 40 CFR 141.201 through 208; 3) determine the cause of the contamination; and 4) take action as directed by the NCDEQ Water Supply Section. When a secondary standard violation occurs, the County will notify DEQ Water Supply and take action as directed. Additional follow-up action specific to coliform monitoring includes repeat sample monitoring and identification of the cause of the coliform presence and correcting it. MCLs for disinfection by-products and MRDLs for disinfectant residuals are primary standards.

Lead and copper action levels: If the 90th percentile results of either lead or copper exceed the corresponding action level, the Town will need to follow additional requirements as required by the Lead and Copper Rule and DEQ Water Supply Section. Additional requirements include increased monitoring and treatment.

- The lead action level is exceeded if the concentration of lead in more than 10 percent of the tap samples collected during any monitoring period conducted in accordance with 40 CFR Part 141 Subpart I is greater than 0.015 mg/L.

- The copper action level is exceeded if the concentration of copper in more than 10 percent of water tap samples collected during any monitoring period conducted in accordance with 40 CFR Part 141 Subpart I is greater than 1.3 mg/L.

4.3 Laboratory Services

Compliance laboratory services are contracted mostly through Envirochem Incorporated. They are a state approved laboratory. Asbestos was analyzed by EMSL Analytical Inc.

Envirochem Incorporated
6602 Windmill Way
Wilmington, N.C. 28405
(910) 392-0223

5.0 EMERGENCY RESPONSE PROGRAM

The Town has a vulnerability assessment and an emergency response plan, but they are both incomplete. They address 3 of the 13 events that could occur (listed below) and 5 events that could cause major issues in the system but are generally covered by the less specific generally accepted causes listed below.

5.1 Natural Events

- Earthquake
- Flood
- High Winds
- Ice Storm
- Drought
- Waterborne Disease

5.2 Human Caused Events

- Vandalism
- Terrorism
- Cyber Attack
- Deferred Maintenance
- Construction Accidents
- Chemical Spills
- Cross Connections

All water system personnel receive basic training that is appropriate for their job and emergency response assignments. In addition, drills, tabletop exercises, practice exercises and full-scale exercises are performed periodically to provide Town staff and the Fire Department with hands on experience implementing portions of the emergency response plan, even though the plan is incomplete. All staff have the most experience with preparation and response for hurricanes because of their location.

6.1 PUBLIC NOTIFICATION

The Federal Safe Drinking Water Act (SDWA), and the Environmental Protection Agency (EPA) Public Notification Rule require purveyors to notify their customers if any of the following conditions occur.

- National primary drinking water regulation (NPDWR) violations.
- Failure to comply with an applicable MCL or MRDL.
- Failure to comply with a prescribed treatment technique.
- Failure to perform water quality monitoring as required by the drinking water regulations.
- Failure to comply with testing procedures as prescribed by drinking water regulations.
- Operation under a variance or an exemption.
- Failure to comply with the requirements of any schedule that has been set under a variance or exemption.
- Occurrence of a waterborne disease outbreak or other waterborne emergency.
- Exceedance of the secondary maximum contaminant level (SMCL) for fluoride.
- Availability of unregulated contaminant monitoring data.
- Issuance of a departmental order.
- Failure to comply with a departmental order.
- Issuance of a category red operating permit by the DEQ Water Supply Section.

Public notice requirements for each type of violation or situation are organized into three tiers per 40 CFR 141.201 through 208 and are based on the seriousness of the violation and the potential for adverse health effects.

Tier 1 public notices are required for National Primary Drinking Water Regulations (NPDWR) violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure. Public notices in this tier must be provided as soon as possible, but no later than 24 hours after the violation is known. The DEQ Water Supply Section must also be notified within this timeframe, who may require repeat or additional notices.

Tier 2 public notices are required for all other NPDWR violations and situations not covered in Tier 1 with the potential to have serious adverse effects on human health. Public notices under Tier 2 requirements, with the exception of turbidity violations, must be provided as soon as possible, but no later than 30 days after the violation is known. Turbidity violations must be reported to the DENR Water Supply Section as soon as possible, but no later than 24 hours after the violation is known, to determine whether a Tier 1 public notice will be necessary. Repeat notices must be issued for as long as the violation persists.

All other NPDWR violations and situations not included in Tier 1 and Tier 2 are grouped within Tier 3. Tier 3 public notices must be provided within one year of the water system learning of the violation or beginning operations under a variance or exemption. The notice must be repeated annually for as long as the violation, variance, exemption, or other situation persists.

7.0 SAFETY PROCEDURES

Safety is the concern and responsibility of all O&M staff. To maintain the highest level of safety, the Town has taken steps toward educating its staff and providing resources to ensure a safe working environment. The Town will strive to improve its safety program on an on-going basis. The American Water Works Association publishes a manual entitled, Safety Practices for Water Utilities (M3), that describes safety programs and provides guidelines for safe work practices and techniques for a variety of water utility work situations. Town personnel are required to take training courses regarding the following topics: asbestos cement pipe handling; confined spaces; hazardous waste; fall protection; hearing protection; competent persons; electrical hazards; heavy equipment operation; CPR and first aid; traffic flagging; lockout-tagout; and blood-borne pathogens.

The Town's facilities are equipped with confined space entry equipment, oxygen-gas meters and lockout-tagout equipment. Each Town vehicle is equipped with first aid and blood-borne handling kits. The Town also owns flagging signs and equipment for safe handling of traffic. The following procedures shall be followed for O&M tasks that involve the most common potential workplace hazards in the Town's water system.

7.1 Equipment Tagging

The Town has standard procedures (lock -out tag-out procedures) for tagging out equipment to prevent injury to personnel and damage to equipment.

7.2 Workplace Chemicals

A list of chemicals used at the water and wastewater facilities (Safety Data Sheets or SDS) are kept in the office.

7.3 Working in Confined Spaces

Standard Procedure – Follow state OSHA requirements for confined space entry.

7.4 Working around Heavy Equipment

Standard Procedure – Obtain proper training and follow all safety procedures. Use noise protection equipment.

7.5 Working in Traffic Areas

Standard Procedure – Wear proper clothing and provide adequate signage and flagging for the work area required by NCDOT standards.

7.6 Working on or around Water Tanks

Standard Procedure – Follow proper safety harness procedures for working on tall structures.

7.7 Working in or around Pump Stations

Standard Procedure – Obtain proper training and follow all safety procedures for working on pumps and electrical equipment. Use noise protection equipment.

7.8 Working on Asbestos Cement (AC) Water Main

Standard Procedure – Obtain proper training and follow all safety procedures for working with asbestos materials.

7.9 Work Safety Regulations

The Town follows all appropriate NCDEQ Water Supply Section regulations in its day-to-day operations and complies with the following state requirements.

- Entry into confined spaces.
- Shoring of open ditches.
- Lockout-tagout for work on energized or de-energized equipment or circuits.
- Fall restraint for access to the top of the County's water tanks.
- Manual on uniform traffic control devices (MUTCD) – Traffic control for work in the public right-of-way.

8.0 CROSS-CONNECTION AND BACKFLOW CONTROL PROGRAM

The Cross-connection Control Plan has been adopted and is being enforced. The Cross Connection Control specialist is assigned by the Town's Utility Department to implement the Cross-Connection Control Program. In addition, one other Water Division personnel is required to be CCS certified. From the water supply sources to customer water meters, the Water Department is responsible for cross-connection control. Downstream of customer water meters, cross-connection control is under the jurisdiction of the County's Building Code Official. Backflow preventers are required at cross connections as set forth in NCAC 15A: 18C and the Town's Cross-Connection Control Program. Inspections are made to ensure proper installation of the backflow prevention assembly(s) (BFAs) or air gaps(s) (AGs). Town water customers other than residential customers are responsible for initial and post-installation testing of their (BFAs); and testing must be performed by a private Backflow Assembly Tester (BAT). After initial installation and annually thereafter, the Town mails out notices to customers to test and maintain their BFAs. Town owned BFAs and AGs are tested and maintained by the Town. Backflow incident response, public education, and recordkeeping and reporting is performed in accordance with NCAC 15A: 18C .0406 and the Town's Cross-Connection Control Program.

9.0 TEST, FORMS AND REPORTING

The DEQ Water Supply Section has enacted regulations for recordkeeping and reporting that may be found in NCAC 15A: 18C .1302. The regulations identify recordkeeping and reporting procedures for operations and water quality testing.

9.1 Engineers Report Water System Management Plan

The Town, pursuant to NCAC 15A: 18C .0507, requires its Engineer to file an Engineers Report & System Management Plan for planning any system improvement.

9.2 Recordkeeping

The DEQ Water Supply Section requires retention of critical records dealing with facilities and water quality issues as summarized below. The following retention periods meet and/or exceed state requirements.

- Bacteriological analysis results: Five years
- Disinfection by products: For as long as system is in operation.
- Chemical analysis results: For as long as the system is in operation.
- Daily source meter readings: For as long as the system is in operation.
- Other records of operation and analyses may be required by DEQ Water Supply Section: Twelve years.
- Documentation of actions to correct violations of primary drinking water standards: Three years after last corrective action.
- Records of sanitary surveys: Twelve years after completion
- Project reports, construction documents and drawings, inspection report, and approvals: Life of the facility
- Where applicable, daily records of chlorine residual and WTP performance: Twelve years
- Public notices and certifications to DEQ Water Supply Section: Three years after issuance

9.3 Reporting

The Town must report the following to DEQ Water Supply Section.

- Within 24 hours: A failure to comply with the primary standards or treatment technique requirements specified in NCAC 15A: 18C .1500
- Within 48 hours: A failure to comply with the monitoring requirements specified in NCAC 15A: 18C .1500.
- Within 24 hours: A violation of a primary MCL.
- Immediately: A backflow incident, per NCAC 15A: 18C .1500.
- As soon as possible, but no later than 24 hours: Violations assigned to Tier 1 in NCAS 15A: 18C .1500.
- As soon as possible, but no later than 30 days for Tier 2.
- As soon as possible, but no later than 365 days for tier 3 violations.

The Town must submit to the DEQ Water Supply Section all applicable reports required by NCAC 15A: 18C .1500. Monthly reports are due by the tenth day of the following month, unless otherwise specified.

Daily source meter readings must be made available to the DEQ Water Supply Section on request.

Records regarding the status of monitoring waivers must be submitted during each monitoring cycle.

Total annual water production records for each source must be made available to the DEQ Water Supply Section on request. Water facilities inventory and report form must be submitted to the DEQ Water Supply Section annually and within 30 days of any change in name, category, ownership, or responsibility for management of the water system.

The County must notify the DEQ Water Supply Section of the presence of:

- Coliform in a sample within 10 days of notification by the testing laboratory; and

- Fecal coliform or E. coli in a sample by the end of the business day in which the Town is notified by the testing laboratory.

When a coliform MCL violation is determined, the Town must:

- Notify the DEQ Water Supply Section within 24 hours of determining acute coliform MCL violations.

- Notify the DEQ Water Supply Section before the end of the next business day when a non-acute coliform MCL is determined; and

- Notify water customers in accordance with NCAC 15A: 18C .1523 and the EPA's Public Notification Rule. If an MCL or MRDL is exceeded, the Town will take follow-up action in accordance with NCAC 15A: 18C .1523.

9.4 Other Reports

Several other reports are required for state agencies, including the Department of Revenue, Department of Labor and Industries, Department of Social and Health Services, Department of Ecology and the Employment Security Department. All of these reports are completed according to their instructions.

10.0 OPERATIONS AND MAINTENANCE RECORDS

10.1 Facilities Operations and Maintenance Manuals

Operations and maintenance manuals are available for staff members' reference. These manuals are kept on file at the Town's Water System's Operations Office. The Town intends to maintain its policy of requiring complete operation and maintenance manuals for all new equipment and facilities.

10.2 Mapping and As-Built Drawing Records

Maintenance of drawings is essential to Town staff, developers, and anyone else needing to know how the water system is laid out throughout the Town. The drawing records are stored at the Town Operations office in paper and electronic media. Updates are maintained by the Town staff.

10.3 GIS Mapping Records

All water lines, sewer lines and all their appurtenances are maintained on the county's GIS system. As part of the Asset Management Plan each asset has been issued a unique identifier code to track that specific asset. The department director, as part of the ongoing maintenance and mapping process completes GIS task orders to ensure that when assets have been installed or repaired, that a record is keep on file for the continuing tracking of maintenance. This service is provided by the County GIS Coordinator.

10.4 Operations and Maintenance Records

Records are stored at the Town's office for the following items.

- Backflow and cross-connections
- Confined spaces
- Hydrant repairs
- Hydrant meter forms
- Hydrant databases
- Pump motor test
- Well sounding and static water levels
- Precipitation
- Water usage
- Water used for construction.
- Water consumable inventory

- Water maintenance
- Water main notes
- Water worksheets
- Water main flushing
- Bacteriological tests
- Volatile organic compound tests
- Synthetic organic compound tests
- Water samples from new developments
- Lead and copper tests
- Chlorination levels
- Customer complaints
- Vandalism forms

11.0 OPERATIONS AND MAINTENANCE DEFIENCIES

The Town's operations and maintenance program is sufficiently staffed and organized. The Town meets all regulations and requirements, including certification requirements for staffing. As a result, there are no human resources or training / certifications notable deficiencies to report.

The County Board of Commissioners initiated an updated Asset Assessment Plan in 2022. The initial assessment involved a complete inventory of the system components and an assessment of its working conditions.

12.0 ASSET MANAGEMENT RECORDS

The Town maintains individual folders for each primary asset in its utility inventory. Those core facilities are elevated storage facilities, permanent and mobile generator facilities, master meter valves, distribution line segments, hydrants valve and residential water meters (by serial number).

The director maintains an individual folder on file for each of these assets.

Emergency Contacts

Contact NC Emergency Management
NCEM
1636 Gold Star Drive
Raleigh NC 27607

Mailing Address:
4236 Mail Service Center
Raleigh NC 27699-4236

Telephones:
Main Switchboard - 919-825-2500

24-Hour Watch Center - 919-733-3300

Director's office fax - 919-825-2685

Eastern Branch Office:
3802B Highway 58 North
Kinston, NC 28502
252-520-4923

Government Assistance Agencies:

NCDEQ (Department of Environmental Quality)
Physical Address
North Carolina Department of Environmental Quality
217 West Jones Street
Raleigh, NC 27603 Map It
877-623-6748
https://www.deq.nc.gov/about/contact-deq

Water and Wastewater
Wilmington Regional Office
Address:
127 Cardinal Drive Ext., Wilmington, NC 28405
Phone: 910-796-7215
Fax: 910-350-2018
Emergency Pager: 910-515-9065

Public Water Supply Section Phone
(919) 707-9100
Mailing Address
Public Water Supply Section
Division of Water Resources
1634 Mail Service Center
Raleigh, NC 27699-1634

Physical Address
Public Water Supply Section
Division of Water Resources
512 North Salisbury Street
Room 1304 L
Raleigh, NC 27604-1170

Brunswick County Emergency Management
3325 Old Ocean Hwy
Government Center Building C
Bolivia, NC 28422
Phone: 910.253.5383

David McIntire (Director)

Emergency Management
Title: Emergency Management Director
Phone: 910-253-2577
david.mcintire@brunswickcountync.gov

National Response Center
(For CERCLA List chemical spills/transportation emergencies) (800) 424-8802)

State Warning Point (Non-business hours)
Contact Emergency Management

Pesticide Emergency Reaction Team
(To report pesticide spills, fires. NC Department of Agriculture)
Kelly Nilsson, Director
Mailing Address:
1035 Mail Service Center, Raleigh, NC 27699-1035
Physical Address:
2 West Edenton Street, Raleigh, NC 27601
Phone: (919) 707-3300

North Carolina Poison Control (NCPC) at 1-800-222-1222.

Town of Holden Beach
Emergency Response Management Plan
Vulnerability Assessment
Administration and Operations

RESPONSIBLE PERSONNEL FOR EMERGENCY RESPONSE

Following is a list of the personnel responsible for emergency management.

Water Resources Department

Primary person with system responsible for implementing the emergency plan:

Chris Clemmons, Public Works Director, ORC
Work (910) 842-6488 Home (910) 846-3363
Cell (910) 443-4301

Back-up Person with system responsible for implementing the emergency plan:

Scott Cunninham Water and Sewer Supervisor

Work (910) 842-6488
Cell (910) 279-5882

On Call Cell (910) 443-6302

OTHER DEPARTMENTS I AGENCIES TO NOTIFY

TOWN HALL

Manager's Office David Hewett
Work (910) 842-6488
Cell (910) 279-23

Tri Beach Fire Department
Fire Department: (910) 842-2333
Fire Chief: Roy (Doug) Todd Cell (910) 916-6510

Coastline Rescue:
(910) 842-2266

Holden Beach Police Department
(910) 842-6707
Chief: Jeremy Dixon. (910) 443-6300 jeremy.dixon@hbtownhall.com

Lieutenant: Frank Dilworth, (910) 279-5300 frank.dilworth@hbtownhall.com

BEMC (Electricity)

795 Ocean Hwy W (Hwy17)

Supply, NC 28462

910-754-4391

Report Outages

800-682-5309

Office (910) 754-4391
Bobby Johnson
Cell (910) 540-2640

NC Poison Control Center
1-800-222-1222

OSHA, NC Department of Labor
During normal working hours (weekdays, 8 a.m. to 5 p.m.), call 1-800-625-2267 or 919-779-8560. After working hours (5 p.m. to 8 a.m.), weekends or holidays, call State Capitol Police at 919-733-3333 to report the fatality.

North Carolina Rural Water Association (NCRWA)
Mailing Address: PO Box 540, Welcome, NC 27374
Physical Address: 3995 Old Highway 52, Lexington, NC 27295
Phone: 336-731-6963
Fax: 336-731-8589
E-Mail: info@ncrwa.org

NEWS MEDIA

TELEVISION STATIONS

WWAY TV3
Office: (910) 763-0979
newsroom@wwaytv3.com

WECT TV
322 Shipyard Blvd.
Wilmington, NC 28412
General Number: 910.791.8070
News Tips: 910.791.6681
24-Hour Phone: 910.791.6681
Email: newsroom@wect.com

RADIO STATIONS

WGNI 97.3 Radio Station Office: (910) 763-6511 GMAIL@WGNI.COM Call or text 102.7 GNI anytime at 910 – 343 – 1027

WYAY 106.3
Station Address:
950 48th Ave N Suite 103
Myrtle Beach, SC 29577
Phone: 716-372-9564

NEWSPAPERS

Brunswick Beacon Office: (910) 754-6890
beacon @atmc.net Fax: (910) 754-5407

Fayetteville Times Office: (910) 323-4848
Fax: (910) 486-3545

Wilmington Star Office: (800) 272-1277
Fax: (910) 343-2227

SUPPORT CALL LIST

Godwin Pumps
Office: (910) 392-3644
Patrick Seay (910) 237-7135

Pipeline Supply
Terry Paxson
Home: (704) 489-2877
Cell: (704) 534-7296
102 Hwy. 57 North
Little River, US 29566
Phone: 8433994443
Toll Free: 8003440924
Fax: 8433994503

Sunbelt Rentals
Kenneth Luther
Cell (843) 514-8369

Rental Service Company
Brian Cross
Office: (910) 343-0031
Cell: (910) 620-5147

Ferguson Enterprises
Rob Watson
Office: (803)775-7355
Cell: (803) 968-0384

CONTRACTORS IN LOCAL AREA TO ASSIST IN REPAIRS

Wayne's Backhoe Russell Hickman Office: (910) 579-7103
Cell: (910) 279-1877

Carmichael Construction
Randall Carmichael Office: (910) 457-6510
Cell: (910) 520-8846

Emergency Response Plan & Procedures

CONTAMINATION OF WATER SOURCE (GROUNDWATER WELLS)

POSSIBLE CAUSES: Spills, Backflow, Back-siphonage, Biological, Terrorism or Chemical Contamination

Actions: Shut pump down and valve off to isolate from system

The Operator in Responsible Charge (ORC) or back-up should notify the Town Manager or Board of Commissioners (verbally and in writing) of contamination of water supply.

Notify NCDEQ (Water Supply Section) Contact government agencies (see below)

for advice and assistance.

Notify all users. Contact local media for public service announcement, if customers cannot be notified by phone or door-to-door

Arrange for alternate source of water if necessary --- i.e., bottled water, bulk hauler, or storage tank.

Contacts:

NCDEQ (Water Supply Section) Wilmington, NC Office (during normal working hours) Raleigh, NC Office (weekends, holidays, or if Wilmington, NC Office cannot be reached)

Brunswick County Emergency Management Bolivia, NC,

Holden Beach Police Department,

Brunswick county Health Department

Contact others as necessary, depending on severity. See Contact List for phone numbers.

ELEVATED STORAGE TANK DAMAGE

POSSIBLE CAUSES: Structural Failure, Tornado, Hurricane, Plane Crash, or Terrorist Activity.

Actions: Shut off valves to isolate damaged tank.

The Operator in Responsible Charge (ORC) should notify the Town Manager or Board of Commissioners (verbally and in writing) of falling water supply.

Contacts: **Notify NCDEQ (Water Supply Section)** Contact government agencies (see below) for advice and assistance.

Notify Government agencies for advice and assistance.

Contact local media for public service announcement if customers cannot be notified by phone or door-to-door.

Possible Actions: Arrange for alternate source of water if necessary --- i.e., emergency connection with state approval, portable potable water system, bottled water, bulk hauler, or storage tank.

See Contact List for phone numbers.

LOSS OF SOURCE

POSSIBLE CAUSES: Dewatering of Aquifer, Pump Damage or Power Outage

Actions:

Contact Town Manager

Notify NCDEQ (Water Supply Section) Contact government agencies (see below) for advice.

Contacts:

Contact local media for public service announcement, if customers cannot be notified by phone or door-to-door.

Possible Actions:

Arrange for an alternate water source (if necessary) NCDEQ, Brunswick County Emergency Management (if necessary)

See Contact List for phone numbers.

FIRE DEMANDING EXTREME AMOUNTS OF WATER

Actions:

The Operator in Responsible Charge (ORC) should notify the Town Manager or Board of Commissioners

Contact Brunswick County and arrange for additional pumping from the Bell Swamp Station.

Begin enforcement of Emergency Water Conservation and Restriction ordinance, if applicable

Contact: local media for public service announcement if customers cannot be notified by phone or door-to-door

Contact NCDEQ Regional office or Raleigh. Brunswick County Emergency Management (if necessary)

Contact Police Department and Fire Department See Contact List for phone numbers.

DROUGHT CONDITION OR WATER SUPPLY SHORTAGE FROM BRUNSWICK

Actions:

The Operator in Responsible Charge (ORC) should notify the Town Manager or Board of Commissioners (verbally and in writing) of failing water supply.

Initiate Emergency Water Shortage Response Plan once a water shortage is declared. (Refer to Water Shortage Policy contained within this emergency response plan)

Begin enforcement of Emergency Water Conservation and Restriction ordinance, if applicable.

Contact:

NCDEQ Regional or Raleigh, Brunswick County Emergency Management (if necessary)

Contact local television and radio media for assistance with public notification of drought condition or water shortage for any cause.

Possible Actions: Arrange for alternate source of water if necessary --- i.e., bottled water, bulk hauler, or storage tank.

See Contact List for phone numbers.

FLOOD CONDITIONS/HURRICANE

Actions:

ORC should contact the Town Manager and the EOC if Activated.

Notify all users of the potential for groundwater well contamination, failure of pumps, or loss of power, etc.

Advise customers to store some drinking water in advance of the potential for flooding and to boil any suspect water for two minutes when notified or after any loss of pressure.

Phone government contacts are listed below.

Contact:

Local media for public service announcement if customers cannot be notified by phone or door-to-door.

Arrange for alternate source of water if necessary --- i.e., emergency pipeline with Public Water Supply approval only, bottled water, bulk hauler, or storage tank.

NCDEQ Regional or State office in Raleigh (although they usually contact you during this type of emergency, Brunswick County Emergency Management, Police (for assistance in public notification).

See Contact List for phone numbers.

BROKEN WATER MAIN / CONTAMINATION OF WATER

Possible Causes: Mini-Quakes, Excessive Vibration, Floods, and Trees Uprooted due to Tornado or Hurricane, or simply broken due to age.

Actions: Contact maintenance crew to repair from contact list or call out sheet if safe to do so Valve off area of damaged main but maintain enough pressure on the line to prevent potential backflow.

Notify Town Hall and Police Department of water outage, what area will be affected, and approximate length of outage. (If possible, have personnel go door to door to advise customers of outage and approximate length of outage.

Contact:

NCDEQ Regional or State office in Raleigh if contamination of water main occurs or length of outage will be substantial.

Submit Boil Water Notice and follow up sampling protocol by guidelines from NCDEQ.

Contact local television and radio media for assistance with public notification of contamination or lengthy outages.

See Contact List for phone numbers.

HYDRANT DAMAGE

POSSIBLE CAUSES:

Vehicular Accident, Water Hammer, Restraint Failure, Falling Trees or Structures due to Tornado or Hurricane, or Soil Failure due to Flooding or Heavy Rains.

Actions:

Contact maintenance crew to repair. Use contact list or callout sheet if safe to do so.
Valve off damaged hydrants and mains, if also damaged.

Notify Town Hall and Police Department of water outage, what area will be affected, and approximate length of outage. (If possible have personnel go door to door to advise customers of outage and approximate length of outage.)

Contact:

NCDEQ Regional or State office in Raleigh if contamination of water main occurs or length of outage will be substantial.

Submit Boil Water Notice and follow up sampling protocol by guidelines from NCDEQ.

Contact local television and radio media for assistance with public notification of contamination or lengthy outages.

See Contact List for phone numbers.

A. LEAD & COPPER

Appendix A

Lead and Copper

LEAD AND COPPER 90th PERCENTILE SUMMARY[1]

Water System Number: NC 04-10-060 Date: 9-13-22

System Name: Town of Holden Beach

Compliance Period: 6-1-22 - 9-30-22 Monitoring Frequency: every 3 years

LEAD SAMPLES			
90th Percentile Level = _____			
No.	Location[3] Code	Tier/Target Category	Lead[2] mg/l
1	#081	3	<0.003
2	#062	2	<0.003
3	#086	1	<0.003
4	#011	1	<0.003
5	#005	1	<0.003
6	#085	3	<0.003
7	#063	1	<0.003
8	#051	1	<0.003
9	#084	2	<0.003
10	#025	1	<0.003
11	#072	2	<0.003
12	#017	1	<0.003
13	#132	3	<0.003
14	#051	1	<0.003
15	#082	3	<0.003
16	#134	2	<0.003

COPPER SAMPLES			
90th Percentile Level = _____			
No.	Location[3] Code	Tier/Target Category	Copper[2] mg/l
1	#081	3	<0.050
2	#062	2	<0.050
3	#086	1	<0.050
4	#011	1	<0.050
5	#005	1	<0.050
6	#085	3	<0.050
7	#063	1	<0.050
8	#051	1	<0.050
9	#084	2	<0.050
10	#025	1	<0.050
11	#072	2	<0.050
12	#017	1	<0.050
13	#132	3	<0.050
14	#051	1	<0.050
15	#082	3	<0.050
16	#134	2	<0.050

[1] 90th Percentile Level = Concentration in the sample with sequence number yielded by 0.9 x number of samples. (Only 10% of the samples have higher lead or copper values) For 5 samples, 90th Percentile Level is the average of 4th and 5th highest samples.

[2] Arrange in ascending order. (Place results of all lead or copper samples taken during the monitoring period in order from the sample with the lowest concentration at the top to the sample with the highest concentration at the bottom.) Attach additional pages if necessary.

[3] Attach a location code key showing the alphanumeric location code in ascending order and the corresponding address of the sample site (see page 2 of this form). Explain any changes to the sampling sites from the previous sampling event. If any sites have been added or removed, also update the Sampling Pool Details online through the Lead & Copper Data Acquisition Portal: https://www.ncwater.org/?page=679

Use our web-based certification process "ECERT" to submit a copy of your 90th Percentile Summary under the **90th Percentile module. Access to ECERT is available from our website or the following link: https://pws.ncwater.org/ECERT/. If you do not have internet access, mail the completed notice to the appropriate Lead and Copper Rule Manager at the Public Water Supply Section, 1634 Mail Service Center, Raleigh, NC 27699-1634.

LEAD AND COPPER 90th PERCENTILE SUMMARY[1]

Water System Number: NC 04-10-060 Date: 9-13-22

System Name: Town of Holden Beach

Compliance Period: 1-1-22 - 9-30-22 Monitoring Frequency: every 3 years

LEAD SAMPLES			
90th Percentile Level = _____			
No.	Location[3] Code	Tier/Target Category	Lead[2] mg/l
17	#135	1	<0.003
18	#120	1	<0.003
19	#131	1	<0.003
20	#026	1	<0.003

COPPER SAMPLES			
90th Percentile Level = _____			
No.	Location[3] Code	Tier/Target Category	Copper[2] mg/l
17	#135	1	<0.050
18	#120	1	0.096
19	#131	1	0.166
20	#026	1	0.111

[1] 90th Percentile Level = Concentration in the sample with sequence number yielded by 0.9 x number of samples. (Only 10% of the samples have higher lead or copper values) For 5 samples, 90th Percentile Level is the average of 4th and 5th highest samples.

[2] Arrange in ascending order. (Place results of all lead or copper samples taken during the monitoring period in order from the sample with the lowest concentration at the top to the sample with the highest concentration at the bottom.) Attach additional pages if necessary.

[3] Attach a location code key showing the alphanumeric location code in ascending order and the corresponding address of the sample site (see page 2 of this form). Explain any changes to the sampling sites from the previous sampling event. If any sites have been added or removed, also update the Sampling Pool Details online through the Lead & Copper Data Acquisition Portal: https://www.ncwater.org/?page=679

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LEAD AND COPPER 90th PERCENTILE SUMMARY[1]

Water System Number: 04-10-060 Date: 11-26-19

System Name: Town of Holden Beach

Compliance Period: 2016 - 2019 Monitoring Frequency: 3 years

LEAD SAMPLES			
90th Percentile Level = _____			
No.	Location[3] Code	Tier/Target Category	Lead[2] mg/l
1	051	1	<0.003
2	121	1	<0.003
3	082	1	<0.003
4	086	1	<0.003
5	062	1	<0.003
6	026	1	<0.003
7	052	1	<0.003
8	028	1	<0.003
9	025	1	<0.003
10	058	1	<0.003
11	081	3	<0.003
12	005	1	<0.003
13	017	1	<0.003
14	120	1	<0.003
15	072	1	<0.003
16	084	2	<0.003

COPPER SAMPLES			
90th Percentile Level = _____			
No.	Location[3] Code	Tier/Target Category	Copper[2] mg/l
1	051	1	<0.050
2	121	1	<0.050
3	082	1	<0.050
4	086	1	<0.050
5	062	1	<0.050
6	026	1	<0.050
7	052	1	<0.050
8	028	1	<0.050
9	025	1	<0.050
10	058	1	<0.050
11	081	3	<0.050
12	005	1	<0.050
13	017	1	<0.050
14	120	1	0.098
15	072	1	0.101
16	084	2	0.107

[1] 90th Percentile Level = Concentration in the sample with sequence number yielded by 0.9 x number of samples. (Only 10% of the samples have higher lead or copper values) For 5 samples, 90th Percentile Level is the average of 4th and 5th highest samples.

[2] Arrange in ascending order. (Place results of all lead or copper samples taken during the monitoring period in order from the sample with the lowest concentration at the top to the sample with the highest concentration at the bottom.) Attach additional pages if necessary.

[3] Attach a location code key showing the alphanumeric location code in ascending order and the corresponding address of the sample site (see page 2 of this form). Explain any changes to the sampling sites from the previous sampling event. If any sites have been added or removed, also update the Sampling Pool Details online through the Lead & Copper Data Acquisition Portal: https://www.ncwater.org/?page=679

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LEAD AND COPPER 90th PERCENTILE SUMMARY[1]

Water System Number: 04-10-060 Date: 11-26-19

System Name: Town of Holden Beach

Compliance Period: 2016 - 2019 Monitoring Frequency: 3 years

LEAD SAMPLES			
90th Percentile Level = _____			
No.	Location[3] Code	Tier/Target Category	Lead[2] mg/l
17	063	1	<0.003
18	054	1	<0.003
19	085	3	<0.003
20	011	1	0.022

COPPER SAMPLES			
90th Percentile Level = _____			
No.	Location[3] Code	Tier/Target Category	Copper[2] mg/l
17	063	1	0.123
18	054	1	0.139
19	085	3	0.144
20	011	1	0.193

[1] 90th Percentile Level = Concentration in the sample with sequence number yielded by 0.9 x number of samples. (Only 10% of the samples have higher lead or copper values) For 5 samples, 90th Percentile Level is the average of 4th and 5th highest samples.

[2] Arrange in ascending order. (Place results of all lead or copper samples taken during the monitoring period in order from the sample with the lowest concentration at the top to the sample with the highest concentration at the bottom.) Attach additional pages if necessary.

[3] Attach a location code key showing the alphanumeric location code in ascending order and the corresponding address of the sample site (see page 2 of this form). Explain any changes to the sampling sites from the previous sampling event. If any sites have been added or removed, also update the Sampling Pool Details online through the Lead & Copper Data Acquisition Portal: https://www.ncwater.org/?page=679

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LEAD AND COPPER GUIDELINES: SAMPLING POOL SITE SELECTION, SAMPLING PROCEDURES AND FOLLOW-UP ACTIONS

The main objective of the Lead and Copper Rule (LCR), 15A NCAC 18C .1507, is to protect the public from contaminants resulting from corrosion in the piping system. LCR requires the water served by all community and non-transient non-community public water systems to meet the "action levels" for lead and copper as measured at the consumer taps and/or provide optimal corrosion control treatment to minimize these corrosion by-products within the distribution system. If more than 10 percent (10%) of the tap water samples collected during any monitoring period contains more than 0.015 mg/L for lead and/or 1.3 mg/L for copper, the action level will have been exceeded (i.e., if the "90th percentile" lead level is greater than 0.015 mg/L or if the "90th percentile" copper level is greater than 1.3 mg/L).

Steps Needed to Complete the Lead and Copper Monitoring Requirements

A. SAMPLING POOL SITE SELECTION

1. From the table below, determine the **standard** number of required sites to be sampled each compliance period, based on your system's population. (Note: Your system may qualify for reduced monitoring in the future, depending on sample collection and results.)

Number of Samples		
System Size (Population Served)	**Number of Sites (Standard)**	**Number of Sites (Reduced)**
> 100,000	100	50
10,001 - 100,000	60	30
3,301 – 10,000	40	20
501 – 3,300	20	10
101 – 500	10	5
≤ 100	5	5

2. Complete the required Construction Materials Report included with this package (also located on our website at http://deq.nc.gov/about/divisions/water-resources/drinking-water/compliance-services#lcr) and submit it to the Lead and Copper Rule Manager.

3. Use information gathered to complete your Construction Materials Report to select sampling pool sites that have the highest probability of corrosion. Tier 1 sites have the highest probability of corrosion so they are considered the highest priority sites, decreasing in priority to Tier 2, and then Tier 3. If no "Tier" sites are available, select "Other" sites as sampling pool sites.

For Community Water Systems (CWS):

Tier 1 sampling sites consist of single family structures that:
- contain copper pipe with lead solder that was installed January 1, 1983 through December 31, 1985; and/or
- contain lead pipe or are served by a lead service line (any age structure).

(**Note:** When multiple family residences comprise at least 20% of the structures served by a water system, the system may count them as Tier 1 sites.)

Tier 2 sampling sites consist of buildings, including multiple-family residences that:
- contain copper pipe with lead solder that was installed January 1, 1983 through December 31, 1985; and/or
- contain lead pipe or are served by a lead service line (any age structure).

Tier 3 sampling sites consist of single family structures that contain copper pipes with lead solder installed before 1983.

If there are insufficient numbers of Tier 1, 2, and 3 sampling sites in a community water system, the system shall complete its sampling pool with representative sites throughout the distribution system. A site is considered a 'representative site' if the plumbing material used at that site would be commonly found at other sites served by the water system.

For Non-Transient Non-Community (NTNC) Water Systems:

Tier 1 sampling sites consist of buildings that:
- contain copper pipes with lead solder installed January 1, 1983 through December 31, 1985; and/or
- contain lead pipes or are served by a lead service line (any age structure).

(Note that Tier 1 NTNC sites differ slightly from that of Tier I CWS sites in that the Rule states "buildings" instead of "single family structures.")

A NTNC water system with insufficient Tier 1 sampling sites shall complete its sampling pool with sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed to complete the sampling pool, the NTNC water system shall use representative sites throughout the distribution system. A "representative site" is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

** ***Important Note Regarding Lead Service Lines*** *(For CWS and NTNC Water Systems):*
As per 15A NCAC 18C Section .1507 [§141.86(a)(8)]: *Any water system whose distribution system contains lead service lines shall draw 50 percent of the samples it collects during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50 percent of the samples from sites served by a lead service line. A water system that cannot identify a sufficient number of sampling sites served by a lead service line shall collect first-draw samples from all of the sites identified as being served by such lines.*

B. SAMPLING POOL SITING PLAN

1. Create a readable map, sketch or schematic of your distribution system. Clearly indicate the locations of the sampling pool sites. Be aware that it is in your best interest to select more sampling pool sites than the minimum **standard** number required. The designation of more than the minimum number of sampling pool sites available will provide greater flexibility in performing additional sampling, if necessary.

2. Assign each sampling pool site an alphanumeric identifier as a location code. The code for each sampling site must consist of three digits using letters, numbers, or a combination of both (for example: ABC, 123, 001, or 1B3). Add the location code for each sampling pool site to the map or sketch. DO NOT ever change the code for a location. If a site is dropped from the pool, the replacement site MUST have a new code.

3. Complete all information on the Lead and Copper Sample Siting Plan - Site Selection Process form **and** the Lead and Copper Sampling Pool - Details spreadsheet. The spreadsheet should list all sampling pool sites selected as specified in item one above. Be sure the sampling pool site location codes used in the spreadsheet correctly correspond to the location codes used on the map. For each sampling pool site listed in the spreadsheet, be sure to indicate the location code, physical site address (Street and City for CWS) or physical location (for NTNC), year built, plumbing materials in the structure, existence of a lead service line, tier level, tier level designation justification, and the date and designation of when the site was either added to, or deleted from, the sampling pool with comments explaining the changes. See the examples in the spreadsheet for listing CWS vs. NTNC systems.

4. Submit the following completed documents to the Lead and Copper Rule Manager for review. Be sure your public water system number and the name of your public water supply system are included on each document.
   - Map or schematic of distribution system denoting sampling pool site location codes;
   - Lead and Copper Sampling Pool Siting Plan - Site Selection Process form;
   - Lead and Copper Sampling Pool - Details spreadsheet; and
   - Construction Materials Report.

5. Note that any future changes to the sampling pool siting plan must be reviewed by the State and will require a written submittal of the change. Consult with your Regional Office when selecting new sites. Denote the date(s) of any changes and reasons for the changes on your Sampling Pool - Details spreadsheet and submit the revised Sampling Pool - Details spreadsheet and revised map/schematic to the Lead and Copper Rule Manager and the appropriate Regional Office.

C. SAMPLE COLLECTION PROCEDURES

1. Please refer to EPA's February 29, 2016 memorandum entitled "Clarification of Recommended Tap Sampling Procedures for Purposes of the Lead and Copper Rule" prior to collecting samples. (Posted on our website at http://deq.nc.gov/about/divisions/water-resources/drinking-water/compliance-services#lcr). Collect each water sample in bottles provided by your lab. Samples must be analyzed by a NC certified laboratory. The water shall stand motionless for at least 6 hours in the plumbing system before collection of the sample. Residential samples shall be collected from the cold-water kitchen tap or bathroom sink tap that is not fitted with a point-of-use treatment device. Non-residential samples shall be collected at an interior tap from which water is typically drawn for consumption. Leave faucet aerators in place when conducting sampling. Do not collect samples from outside spigots.

** ***Important Note Regarding Lead Service Lines*** *(For CWS and NTNC Water Systems)*:
Sample collection at a location served by a lead service line requires a different sampling procedure from that used for locations without a lead service line. As per 15A NCAC 18C Section .1507 [§141.86(b)(3)][:

Each service line sample shall be one liter in volume and have stood motionless in the lead service line for at least six hours. Lead service line samples shall be collected in one of the following three ways:

i. *At the tap after flushing the volume of water between the tap and the lead service line. The volume of water shall be calculated based on the interior diameter and length of the pipe between the tap and the lead service line;*
ii. *Tapping directly into the lead service line; or*
iii. *If the sampling site is a building constructed as a single-family residence, allowing the water to run until there is a significant change in temperature which would be indicative of water that has been standing in the lead service line.*

2. Collect the required **standard** number of samples for a minimum of two consecutive six-month periods. (Note: For systems with less than five sampling sites, some sites will need to be sampled more than once, on different days, in order to obtain the required minimum five samples.)

3. Water systems must collect samples from the same sampling site from which it collected a previous sample. If, for any reason, the water system cannot gain entry to a sampling site in order to collect a follow-up sample, the system may collect the follow-up tap sample from another sampling site in its sampling pool as long as the new site meets the same targeting criteria, and is within reasonable proximity of the original site. The system must designate any site that was not sampled during previous monitoring periods and include an explanation of why sampling sites have changed with their 90th percentile report.

4. Calculate the 90th percentiles for lead and copper as described below:

   (a) List the lead results in ascending order in a column with the lowest concentration at the top of the list and highest concentration at the bottom of the list. Number each entry. Repeat this listing process using the copper results. Use the "Lead and Copper 90th Percentile Summary" form (or a similar reporting format that includes the same information) when submitting your 90th percentile calculations.

   (b) Multiply the number of samples in each column x 0.9 to determine the sample number that represents the 90th percentile.
   Example: 20 samples x 0.9 = 18
   Therefore, the result for the 18th sample in the ascending list is the 90th percentile.

   If you collect an odd number of samples, use interpolation to determine the 90th percentile.
   Example: 25 samples x 0.9 = 22.5
   In this case, the 90th percentile would be determined by adding one-half of the difference between the 22nd and 23rd sample results to the 22nd sample result as shown below.

   22nd sample result = 0.010 mg/L; 23rd sample result = 0.016 mg/L
   90th percentile value = 0.010 + ½ (0.016 – 0.010) = 0.013 mg/L

   (c) If you sample from only five locations, the 90th percentile value is calculated by averaging the 4th and 5th highest results.

5. In order to avoid a reporting violation, ensure that your laboratory reports the results of the sampling to the Public Water Supply Section by the 10th day of the month following the month in which the results are received or by the 10th day of the month following the end of a monitoring period, whichever is earlier.

D. REDUCED MONITORING

Based on sample collection and sampling results, systems may be eligible for reduced monitoring. If the 90th percentile for lead and the 90th percentile for copper are at or below the action level (0.015 mg/L for lead and 1.3 mg/L for copper) for two consecutive six-month periods, your water system may request reduced monitoring by completing and submitting the "Lead and Copper Reduced Monitoring Request Form" (located on our website) to the State's Lead and Copper Rule Manager.

E. MONITORING AND REPORTING CONSIDERATIONS

1. The results of all lead and copper sampling must be reported to the State including the results of non-compliance sampling, homeowner-requested sampling, and sampling conducted by a water system for investigatory or follow-up purposes, as well as, the required compliance samples.

2. For samples collected during a system's monitoring period:
(Note: January 1st through June 30th and July 1st through December 31st are the monitoring period for systems on six-month monitoring frequencies. For systems monitoring annually or every three years, the monitoring period is June 1st through September 30th.)

   The following sample results MUST be reported to the State as **compliance samples** and be included in your water system's 90th percentile calculations for each applicable monitoring period:

   - All first draw samples collected at any of your system's sampling pool locations.
   - All first draw samples collected from non-sampling pool locations during the monitoring period where it is "reasonably able to determine" that the location sampled meets the highest priority tier level site classification for your system.

3. If your system's population has changed, be sure that you are sampling the proper minimum number of locations to avoid a monitoring violation. The addition of new sampling pool sites will require submittal of an updated Sampling Pool spreadsheet and associated map.

4. Sampling schedules and sample results are available for review on Drinking Water Watch located at this web page: https://deq.nc.gov/about/divisions/water-resources/drinking-water/sampling-status-and-drinking-water-watch.

F. REQUIRED FOLLOW-UP ACTIONS WHEN AN ACTION LEVEL IS EXCEEDED

If the 90th percentile for lead and/or the 90th percentile for copper exceed their corresponding action level (0.015 mg/L for lead and 1.3 mg/L for copper) for any compliance period, the following actions must be performed:

1. If the lead action level is exceeded, public education on lead in drinking water must be distributed to your system's customers within 60 days after the end of the monitoring period in which the exceedance occurred, and certification of completing this requirement must be provided to the State within 70 days after the end of the monitoring period in which the exceedance occurred. (See Public Notification Requirements below).

2. Submit a Corrosion Control Treatment (CCT) Recommendation (Form 141-C) to the State stating your system's plans to rectify the corrosion problem. The Form 141-C must be submitted within 6 months after the exceedance. To complete the CCT Recommendation, you must perform the following:

   - Measure Water Quality Parameters (WQPs) at each entry point after treatment and at the required number of locations in the distribution system during each monitoring period in which the action level has been exceeded; and
   - Collect water samples at each entry point after treatment and analyze them for lead and copper. (Note: Make sure your laboratory uses the appropriate reporting form specifically designated for these "Lead and Copper Source Water" samples.)

3. If necessary, submit within 6 months after exceedance, a Source Water Treatment (SOWT) recommendation to the State stating your system's plans to rectify any lead and/or copper contamination in your finished water.

4. If your system was on a reduced monitoring schedule, your system will be returned to a six-month **standard** monitoring schedule and will have to monitor from the **standard** minimum number of locations in the table on page 1.

Once treatment (CCT and/or SOWT) has been approved and installed, your water system must perform the following:

1. Monitor the tap water in the distribution system for lead and copper on a six-month schedule until the system qualifies for reduced monitoring;
2. Measure water quality parameters in the distribution system every six months until system qualifies for reduced monitoring;
3. Monitor the source water at each entry point after treatment for lead and copper (if necessary); and

4. Measure water quality parameters in the source water at each entry point after treatment every two weeks until the system qualifies for reduced monitoring.

After two consecutive six-month periods of follow-up monitoring have been performed, your water system must submit the results (on Form 141-C2 as a summary) to the State for review and for designation of the operating ranges for acceptable corrosion control treatment. Once these ranges have been established, your water system must complete another two consecutive six-month periods of monitoring (as described in items 2 and 4 above) to verify the ability of the installed treatment to meet the State-specified operating ranges.

If the lead and copper sample results are at or below the action levels, a small or medium system may request reduced monitoring from the State Lead and Copper Rule Manager. However, if an action level is exceeded, the system must continue to conduct tap sampling, continue public education distribution (if the lead action level is exceeded), continue water quality parameter sampling at entry point(s) and in the distribution system, and possibly begin a lead service line replacement program.

G. SOURCE WATER AND/OR TREATMENT CHANGES

The State's Lead and Copper Rule Manager must review and approve a change in source water, the addition of a new source, or long-term change in water treatment before it is implemented by the water system. Failure to notify the State and get approval before implementing the change is a violation under the Lead and Copper Rule. Systems should strive to submit their request **90 days** before the change is desired to allow time to resolve any comments and questions. Treatment changes to address a current MCL can be handled on a case-specific basis and the timeframes may necessarily be compressed.

Changes in source water and/or treatment may result in monitoring schedule changes and re-evaluation of your system's corrosion control treatment. Any necessary changes to a system's compliance monitoring schedule and corrosion control treatment will be determined on a case-by-case basis. To request a change, complete the form entitled "Request for Source Water and/or Treatment Changes Under the Lead and Copper Rule (LCR)" located on our website at http://deq.nc.gov/about/divisions/water-resources/drinking-water/compliance-services#lcr and submit it for approval to the Lead and Copper Rule Manager 90 days before the proposed change date.

H. PUBLIC NOTIFICATION REQUIREMENTS

1. **Federal Requirements**: The Lead and Copper Rule requires certain notifications to be provided to water system customers.

   - **Public Education** - In the event that a system experiences an exceedance of the lead action level after calculating the 90th percentile value, all customers of the water system and possibly other agencies and organizations must be notified of the action level exceedance and provided information regarding the health effects of lead and actions that can be taken to reduce lead in drinking water. This notification must be completed within 60 days after the end of the monitoring period in which the exceedance occurred, and certification of completion must be provided to the State within 70 days. A template containing all required information and language is available on our website at http://deq.nc.gov/about/divisions/water-resources/drinking-water/compliance-services#lcr .

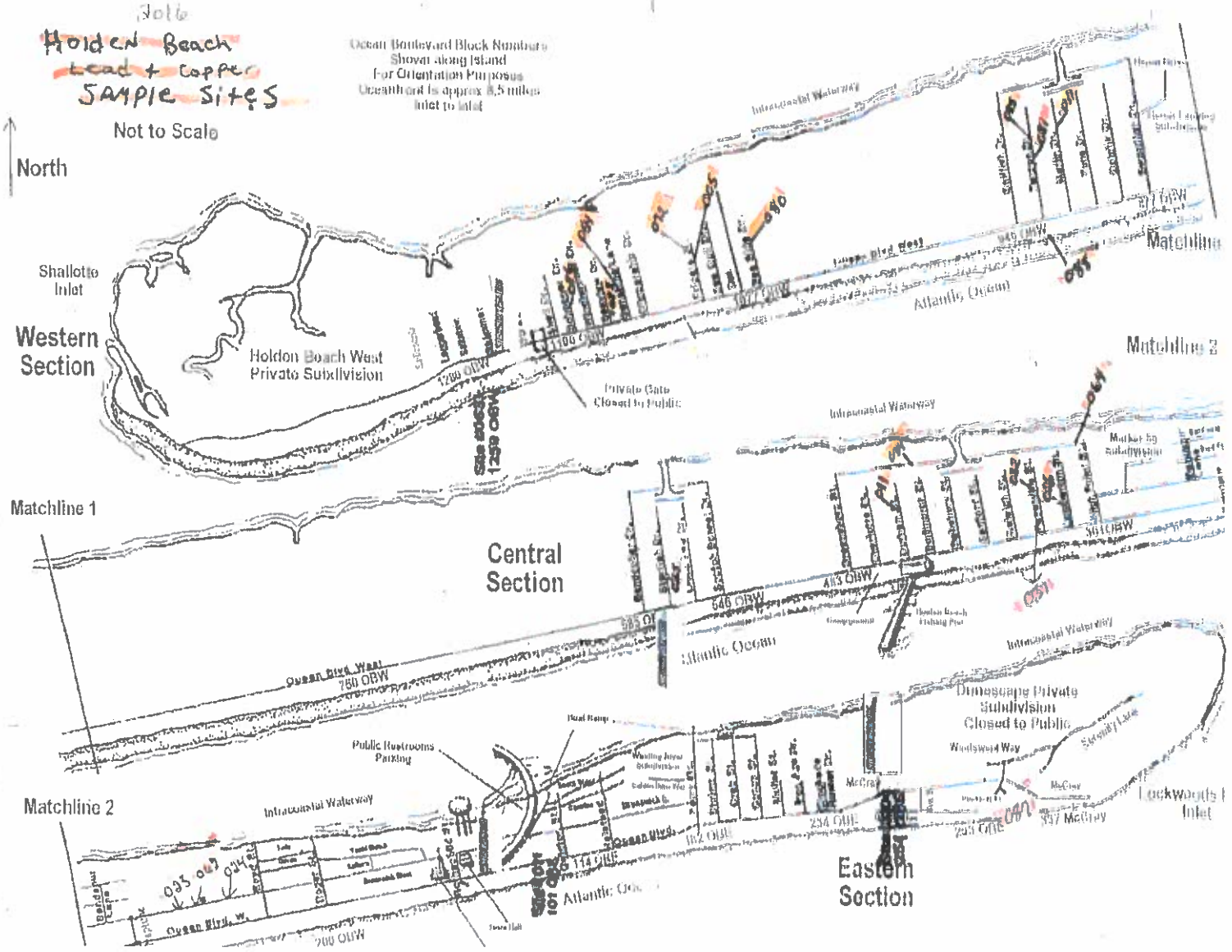
   - **Consumer Notice of Lead Tap Water Results** - Customers at locations that were sampled for lead are required to be notified of the lead sampling result at their location. This notification must be provided to the consumers at the locations sampled within 30 days of receipt of the results by the water system. The system must certify completion of this requirement to the State within 90 days of the end of the monitoring period. The consumer notice is required to contain specific information and language. A template containing all required information and language is available on our website.

2. **State Requirements**: In addition, the State's Public Notification Requirements include Special Notification for Distribution System Samples under 15A NCAC 18C .1523(c). For individual lead or copper results above the respective action level, the consumers at the location sampled must be notified within 48 hours after receipt of the results by the water system. Templates for the Special Notification for Distribution System Samples are also available on our website.

LEAD AND COPPER

Holden Beach
Lead + Copper
SAMPLE SITES

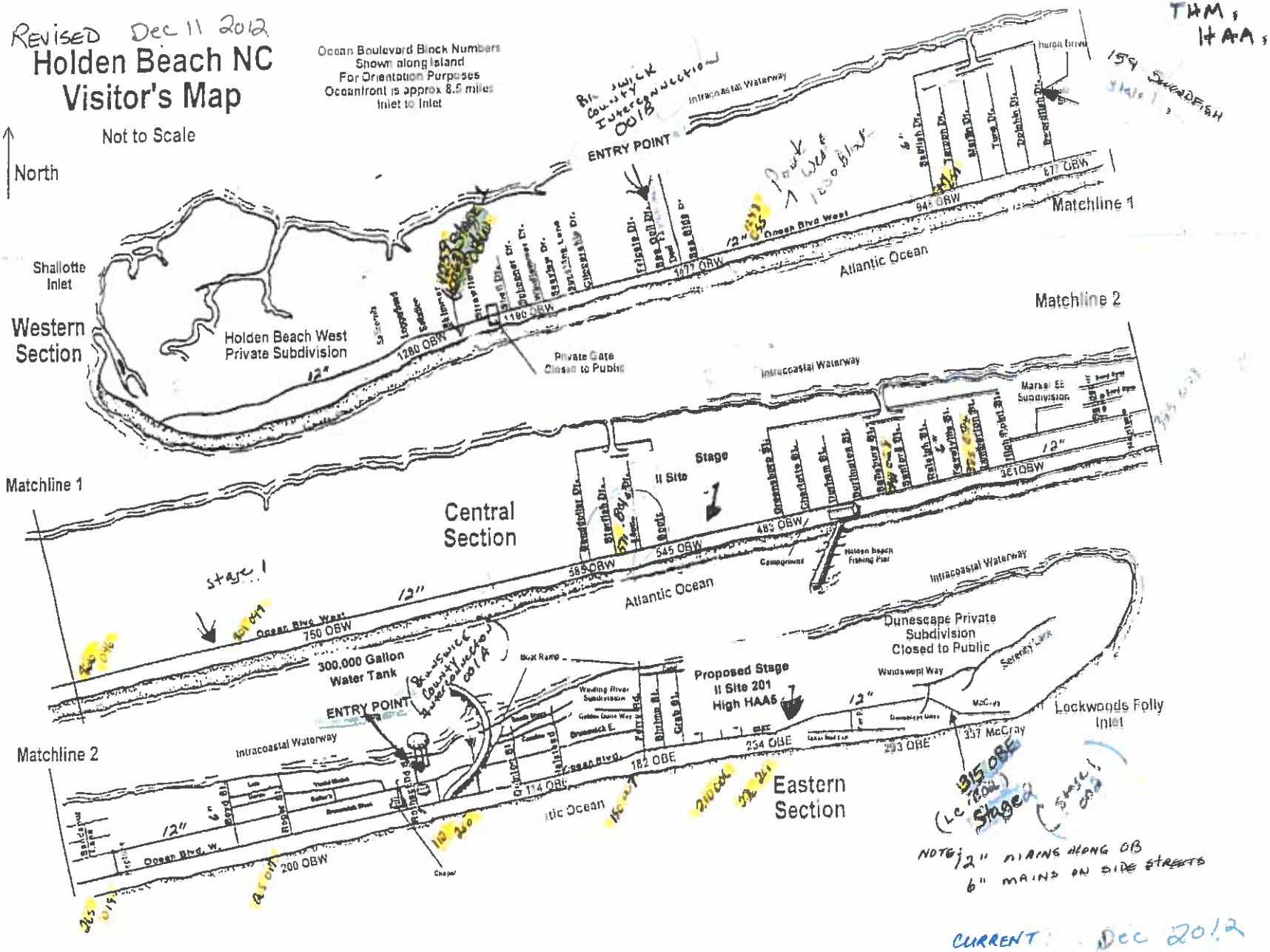
Not to Scale



B. DISINFECTION BY-PRODUCTS COMPLIANCE MONITORING

Appendix B

Disinfectant By-Products Compliance Monitoring


REVISED Dec 11 2012
Holden Beach NC
Visitor's Map
Not to Scale
North
Ocean Boulevard Block Numbers
Shown along Island
For Orientation Purposes
Oceanfront is approx 8.8 miles
Inlet to Inlet
THM's
HAA's
154 Swordfish
Brunswick County Emergency 0018
ENTRY POINT
Intracoastal Waterway
Huron Drive
Ocean Blvd West
677 OBW
945 OBW
1077 OBW
1190 OBW
1280 OBW
Atlantic Ocean
Matchline 1
Matchline 2
Shallotte Inlet
Western Section
Holden Beach West Private Subdivision
Private Gate Closed to Public
Central Section
II Site
Stage 1
Stage
Marsh St Subdivision
361 OBW
485 OBW
545 OBW
585 OBW
Campground
Holden Beach Fishing Pier
Ocean Blvd West
750 OBW
300,000 Gallon Water Tank
Boat Ramp
Proposed Stage
II Site 201
High HAA5
Dunescape Private Subdivision Closed to Public
Windswept Way
Lockwoods Folly Inlet
Eastern Section
182 OBE
234 OBE
293 OBE
337 McCray
315 OBE
(LC '12)
Staged
Ocean Blvd. W.
200 OBW
Chapel
NOTE: 12" MAINS ALONG OB
6" MAINS ON SIDE STREETS
CURRENT: Dec 2012

envirochem

ANALYTICAL & CONSULTING CHEMISTS

Environmental Chemists, Inc.

6502 Windmill Way, Wilmington, NC 28405 • 910.392.0223 Lab • 910.392.4424 Fax
710 Bowsertown Road, Manteo, NC 27954 • 252.473.5702 Lab/Fax
235-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.3843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 3/3/2022 **TIME:** 9:45:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.008	mg/L	3/4/2022	11:31	3/8/2022	12:01	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.013	mg/L	3/4/2022	11:31	3/8/2022	12:01	0.08
2942	Bromoform	EPA 502.2	0.001	0.002	mg/L	3/4/2022	11:31	3/8/2022	12:01	0.08
2941	Chloroform	EPA 502.2	0.001	0.013	mg/L	3/4/2022	11:31	3/8/2022	12:01	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.036	mg/L	03/04/2022	11:31	3/8/2022	12:01	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.003	mg/L	03/04/2022	13:47	3/11/2022	11:30	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	03/04/2022	13:47	3/11/2022	11:30	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	03/04/2022	13:47	3/11/2022	11:30	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.012	mg/L	03/04/2022	13:47	3/11/2022	11:30	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	03/04/2022	13:47	3/11/2022	11:30	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.019	mg/L	03/04/2022	13:47	3/11/2022	11:30	0.06

Laboratory Log Number: 22-09314 REPORT #: 2022-03937 Reviewed by: Tammy Duran

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants

Comment:

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ANALYTICAL & CONSULTING CHEMISTS

Environmental Chemists, Inc.

5602 Windmill Way, Wilmington, NC 28405 • 910.392.0223 Lab • 910.392.4424 Fax
710 Howerstown Road, Manteo, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit.

Water System Number: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B02 **Tap Location:** Sample Station **Street Address:** 315 Ocean Blvd East **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 3/3/2022 **TIME:** 10:00:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

ABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.009	mg/L	3/4/2022	11:56	3/8/2022	12:01	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.013	mg/L	3/4/2022	11:56	3/8/2022	12:01	0.08
2942	Bromoform	EPA 502.2	0.001	0.002	mg/L	3/4/2022	11:56	3/8/2022	12:01	0.08
2941	Chloroform	EPA 502.2	0.001	0.013	mg/L	3/4/2022	11:56	3/8/2022	12:01	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.037	mg/L	03/04/2022	11:56	3/8/2022	12:01	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.003	mg/L	03/04/2022	13:47	3/11/2022	11:31	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	03/04/2022	13:47	3/11/2022	11:31	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	03/04/2022	13:47	3/11/2022	11:31	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.012	mg/L	03/04/2022	13:47	3/11/2022	11:31	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	03/04/2022	13:47	3/11/2022	11:31	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.019	mg/L	03/04/2022	13:47	3/11/2022	11:31	0.06

Laboratory Log Number: 22-09317 REPORT #: 2022-03937 Reviewed by: Jammy Duan

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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ANALYTICAL & CONSULTING CHEMISTS

Environmental Chemists, Inc.

6602 Windmill Way, Wilmington, NC 28405 • 910.392.0223 Lab • 910.392.4424 Fax
710 Bowsertown Road, Manteo, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit.

Water System Number: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B02 **Tap Location:** Sample Station **Street Address:** 315 Ocean Blvd East **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 6/8/2022 **TIME:** 8:56:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.009	mg/L	6/10/2022	16:43	6/14/2022	14:50	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.015	mg/L	6/10/2022	16:43	6/14/2022	14:50	0.08
2942	Bromoform	EPA 502.2	0.001	0.001	mg/L	6/10/2022	16:43	6/14/2022	14:50	0.08
2941	Chloroform	EPA 502.2	0.001	0.017	mg/L	6/10/2022	16:43	6/14/2022	14:50	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.042	mg/L	06/10/2022	16:43	6/14/2022	14:50	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.003	mg/L	06/10/2022	12:47	6/15/2022	10:50	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	06/10/2022	12:47	6/15/2022	10:50	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.003	mg/L	06/10/2022	12:47	6/15/2022	10:50	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.013	mg/L	06/10/2022	12:47	6/15/2022	10:50	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	06/10/2022	12:47	6/15/2022	10:50	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.019	mg/L	06/10/2022	12:47	6/15/2022	10:50	0.06

Laboratory Log Number: 22-25510 REPORT #: 2022-10545 Reviewed by: Tammy Duran

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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Environmental Chemists, Inc.

6602 Windmill Way, Wilmington, NC 28405 • 910.392.0223 Lab • 910.392.4424 Fax
710 Bowmertown Road, Manteo, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.9843 Lab/Fax

info@environmentalchemist.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis
Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 6/8/2022 **TIME:** 8:42:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.009	mg/L	6/10/2022	16:18	6/14/2022	14:50	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.015	mg/L	6/10/2022	16:18	6/14/2022	14:50	0.08
2942	Bromoform	EPA 502.2	0.001	0.002	mg/L	6/10/2022	16:18	6/14/2022	14:50	0.08
2941	Chloroform	EPA 502.2	0.001	0.017	mg/L	6/10/2022	16:18	6/14/2022	14:50	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.043	mg/L	06/10/2022	16:18	6/14/2022	14:50	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.004	mg/L	06/10/2022	12:47	6/15/2022	10:49	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	06/10/2022	12:47	6/15/2022	10:49	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.003	mg/L	06/10/2022	12:47	6/15/2022	10:49	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.014	mg/L	06/10/2022	12:47	6/15/2022	10:49	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	06/10/2022	12:47	6/15/2022	10:49	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.021	mg/L	06/10/2022	12:47	6/15/2022	10:49	0.06

Laboratory Log Number: 22-25509 REPORT #: 2022-10545 Reviewed by: Jammy Duncan

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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Environmental Chemists, Inc.

6602 Windmill Way, Wilmington, NC 28405 • 910.392.0223 Lab • 910.392.4824 Fax
710 Bowertown Road, Morrisville, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.3943 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2

Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 9/7/2022 **TIME:** 8:30:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.021	mg/L	9/13/2022	19:26	9/23/2022	9:08	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.018	mg/L	9/13/2022	19:26	9/23/2022	9:08	0.08
2942	Bromoform	EPA 502.2	0.001	0.007	mg/L	9/13/2022	19:26	9/23/2022	9:08	0.08
2941	Chloroform	EPA 502.2	0.001	0.012	mg/L	9/13/2022	19:26	9/23/2022	9:08	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.058	mg/L	09/13/2022	19:26	9/23/2022	9:08	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.006	mg/L	09/08/2022	15:47	9/14/2022	8:37	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	09/08/2022	15:47	9/14/2022	8:37	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.002	mg/L	09/08/2022	15:47	9/14/2022	8:37	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.008	mg/L	09/08/2022	15:47	9/14/2022	8:37	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	09/08/2022	15:47	9/14/2022	8:37	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.016	mg/L	09/08/2022	15:47	9/14/2022	8:37	0.06

Laboratory Log Number: 22-42964 REPORT #: 2022-17527 Reviewed by: T. Duran L. Dunn

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants

Comment:

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Environmental Chemists, Inc.

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710 Bowerstown Road, Marion, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B02 **Tap Location:** Sample Station **Street Address:** 315 Ocean Blvd East **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 9/7/2022 **TIME:** 7:55:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.021	mg/L	9/13/2022	19:51	9/23/2022	9:08	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.018	mg/L	9/13/2022	19:51	9/23/2022	9:08	0.08
2942	Bromoform	EPA 502.2	0.001	0.007	mg/L	9/13/2022	19:51	9/23/2022	9:08	0.08
2941	Chloroform	EPA 502.2	0.001	0.012	mg/L	9/13/2022	19:51	9/23/2022	9:08	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.058	mg/L	09/13/2022	19:51	9/23/2022	9:08	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.008	mg/L	09/08/2022	15:47	9/14/2022	8:38	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	0.002	mg/L	09/08/2022	15:47	9/14/2022	8:38	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	<0.001	mg/L	09/08/2022	15:47	9/14/2022	8:38	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.009	mg/L	09/08/2022	15:47	9/14/2022	8:38	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	09/08/2022	15:47	9/14/2022	8:38	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.019	mg/L	09/08/2022	15:47	9/14/2022	8:38	0.06

Laboratory Log Number: 22-42965 REPORT #: 2022-17527 Reviewed by: T. Durant, J. Dunn

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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Environmental Chemists, Inc.

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710 Bowerstown Road, Martin, NC 27854 • 252-473-5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: All applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 12/8/2022 **TIME:** 9:18:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 524.2	0.001	0.014	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
2943	Bromodichloromethane	EPA 524.2	0.001	0.014	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
2942	Bromoform	EPA 524.2	0.001	0.004	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
2941	Chloroform	EPA 524.2	0.001	0.012	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
	Total Trihalomethanes	EPA 524.2	0.001	0.044	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.008	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.014	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	0.002	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.028	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06

Laboratory Log Number: 22-60165 REPORT #: 2022-24446 Reviewed by: Jammy Duncan

*Note. If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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ANALYTICAL & CONSULTING CHEMISTS

Environmental Chemists, Inc.

6602 Windmill Way, Wilmington, NC 28405 • 910.392.0223 Lab • 910.392.4024 Fax
710 Edwardstown Road, Morgan, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.3843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Complaince **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 12/8/2022 **TIME:** 9:18:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 524.2	0.001	0.014	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
2943	Bromodichloromethane	EPA 524.2	0.001	0.014	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
2942	Bromoform	EPA 524.2	0.001	0.004	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
2941	Chloroform	EPA 524.2	0.001	0.012	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
	Total Trihalomethanes	EPA 524.2	0.001	0.044	mg/L	12/15/2022	08:13	12/23/2022	13:02	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.008	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.014	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	0.002	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.028	mg/L	12/12/2022	13:22	12/19/2022	15:29	0.06

Laboratory Log Number: 22-60165 REPORT #: 2022-24446 Reviewed by: Tammy Duran

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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710 Bowsertown Road, Manteo, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2

Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 3/15/2023 **TIME:** 9:36:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 524.2	0.001	0.010	mg/L	3/21/2023	22:15	3/30/2023	8:11	0.08
2943	Bromodichloromethane	EPA 524.2	0.001	0.010	mg/L	3/21/2023	22:15	3/30/2023	8:11	0.08
2942	Bromoform	EPA 524.2	0.001	0.002	mg/L	3/21/2023	22:15	3/30/2023	8:11	0.08
2941	Chloroform	EPA 524.2	0.001	0.010	mg/L	3/21/2023	22:15	3/30/2023	8:11	0.08
	Total Trihalomethanes	EPA 524.2	0.001	0.032	mg/L	03/21/2023	22:15	3/30/2023	8:11	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.005	mg/L	03/20/2023	13:04	3/28/2023	11:32	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	03/20/2023	13:04	3/28/2023	11:32	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.003	mg/L	03/20/2023	13:04	3/28/2023	11:32	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.013	mg/L	03/20/2023	13:04	3/28/2023	11:32	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	03/20/2023	13:04	3/28/2023	11:32	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.021	mg/L	03/20/2023	13:04	3/28/2023	11:32	0.06

Laboratory Log Number: 23-13104 REPORT #: 2023-05252 Reviewed by: T. Duran | J Dunn

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

mment:

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710 Bowsertown Road, Manteo, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2

Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B02 **Tap Location:** Sample Station **Street Address:** 315 Ocean Blvd East **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 3/15/2023 **TIME:** 9:50:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

***ABORATORY ID #:** 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 524.2	0.001	0.010	mg/L	3/21/2023	22:43	3/30/2023	8:11	0.08
2943	Bromodichloromethane	EPA 524.2	0.001	0.011	mg/L	3/21/2023	22:43	3/30/2023	8:11	0.08
2942	Bromoform	EPA 524.2	0.001	0.002	mg/L	3/21/2023	22:43	3/30/2023	8:11	0.08
2941	Chloroform	EPA 524.2	0.001	0.011	mg/L	3/21/2023	22:43	3/30/2023	8:11	0.08
	Total Trihalomethanes	EPA 524.2	0.001	0.034	mg/L	03/21/2023	22:43	3/30/2023	8:11	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.004	mg/L	03/20/2023	13:04	3/28/2023	11:33	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	03/20/2023	13:04	3/28/2023	11:33	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.002	mg/L	03/20/2023	13:04	3/28/2023	11:33	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.012	mg/L	03/20/2023	13:04	3/28/2023	11:33	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	03/20/2023	13:04	3/28/2023	11:33	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.018	mg/L	03/20/2023	13:04	3/28/2023	11:33	0.06

Laboratory Log Number: 23-13107 REPORT #: 2023-05252 Reviewed by: T. Duran / J Dunn

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants

·mment:

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Environmental Chemists, Inc.

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710 Bowertown Road, Manteo, NC 27954 • 252 473 5702 Lab/Fax
255 A Wilmington Highway, Jacksonville, NC 28540 • 910 347 5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2

Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 6/7/2023 **TIME:** 9:00:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

*** ABORATORY ID #: 37729**

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.007	mg/L	6/9/2023	09:18	6/13/2023	16:29	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.013	mg/L	6/9/2023	09:18	6/13/2023	16:29	0.08
2942	Bromoform	EPA 502.2	0.001	0.001	mg/L	6/9/2023	09:18	6/13/2023	16:29	0.08
2941	Chloroform	EPA 502.2	0.001	0.017	mg/L	6/9/2023	09:18	6/13/2023	16:29	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.038	mg/L	06/09/2023	09:18	6/13/2023	16:29	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.012	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.016	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06

Laboratory Log Number: 23-28842 REPORT #: 2023-11513 Reviewed by: T. Duran T. Dunn

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

mment:

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ANALYTICAL & CONSULTING CHEMISTS

Environmental Chemists, Inc.

6602 Windmill Way, Wilmington, NC 28405 • 910.392.0223 Lab • 910.392.4424 Fax
710 Bowertown Road, Morehead, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2

Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B02 **Tap Location:** Sample Station **Street Address:** 315 Ocean Blvd East **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 6/7/2023 **TIME:** 9:12:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

BORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.008	mg/L	6/9/2023	13:28	6/13/2023	16:29	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.013	mg/L	6/9/2023	13:28	6/13/2023	16:29	0.08
2942	Bromoform	EPA 502.2	0.001	0.001	mg/L	6/9/2023	13:28	6/13/2023	16:29	0.08
2941	Chloroform	EPA 502.2	0.001	0.018	mg/L	6/9/2023	13:28	6/13/2023	16:29	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.040	mg/L	06/09/2023	13:28	6/13/2023	16:29	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.003	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.015	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	0.002	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.024	mg/L	06/08/2023	12:52	6/14/2023	9:53	0.06

Laboratory Log Number: 23-28843 REPORT #: 2023-11513 Reviewed by: T. Duran J. Duran

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

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Environmental Chemists, Inc.

5602 Windmill Way, Wilmington, NC 28405 • 910.392.4223 Lab • 910.392.4424 Fax
710 Bowerstown Road, Morehead, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance reasons

Water System Number: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B02 **Tap Location:** Sample Station **Street Address:** 315 Ocean Blvd East **City:** Holden Beach

☑ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 9/6/2023 **TIME:** 9:39:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 524.2	0.001	0.006	mg/L	9/9/2023	18:04	9/14/2023	9:11	0.08
2943	Bromodichloromethane	EPA 524.2	0.001	0.015	mg/L	9/9/2023	18:04	9/14/2023	9:11	0.08
2942	Bromoform	EPA 524.2	0.001	<0.001	mg/L	9/9/2023	18:04	9/14/2023	9:11	0.08
2941	Chloroform	EPA 524.2	0.001	0.031	mg/L	9/11/2023	00:48	9/14/2023	9:11	0.08
	Total Trihalomethanes	EPA 524.2	0.001	0.052	mg/L	09/09/2023	18:04	9/14/2023	9:11	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.002	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.019	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.025	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06

Laboratory Log Number: 23-49338 REPORT #: 2023-20181 Reviewed by: Connie Sanders

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.3843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 9/6/2023 **TIME:** 9:28:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 524.2	0.001	0.006	mg/L	9/9/2023	17:35	9/14/2023	9:11	0.08
2943	Bromodichloromethane	EPA 524.2	0.001	0.015	mg/L	9/9/2023	17:35	9/14/2023	9:11	0.08
2942	Bromoform	EPA 524.2	0.001	<0.001	mg/L	9/9/2023	17:35	9/14/2023	9:11	0.08
2941	Chloroform	EPA 524.2	0.001	0.030	mg/L	9/11/2023	00:20	9/14/2023	9:11	0.08
	Total Trihalomethanes	EPA 524.2	0.001	0.051	mg/L	09/09/2023	17:35	9/14/2023	9:11	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.002	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.003	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.016	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	0.003	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.024	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06

Laboratory Log Number: 23-49337 REPORT #: 2023-20181 Reviewed by: Bonnie Sanders

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B02 **Tap Location:** Sample Station **Street Address:** 315 Ocean Blvd East **City:** Holden Beach

☑ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 9/6/2023 **TIME:** 9:39:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 524.2	0.001	0.006	mg/L	9/9/2023	18:04	9/14/2023	9:11	0.08
2943	Bromodichloromethane	EPA 524.2	0.001	0.015	mg/L	9/9/2023	18:04	9/14/2023	9:11	0.08
2942	Bromoform	EPA 524.2	0.001	<0.001	mg/L	9/9/2023	18:04	9/14/2023	9:11	0.08
2941	Chloroform	EPA 524.2	0.001	0.031	mg/L	9/11/2023	00:48	9/14/2023	9:11	0.08
	Total Trihalomethanes	EPA 524.2	0.001	0.052	mg/L	09/09/2023	18:04	9/14/2023	9:11	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.002	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.019	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.025	mg/L	09/11/2023	12:08	9/21/2023	11:35	0.06

Laboratory Log Number: 23-49338 REPORT #: 2023-20181 Reviewed by: Bonnie Sanders

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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6602 Windmill Way, Wilmington, NC 28405 • 910.392.0223 Lab • 910.392.4824 Fax
710 Bowertown Road, Morton, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.3843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: All applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

[X] Check if sample site is owned or controlled by water system [ ] Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 9/6/2023 **TIME:** 9:28:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 524.2	0.001	0.006	mg/L	9/9/2023	17:35	9/14/2023	9:11	0.08
2943	Bromodichloromethane	EPA 524.2	0.001	0.015	mg/L	9/9/2023	17:35	9/14/2023	9:11	0.08
2942	Bromoform	EPA 524.2	0.001	<0.001	mg/L	9/9/2023	17:35	9/14/2023	9:11	0.08
2941	Chloroform	EPA 524.2	0.001	0.030	mg/L	9/11/2023	00:20	9/14/2023	9:11	0.08
	Total Trihalomethanes	EPA 524.2	0.001	0.051	mg/L	09/09/2023	17:35	9/14/2023	9:11	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.002	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.003	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.016	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	0.003	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.024	mg/L	09/08/2023	11:00	9/19/2023	8:22	0.06

Laboratory Log Number: 23-49337 REPORT #: 2023-20181 Reviewed by: Bonnie Sanders

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

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6602 Windmill Way, Wilmington, NC 28405 • 910.392.0023 Lab • 910.392.4424 Fax
739 Buwaretown Road, Marion, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

info@environmentalchemists.com

TTHM/HAA5 - Stage 2

Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B01 **Tap Location:** Sample Station **Street Address:** 571 Ocean Blvd West **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 12/13/2023 **TIME:** 10:14:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

ABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.015	mg/L	12/19/2023	23:01	1/2/2024	16:08	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.017	mg/L	12/19/2023	23:01	1/2/2024	16:08	0.08
2942	Bromoform	EPA 502.2	0.001	0.004	mg/L	12/19/2023	23:01	1/2/2024	16:08	0.08
2941	Chloroform	EPA 502.2	0.001	0.016	mg/L	12/19/2023	23:01	1/2/2024	16:08	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.052	mg/L	12/19/2023	23:01	1/2/2024	16:08	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.006	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.005	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.013	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	<0.002	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.024	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06

Laboratory Log Number: 23-70684 REPORT #: 2023-29193 Reviewed by: Bonnie Sanders

*Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

Environmental Chemists, Inc.

6602 Windmill Way, Wilmington, NC 28405 • 910.392.0225 Lab • 910.392.4424 Fax
710 Bowsertown Road, Manteo, NC 27954 • 252.473.5702 Lab/Fax
255-A Wilmington Highway, Jacksonville, NC 28540 • 910.347.5843 Lab/Fax

ANALYTICAL & CONSULTING CHEMISTS

info@environmentalchemists.com

TTHM/HAA5 - Stage 2
Disinfection Byproducts Analysis

Note: ALL applicable information must be supplied for compliance credit

Water SystemNumber: NC 04-10-060 **County** Brunswick

Name of Water System: Town of Holden Beach

Sample Type: Routine Compliance **Facility ID:** D01

Sample Point: B02 **Tap Location:** Sample Station **Street Address:** 315 Ocean Blvd East **City:** Holden Beach

☒ Check if sample site is owned or controlled by water system ☐ Check if sample site is a daycare or K-12 school

Collected by: Chris Clemmons **DATE:** 12/13/2023 **TIME:** 10:28:00 AM

Mail Results to (water system representative):

Town of Holden Beach
110 Rothchild Street
Holden Beach NC 28462
Customer Number 09020017

Phone Number 910-279-5882
Fax Number:
Responsible Person's Email:
pworks@hbtownhall.com

LABORATORY ID #: 37729

CONTAM CODE	CONTAMINANT	METHOD CODE	REQUIRED REPORTING LIMIT	QUANTIFIED RESULTS		ANALYSIS STARTED		ANALYSIS COMPLETED		ALLOWABLE LIMIT
2944	Chlorodibromomethane	EPA 502.2	0.001	0.014	mg/L	12/19/2023	02:19	1/2/2024	16:08	0.08
2943	Bromodichloromethane	EPA 502.2	0.001	0.016	mg/L	12/19/2023	02:19	1/2/2024	16:08	0.08
2942	Bromoform	EPA 502.2	0.001	0.003	mg/L	12/19/2023	02:19	1/2/2024	16:08	0.08
2941	Chloroform	EPA 502.2	0.001	0.015	mg/L	12/19/2023	02:19	1/2/2024	16:08	0.08
	Total Trihalomethanes	EPA 502.2	0.001	0.048	mg/L	12/19/2023	02:19	1/2/2024	16:08	0.08
2454	Dibromoacetic Acid	EPA 552.2	0.001	0.006	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
2453	Monobromoacetic Acid	EPA 552.2	0.001	<0.001	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
2452	Trichloroacetic Acid	EPA 552.2	0.001	0.004	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
2451	Dichloroacetic Acid	EPA 552.2	0.001	0.014	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
2450	Monochloroacetic Acid	EPA 552.2	0.002	0.003	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06
	Total Haloacetic Acids	EPA 552.2	0.002	0.027	mg/L	12/19/2023	09:54	12/27/2023	10:43	0.06

Laboratory Log Number: 23-70689 REPORT #: 2023-29193 Reviewed by: Bonnie Santoro

Note: If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours of completion of the analyses for all required contaminants.

Comment:

Disinfectants and Disinfection Byproducts Rules Summary

RULE: 15A NCAC 18C Section .2008 – "Disinfectants and Disinfection Byproducts" (Note: Federal Rules 40 CFR 141.53, 141.54, 141.64, 141.65, 141 Subpart L, 141 Subpart U, and 141 Subpart V were incorporated into Section .2008 of North Carolina's Regulations by reference.)

APPLIES TO: Community water systems and non-transient non-community (NTNC) water systems that deliver water which has been treated with a disinfectant other than UV light [40 CFR 141.130(a)(1) and 141.620(b)]; some provisions of the rule only apply to systems utilizing chlorine dioxide or ozone. Transient systems that use chlorine dioxide are also subject to the monitoring requirements for chlorine dioxide and chlorite in Subpart L [40 CFR 141.130(a)(2)].

Requirements for All Community and NTNC Systems Subject to the Rule

- **Chlorine and Chloramine Monitoring**
  - Residual disinfectant monitoring requirements can be found in 40 CFR 141.132(c)(1).
- **Compliance with the Chlorine and Chloramine Maximum Residual Disinfectant Levels (MRDLs)**
  - Compliance is based on a running annual average as described in 40 CFR 141.133(c)(1).
- **Total Trihalomethanes (TTHM) and Haloacetic Acids (Five) (HAA5) Monitoring**
  - Monitoring schedules are based on population and source type [40 CFR 141.621, 141.623, and 141.625]. Monitoring charts that summarize the required schedules for routine, reduced, and increased monitoring as well as the requirements for going to and from reduced and increased monitoring are located on the Compliance Services webpage (https://deq.nc.gov/about/divisions/water-resources/drinking-water/compliance-services#dbp).
  - Samples must be collected from the locations and during the month(s) listed in your Stage 2 DBP Compliance Monitoring Plan (CMP). [40 CFR 141.621(a)(1)]
  - Samples must be collected during normal operating conditions. [40 CFR 141.132(a)(1)]
  - All samples collected from DBP compliance monitoring sites during normal operating conditions and analyzed in accordance with the Rules must be reported as compliance samples. [40 CFR 141.133(a)(2)]
- **Compliance with TTHM and HAA5 Maximum Contaminant Levels (MCLs)**
  - If the locational running annual average (LRAA) for TTHM or HAA5 exceeds the MCL at any sampling site, then the system is in violation of the MCL. [40 CFR 141.620(d)(1)]
    - The LRAA is a location specific RAA. LRAAs must be calculated for both TTHM and HAA5 at each sample point. Results from different locations are not averaged together under the Stage 2 DBP Rule.
  - For systems monitoring annually or triennially, if a sample exceeds the MCL then the system is required to go to increased monitoring and compliance with the MCLs will be evaluated once there are four quarters of results (or earlier if the LRAA would exceed the MCL regardless of future results). [40 CFR 141.620 (c)(7) and (d)(2)]
- **Subpart V Monitoring Plan Requirements**
  - Systems are required to have a DBP monitoring plan which must be completed prior to beginning monitoring for DBPs which must contain the following [40 CFR 141.622]:
    - Monitoring Locations
    - Monitoring Dates
    - Compliance Calculation Procedures
  - Stage 2 DBP Compliance Monitoring Plan (CMP) templates are available on the Compliance Services webpage.
  - CMPs are required to be kept on file for State and public review. [40 CFR 141.622(a)(1)]
  - Changes to the monitoring plan require consultation with the State, and the State can require modifications to your plan. [40 CFR 141.622(c)]
- **Operational Evaluation Levels (OELs)**
  - OELs are calculated by taking the sum of the two previous quarters' results plus twice the

current quarter's result and dividing by four for each contaminant and sample site. If an OEL exceeds the MCL for TTHM or HAA5, then the system has exceeded the operational evaluation level for that contaminant. [40 CFR 141.626(a)]

- When an OEL is exceeded, you must conduct an operational evaluation and submit a written report to the State no later than 90 days after being notified of the analytical result that causes the OEL exceedance. The report must be made available to the public upon request. [40 CFR 141.626(b)(1)]

Additional Requirements for Surface Water Systems Using Conventional Treatment

- **Disinfection Byproduct Precursor (DBPP) Monitoring**
  - Systems must monitor each treatment plant for raw water total organic carbon (TOC), raw water alkalinity, and treated water TOC. These samples are "paired samples" and must be collected at the same time and at a time representative of normal operation conditions. [40 CFR 141.132(d)(1)]
  - DBPP monitoring must be conducted monthly while on routine monitoring, and quarterly while on reduced monitoring. [40 CFR 141.132(d)]
- **Treatment Technique Requirements**
  - Systems must meet the TOC removal requirements specified in 40 CFR 141.135(b)(2).
  - Alternative compliance requirements may be used if the Step 1 removal requirement is not met as specified in 40 CFR 141.135.
- **Monitoring Plans**
  - DBPP monitoring locations and schedules must be included in the DBP monitoring plan. [40 CFR 141.132(f)(1)]
    - This is included in the standard form for the Stage 2 DBP Compliance Monitoring Plan on the Compliance Services webpage.

Additional Requirements for Systems Using Chlorine Dioxide (Including Transient Systems)

- **Daily Entry Point Monitoring**
  - Systems must collect daily chlorine dioxide and chlorite samples at the entry point. [40 CFR 141.132 (b)(2)(i)(A) and (c)(2)(i)]
- **Chlorite Distribution System Three-Sample Sets**
  - Chlorite three-sample sets must be collected at the following locations: near the first customer, at an average residence time location, and at a maximum residence time location. [40 CFR 141.132(b)(2)]
  - Three-sample sets must be collected monthly if on routine monitoring or quarterly if on reduced monitoring. [40 CFR 141.132(b)(2) (i)(B) and (iii)(B)]
  - An additional three-sample set is required on each day following an entry point chlorite sample exceeding the MCL. [40 CFR 141.132(b)(2)(ii)]
- **Additional Monitoring for Chlorine Dioxide**
  - Additional monitoring for chlorine dioxide is required on each day following an entry point chlorine dioxide sample exceeding the MRDL. [40 CFR 141.132(c)(2)(ii)]
- **Compliance with the Chlorite MCL**
  - If the average of any three-sample set exceeds the MCL, then the system is in violation of the MCL. [40 CFR 141.133(b)(3)]
- **Compliance with the Chlorine Dioxide MRDL**
  - Acute and non-acute violations can occur for chlorine dioxide MRDL exceedances as described in 40 CFR 141.133(c)(2).
- **Monitoring Plans**
  - Chlorine dioxide and chlorite monitoring locations and schedules must be included in the DBP

monitoring plan. [40 CFR 141.132(f)(1)]

- This is included in the standard form for the Stage 2 DBP Compliance Monitoring Plan on the Compliance Services webpage.

Additional Requirements for Systems Using Ozone

- **Bromate Monitoring**
  - Systems must collect bromate samples at the entry point monthly for routine monitoring or quarterly if on reduced monitoring. These samples must be collected while the ozonation system is operating under normal conditions. [40 CFR 141.132 (b)(3)]
- **Compliance with the Bromate MCL**
  - If the running annual average (RAA) for any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL. [40 CFR 141.133(b)(2)]
- **Monitoring Plans**
  - Bromate monitoring locations and schedules must be included in the DBP monitoring plan. [40 CFR 141.132(f)(1)]
    - This is included in the standard form for the Stage 2 DBP Compliance Monitoring Plan on the Compliance Services webpage.

Frequently Asked Questions

- **How do I get on reduced monitoring?**
  - If you believe your system meets the requirements for reduced monitoring, email the DBP rule manager your request for reduced monitoring. Make sure to include your water system ID number and which contaminant(s) you are requesting reduced monitoring for.
- **What is my monitoring schedule?**
  - Monitoring schedules can be checked online through PWS reports. Go to https://pws.ncwater.org/WSReports/Pages/External.aspx, click "Water System," enter your water system ID at the top, and click the "Sampling Status Report" icon.
- **How do I move a sample site?**
  - To move a DBP sample site, you will need to submit an updated CMP to the DBP rule manager for approval.
- **Can I collect additional samples?**
  - Yes, Additional compliance samples will be averaged when determining compliance.
- **Do special/non-compliance samples need to be submitted to the State?**
  - No; however, all samples meeting the rule requirements are considered compliance samples and need to be submitted to the State. Samples collected from site locations other than the compliance monitoring sites or samples that are not collected during normal operating conditions would be non-compliance samples and should not be submitted to the State.

For additional questions regarding the Disinfectants and Disinfection Byproducts Rules, please contact the D/DBP Rule Manager listed on the Compliance Services webpage.

C. BACTERIOLOGICAL TESTING

Appendix C

Bacteriological Testing
(Coliform Testing Sites)

REVISED TOTAL COLIFORM RULE [RTCR]

RULE: 15A NCAC 18C Section .1539 – "Revised Total Coliform Rule" (Note Federal Rule 40 CFR 141 Subpart Y was incorporated into Section .1539 of NC's Regulations by reference.)

APPLIES TO: All water systems including, community (C), non-transient non-community (NTNC), transient non-community (TNC), and adjacent non-public (NP) water systems.

SAMPLING REQUIREMENTS:

- **Sampling Location**: Distribution system
- **Required samples types**:
  - Total Coliform (TC) and E. *coli* (EC): Routine and Repeat samples, as necessary.
  - Chlorine or chloramine residuals: For each total coliform sample collected, systems that add a disinfectant must report the chemical used and disinfectant residual measured at the time of collection.
- **Sampling Frequency**:
  - Non-transient (NTNC) and transient non-community (TNC) water systems serving 1,000 or fewer people using only ground water (GW) – quarterly monitoring, unless the State requires system to begin increased monthly monitoring
  - Community (C) water systems serving 1,000 or fewer people using only ground water – monthly monitoring
  - Surface water (SW) and ground water under the direct influence (GWUDI) of surface water systems serving 1,000 or fewer people – monthly monitoring
  - All water systems including, community (C), non-transient non-community (NTNC), transient non-community (TNC), and adjacent non-public water systems serving more than 1,000 people – monthly monitoring
- **Number of Sample Required**:
  - Non-transient and transient non-community water systems serving 1,000 or fewer people using only ground water (GW) – 1 sample
  - Community (C) water systems serving 1,000 or fewer people using only ground water (GW) – 1 sample
  - Surface water (SW) and ground water under the direct influence of surface water (GWUDI) systems serving 1,000 or fewer people – 1 sample
  - All water systems including, community (C), non-transient non-community (NTNC), transient non-community (TNC), and adjacent non-public water systems serving more than 1,000 people – number of samples based on the population served by the system as in the table that follows:

Total Coliform Monitoring Frequency for Public Water Systems Serving More than 1,000 People			
Population Served	**Minimum Number of Samples per Month**	**Population Served**	**Minimum Number of Samples per Month**
1,001 to 2,500	2	70,001 to 83,000	80
2,501 to 3,300	3	83,001 to 96,000	90
3,301 to 4,100	4	96,001 to 130,000	100
4,101 to 4,900	5	130,001 to 220,000	120
4,901 to 5,800	6	220,001 to 320,000	150
5,801 to 6,700	7	320,001 to 450,000	180

6,701 to 7,600	8	450,001 to 600,000	210
7,601 to 8,500	9	600,001 to 780,000	240
8,501 to 12,900	10	780,001 to 970,000	270
12,901 to 17,200	15	970,001 to 1,230,000	300
17,201 to 21,500	20	1,230,001 to 1,520,000	330
21,501 to 25,000	25	1,520,001 to 1,850,000	360
25,001 to 33,000	30	1,850,001 to 2,270,000	390
33,001 to 41,000	40	2,270,001 to 3,020,000	420
41,001 to 50,000	50	3,020,001 to 3,960,000	450
50,001 to 59,000	60	3,960,001 or more	480
59,001 to 70,000	70		

- **Additional/Special Sampling Requirements:**
  - If a routine sample is found to be total coliform-positive, the system must collect a set of three repeat samples for each total coliform-positive sample. Repeat samples should be collected from the original positive location, a location within 5 service connections upstream, and a location within 5 service connections downstream. Repeat sample collection must continue at the same 3 locations until all repeat samples are total coliform-negative OR until the water system has a coliform treatment technique trigger which requires completion of an assessment.
  - If a routine sample is found to be total coliform-positive, ground water (GW) systems must collect a sample from each well in use at the time the routine total coliform-positive sample was collected. Ground water system serving 1,000 or fewer people with only one well may use the ground water sample as its repeat upstream location to satisfy both requirements. However, the ground water sample must be used in the calculation of the coliform treatment technique trigger if the sample is total coliform-present.
  - A system on quarterly monitoring must perform additional routine monitoring the month immediately following the routine total coliform-positive sample, collecting a total of three routine samples. If a routine total coliform-positive sample is collected at the end of the month and repeat sample collection falls into the next month, the three additional routines are still required to be collected the month after the original routine positive and so would be collected during the same month as the repeats.
  - A system on quarterly monitoring must immediately begin monthly monitoring the month after any of the following events occur: the system triggers a level 2 assessment or two level 1 assessments in a rolling 12-month period, the system has an E. *coli* MCL violation, the system has had an RTCR treatment technique violation, the system has two RTCR monitoring violations in a rolling 12-month period, or the system has one RTCR monitoring and one level 1 assessment in a rolling 12-month period. The system may be eligible to return to quarterly after 12 months of consistent monthly sampling. However, the system must remain on monthly monitoring until the state has performed a site visit and given written approval for the system to return to quarterly monitoring.

COMPLIANCE BASED ON:

- **Maximum Contaminant Level (MCL)** based on presence of E. *coli*. Samples must be confirmed by repeats. The following situations result in an E. *coli* MCL:
  - The system has an E. *coli*-positive repeat sample following a total coliform-positive routine sample.

- The system has a total coliform-positive repeat sample following an E. *coli*-positive routine samples.
- The system fails to take all required repeat samples following an E. *coli*-positive routine sample.
- The system fails to test for E. *coli* when any repeat sample is total-coliform positive.

- **Treatment Technique (TT)** based on presence of total coliform bacteria. For systems collecting fewer than 40 samples per month, the system has two or more total coliform-positive samples in the same monitoring period. For systems collecting 40 or more samples per month, the system exceeds 5.0% total coliform-positive samples during the monthly monitoring period.

INCOMING REPORT/PLAN SUBMITTALS FROM SYSTEMS TO THE STATE:

- **Analytical Results for All Compliance Samples** MUST be submitted to the State by NC certified laboratories in required format. (15 NCAC 18C Section .1525; [40 CFR 141.31])
- **Sample Siting/Location Plans:** All systems must develop a written sampling siting plan that identifies sampling sites and a sample collection schedule that are representative of water throughout the distribution system. Plans should be kept onsite. Although State approval is not required, the State may require that any system submit a plan and can require any changes in the plan elements.
- **Waiver Applications:** N/A
- **Monthly Operating Report:** N/A
- **Quarterly Status Reports and Corrective Action Plan Following MCL Violations:** When MCL violations are issued, a system must contact the State to have a Level 2 Assessment performed, documenting any sanitary defects and pathways for microbial contamination. Corrective actions must be completed for the identified issues.
- **Other Misc. Submittals if triggered by conditions of the rule**:
  - All systems must conduct an assessment after exceeding treatment technique triggers. A level 1 assessment is required if the system has had no other treatment technique triggers in the past 12 months. A level 2 assessment is required if the system has had two treatment technique trigger in the past 12 months OR if the system has had an MCL violation. Assessments must be conducted consistent with State requirements and documented on State provided assessment forms. A level 1 assessment may be completed by the state OR by a water system representative. A level 2 assessment must be completed by the State OR by a professional engineer or certified operator that has been approved by the State to conduct the assessment.
  - Seasonal systems operating for only a portion of the year that de-pressurize either partially or fully during the offseason are required to complete a State-approved start-up procedure prior to serving water to the public. Start-up procedures must be conducted consistent with State requirements and documented on State provided seasonal start-up forms. A total coliform-negative sample is required prior to serving water to the public and may be collected either as a compliance or noncompliance sample. A copy of the sample result should be submitted with the seasonal start-up form.

OUTGOING ENFORCEMENT/REPORTS/APPROVALS FROM STATE TO SYSTEMS:

- **Violation Letters:** Includes monitoring and reporting violations, MCL violations, treatment technique violations, failure to perform any follow-up actions, etc.

- MCL Violations: Tier 1 violations issued when presence of E. *coli* is confirmed by total coliform-present repeats or a failure to collect repeats.
- Treatment Technique Violations: Tier 2 violations issued when a system exceeds a treatment technique trigger and fails to conduct the required assessment or corrective actions within 30 days of the trigger or within an extended timeframe that was granted by the State. Also issued when a seasonal system that de-pressurizes either partially or fully during the offseason fails to complete a State-approved start-up procedure prior to serving water to the public.
- Monitoring and Reporting Violations: Tier 3 violations issued if a sample required under the rule is not collected or reported to the state within the specified time frame. Total coliform-absent samples are required to be submitted to the State by the 10th day of the month following the sample collection date. Total coliform-present and repeat samples are required to be submitted to the State within 48 hours after the analysis is completed. E. *coli*-present samples must be submitted to the state within 24 hours after the analysis is completed.

- **Administrative Orders**
- **Administrative Penalties**
- **Exceedance Letters:** N/A
- **Approvals**:
  - Sample Invalidation Requests
  - Return to Quarterly Monitoring Requests

(May 2019)

REVISED TOTAL COLIFORM RULE (RTCR) - SAMPLE SITING PLAN TEMPLATE

SYSTEM INFORMATION

SYSTEM NAME: Town of Holden Beach
WATER SYSTEM NUMBER: NC 0410060
ADDRESS: 110 Rothchild Street Holden Beach, NC 28462
COUNTY: Brunswick

SYSTEM TYPE: ☒ Community ☐ Non-Transient Non-Community ☐ Transient ☐ Non-Public

SEASONAL SYSTEM: ☐ Yes ☒ No

POPULATION SERVED: 6200
NUMBER OF SERVICE CONNECTIONS: 2441

SOURCE TYPE: ☐Surface Water or GWUDI ☒Purchase Surface Water/GWUDI

☐Ground Water ☐Purchase Ground Water

DISINFCTANT USED: ☐Chlorine ☒Chloramines ☐Chlorine Dioxide ☐None ☐Other: _____

RESIDUAL DISINFECTANT MEASURED: ☐Free Chlorine ☐Total Chlorine ☐None ☐Other: _____

SELLING FINISHED WATER: ☐ Yes ☒ No

ROUTINE SAMPLING INFORMATION

MINIMUM NUMBER OF REQUIRED ROUTINE SAMPLES / FREQUENCY: 7/MN

NUMBER OF EXTRA SAMPLES TO BE COLLECTED EACH COMPLIANCE PERIOD ABOVE MINIMUM: 0

LIST OF ROUTINE SAMPLE LOCATIONS AND MAXIMUM RESIDENCE TIME (*MRT) SITES: (Example)

Site Address	Tap Location	Routine Sample Location Code
315 Ocean Blvd East	Sampling Station	002
226 Ocean Blvd East	Sampling Station	201 /
210 Ocean Blvd East	Sampling Station	006
150 Ocean Blvd East	Sampling Station	009 /
110 Rothschild Street	Maintenance Garage	200 /
205 Ocean Blvd West	Sampling Station	017 /
265 Ocean Blvd West	Sampling Station	019 /
325 Ocean Blvd West	Sampling Station	021 /
375 Ocean Blvd West	Sampling Station	024
441 Ocean Blvd West	Pier	029
571 Ocean Blvd West	Sampling Station	139/B02 Bal
801 Ocean Blvd West	Sampling Station	044
866 Ocean Blvd West	Sampling Station	046
944 Ocean Blvd West	Sampling Station	051
1048 Ocean Blvd West	Sampling Station	055

1259 Ocean Blvd West	Sampling Station	053 063
MRT Site: 315 Ocean Blvd East	Sampling Station	002 B02
~~MRT Site: 1259 Ocean Blvd West~~ old Site	Sampling Station	063
MRT Site: 571 Ocean Blvd West	Sampling Station	139/B02 B01

*MRT Sites must be sampled in accordance with the requirements specified in 15A NCAC 18C .1302

SAMPLE COLLECTION SCHEDULE:

Monthly Samples: All 7 monthly samples will be collected by the first Wednesday of the first full week of each month.

SYSTEM NAME: Town of Holden Beach **WATER SYSTEM NUMBER: NC 0410060**

ROTATION CYCLE:

Schedule based on 2017 sampling data.

Month	Samples/ Month	Routine Sample Locations						
JAN	7	009	017	021	029	046	055	200
FEB	7	029	200	009	201	017	055	051
MAR	7	009	024	029	046	051	055	201
APR	7	009	019	021	029	051	055	201
MAY	7	200	017	021	024	055	029	009
JUN	7	009	200	055	021	029	044	017
JUL	7	009	200	017	055	019	029	051
AUG	7	044	029	201	009	055	200	051
SEP	7	024	201	009	200	017	019	021
OCT	7	029	200	009	201	044	055	063
NOV	7	200	009	201	002	055	046	017
DEC	7	029	019	017	009	200	055	051

REPEAT SAMPLING INFORMATION

REPEAT SAMPLE LOCATIONS - STANDARD OPERATING PROCEDURE:

If a routine sample result is total coliform positive or E. coli positive, three repeat samples must be collected for each positive routine sample. Repeat sampling locations include: a repeat original sample (RPOR) at the location where the original positive sample was taken; a repeat upstream sample (RPUP) within 5 service connections upstream of the original positive (towards the well/source of the water); and a repeat downstream sample (RPDN) within 5 service connections downstream of the original positive (away from the well/source of the water). The repeat sampling locations will be assigned unique location codes. This procedure is in place so that a repeat location can be selected based on availability and accessed quickly to ensure that the samples are collected as soon as possible, but no later than 24 hours from learning of the original positive. Note: If a routine positive sample is collected at a service connection on a dead end line, the downstream repeat location must be at the end of the service line, regardless of whether it is within five service connections.

REVISED TOTAL COLIFORM RULE – SAMPLE SITING PLAN GUIDANCE

The Revised Total Coliform Rule (RTCR) (15A NCAC 18C .1539) requires that systems develop a written Sample Siting Plan that identifies sampling sites and a sample collection schedule. These Plans are subject to State review and revision and must be available by no later than **March 31, 2016**. A copy of the Plan must be kept on site and be obtainable for review by the Public Water Supply Section's Regional Office staff during system inspections. If your system already has a Sample Siting Plan, it should be reviewed to ensure all requirements are met before the deadline.

The Plan must be detailed enough for the State reviewer to verify that the routine total coliform sampling sites are representative of water quality throughout the distribution system. The Plan must include information on routine and repeat sample locations and any sampling points necessary to meet the requirements of triggered source water monitoring under the Ground Water Rule (GWR). Note that for ground water systems serving 1,000 or fewer people and using a single well, use of a dual-purpose sample (repeat RTCR sample/triggered GWR source water sample) is approved by the State; thus, the source location can be used for compliance with both the RTCR and the GWR.

Sampling sites should be selected carefully to represent the varying conditions that occur within the distribution system. It is important to identify and include areas that may adversely affect the microbiological quality of the water such as low pressure zones, areas of low velocity, and dead-end lines.

An example Sample Siting Plan template is available on our website.

Factors to consider when preparing a Sample Siting Plan include:

- Location and type of water sources, treatment facilities, storage tanks, booster pump stations, blowoffs/flushing points, hydrants and critical valves;
- Distribution system's configuration and location of mains, branch lines, service connections, loops, dead-end pipes, sites of deteriorating water lines, and interconnections with purchase water systems;
- Cross-connection hazards and shared connections;
- Pressure zones and areas of low water pressure;
- Areas of low-velocity water movement;
- Varying population densities;
- Water age; and
- Avoiding undesirable conditions such as swivel type faucets, leaky faucets, faucets near or below ground, faucets with threads on the inside of their spouts, and faucets with aerators.

A properly completed Sample Siting Plan includes the following:

1. **System information** -
   - System name;
   - County;
   - Seven-digit Water System Number;
   - System type;
   - Total number of service connections;
   - Population count;
   - Minimum number of required routine samples (based on population – see Tables below);
   - List of routine sample location codes with corresponding addresses or site description;
   - List of repeat fixed sample location codes with addresses or site descriptions for each routine sample location OR provide the standard operating procedure (SOP) that will be used for the selection of repeat locations on a situational basis;
   - Frequency of required routine monitoring (e.g. 10 samples/month);
   - Sample collection schedule (e.g. 5 samples during week 2, and 5 samples during week 3 of each month);
   - Monthly rotation cycles (e.g. Sample locations 1-10 will be sampled during the 1st month of each quarter, locations 11-20 will be sampled during 2nd month of each quarter, and locations 21-30 will be sampled during the 3rd month of each quarter);
   - Treatment plant description and type of disinfectant used;
   - Date plan was prepared (and revision date, if applicable); and
   - Name, phone number and email address of the person who prepared or revised the plan.

2. **Distribution system map** – It is highly recommended that a distribution system map displaying the following information be included in your Sample Siting Plan:
   - Layout of distribution system's piping;
   - All water sources and entry points into the distribution system;
   - Treatment facilities, including booster stations;
   - Storage tanks and reservoirs;
   - Hydrant locations;
   - Dead-end mains and known trouble areas;
   - Locations of the routine coliform bacteriological sampling sites;
   - Maximum Residence Time (MRT) sites** and other areas with high water age (** MUST denote locations for measuring residual disinfectant concentrations as required under 15A NCAC 18C .1302).

Number of Sites and Sample Location Code Requirements:

- A minimum of five sites must be identified for small systems required to collect one routine sample per monitoring period.
- Larger systems that collect two or more samples per month must identify at least two to three times the number of sampling sites as required according to the system's population. Use the entire sampling location pool to establish monthly rotation cycles. (See Tables below for required number of routine samples based on population.)
- For systems with less than five (5) service connections, all service connections must be identified as a sample site.
- A location code must be developed for each sampling location. The codes for routine samples must be three characters using letters, numbers or a combination of both (for example: ABC, 002, or 1B3). Note: If there is a need for repeat sampling, the upstream and downstream sample location codes may have to be uniquely created at the time of collection if no routine sampling sites are located within 5 service connections upstream and downstream of the original positive. For example, a repeat sample collected upstream of the routine positive sample collected at location 002 might be coded as "002U". Likewise, the downstream sample would be "002D".
- Address information or a site description must be provided for each location code.

Community Water Systems:

Table 1 - Routine Total Coliform Monitoring Frequency for Community Water Systems

Population Served	Minimum Number of Samples per Month	Population Served	Minimum Number of Samples per Month
25 to 1,000	1	59,001 to 70,000	70
1,001 to 2,500	2	70,001 to 83,000	80
2,501 to 3,300	3	83,001 to 96,000	90
3,301 to 4,100	4	96,001 to 130,000	100
4,101 to 4,900	5	130,001 to 220,000	120
4,901 to 5,800	6	220,001 to 320,000	150
5,801 to 6,700	7	320,001 to 450,000	180
6,701 to 7,600	8	450,001 to 600,000	210
7,601 to 8,500	9	600,001 to 780,000	240
8,501 to 12,900	10	780,001 to 970,000	270
12,901 to 17,200	15	970,001 to 1,230,000	300
17,201 to 21,500	20	1,230,001 to 1,520,000	330
21,501 to 25,000	25	1,520,001 to 1,850,000	360
25,001 to 33,000	30	1,850,001 to 2,270,000	390
33,001 to 41,000	40	2,270,001 to 3,020,000	420
41,001 to 50,000	50	3,020,001 to 3,960,000	450
50,001 to 59,000	60	3,960,001 or more	480

Non-Community Water Systems:

Table 2 - Routine Total Coliform Monitoring Frequency for Non-Community Water Systems	
Population Served	**Minimum Number of Samples/Frequency**
Ground Water Systems	
1,000 or fewer people	1 sample / quarter [see §141.854(b)]
More than 1,000 people	same as community system based on population / month (see Table 1)
Surface Water and GWUDI (Subpart H) Systems	
1,000 or fewer people	1 sample / month [see §141.856(b)]
More than 1,000 people	same as community system based on population / month (see Table 1)

Seasonal Water Systems:

A seasonal system is a non-community water system that is not operated as a public water system on a year-round basis and starts up and shuts down at the beginning and end of each operating season. Seasonal systems must demonstrate completion of a State-approved start-up procedure prior to serving water to the public. North Carolina's Start-up Checklist procedures must be completed annually, prior to the system serving water to the public. Upon completion of the start-up procedures, submit the Checklist and Certification to the Public Water Supply Section to receive compliance credit.

Table 3 - Routine Total Coliform Monitoring Frequency for Seasonal Water Systems	
Population Served	**Minimum Number of Samples/Frequency**
All Public Water Systems that were activated on or after April 1, 2016	
1,000 or fewer people	1 sample / month (while in operation)
More than 1,000 people	same as community system based on population / month (while in operation) (see Table 1)
All Public Water Systems that were activated prior to April 1, 2016	Existing schedule as of March 31, 2016 (while in operation) unless triggered to increased monitoring on or after April 1, 2016, or unless otherwise directed by the State.

Important Notes on Routine Monitoring: [Section .1539, §141.853(a)]

- Routine samples should be collected at representative sites throughout the distribution system. Each routine sample should be collected from a different sampling site.
- Systems must collect samples at regular time intervals throughout the month, except that systems that use only ground water and serve 4,900 or fewer people may collect all required samples on a single day if they are taken from different sites.
- Monitoring may take place at customers' premises, at dedicated sampling stations, or at other approved compliance sampling locations. Avoid sample taps with obvious unsanitary conditions. Make sure the tap is properly disinfected and flushed before collecting a sample.
- Systems are encouraged not to wait until the last week of the compliance period to collect samples to avoid potential problems with timely collection and reporting of results to the State.

APPENDIX D NOTIFICATION REFERENCE

Appendix D

Notification Reference

(BOTH SIDES OF THIS NOTICE MUST BE COPIED AND DISTRIBUTED TO YOUR CUSTOMERS)

NOTICE TO THE PUBLIC

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Has Not Met Monitoring Requirements

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitorir are an indicator of whether or not our drinking water meets health standards. During the compliance period(s) specified the table below, we ['did not monitor or test' or 'did not complete all monitoring or testing'] for the contaminants listed ar therefore cannot be sure of the quality of your drinking water during that time.

CONTAMINANT GROUP**	FACILITY ID NO. / SAMPLE POINT ID	COMPLIANCE PERIOD BEGIN DATE	NO. OF SAMPLES / SAMPLING FREQUENCY	WHEN SAMPLES WERE TAKEN (Returned to Compliance)

** See back of this notice for further information on contaminants

What should I do? There is nothing you need to do at this time.

What is being done? [Describe corrective action]

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

For more information, please contact:

Responsible Person	System Name	System Address (Street)
Phone Number	System Number	System Address (City/State/Zip)

Violation Awareness Date: _____

Date Notice Distributed: _____ **Method of Distribution:** _____

Public Notification Certification:

The public water system named above hereby affirms that public notification has been provided to its consumers in accordance with all delivery, content, format, and deadline requirements specified in 15A NCAC 18C .1523.

Owner/Operator: _____ _____ _____

(Signature) (Print Name) (Date)

Contaminant Group List

(AS) Asbestos - includes testing for Total Asbestos.
(BA) Total Coliform Bacteria - includes testing for Total Coliform bacteria and *E.coli* bacteria. Testing for *E.coli* bacteria is required if total coliform is present in the sample.
(B) Bromate - includes testing for Bromate.
(CD) Chlorine Dioxide/Chlorite - includes testing for Chlorine Dioxide and/or Chlorite.
(DI) Disinfectant Residual must be tested with the collection of each compliance bacteriological sample, at the same time and site.
Fecal Indicators - includes *E.coli*, enterococci or coliphage.
(HAA5) - Haloacetic Acids - includes Monochloroacetic Acid, Dichloroacetic Acid, Trichloroacetic Acid, Monobromoacetic Acid, Dibromoacetic Acid.
(IOC) Inorganic chemicals - includes Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Iron, Manganese, Mercury, Nickel, pH, Selenium, Sodium, Sulfate, and Thallium.
(LC) Lead and Copper are tested by collecting the required number of samples and testing each of the samples for both lead and copper.
(NT) Nitrate/ (NI) Nitrite - includes testing for nitrate and/or nitrite.
(RA) Radionuclides - includes Gross Alpha, Radon, Uranium, Combined Radium, Radium 226, Radium 228, Potassium 40 (Total), Gross Beta, Tritium, Strontium 89, Strontium 90, Iodine 131, and Cesium 134.
(SOC) - Synthetic Organic Chemicals/Pesticides - includes 2,4-D, 2,4,5-TP (Silvex), Alachlor (Lasso), Atrazine, Benzo(a)pyrene, Carbofuran, Chlordane, Dalapon, Di(2-ethylhexyl)adipate, Di(2-ethylhexyl)phthalate, Dibromochloropropane (DBCP), Dinoseb, Endrin, Ethylene dibromide (EDB), Heptachlor, Heptachlor Epoxide, Hexachlorobenzene, Hexachlorocyclopentadiene, Lindane (BHC-Gamma), Methoxychlor, Oxamyl (Vydate), PCBs, Pentachlorophenol, Picloram, Simazine and Toxaphene.
(TOC) - Total Organic Carbon - includes testing for Alkalinity, Dissolved Organic Carbon (DOC), Total Organic Carbon (TOC) and Ultraviolet Absorption 254 (UV254). Source water samples must be tested for both TOC and Alkalinity. Treated water samples must be tested for TOC. Source water samples and treated water samples must be collected on the same day.
(TTHM) - Total Trihalomethanes - includes Chloroform, Bromoform, Bromodichloromethane, and Dibromochloromethane.
(VOC) - Volatile Organic Chemicals - includes 1,2,4-Trichlorobenzene, Cis-1,2-Dichloroethylene, Xylenes (Total), Dichloromethane, o-Dichlorobenzene, p-Dichlorobenzene, Vinyl Chloride, 1,1,-Dichloroethylene, Trans-1,2,-Dichloroethylene, 1,2-Dichloroethane, 1,1,1-Trichloroethane, Carbon Tetrachloride, 1,2-Dichloropropane, Trichloroethylene, 1,1,2-Trichloroethane, Tetrachloroethylene, Chlorobenzene, Benzene, Toluene, Ethylbenzene, and Styrene.
(WQP) Water Quality Parameters (for Lead and Copper Rule) - includes Calcium, Orthophosphate (as PO4), Silica, Conductivity, pH, Alkalinity and Water Temperature.

Instructions for Completing the Notice/Certification Form & for Performing Public Notice for Tier 3 Monitoring Violations

1. **Complete ALL the missing information on the "Notice to the Public."** (Note: Under the section of the notice entitled "What is being done?" describe corrective actions you took, or are taking. You may choose the appropriate language below, or develop your own:
   - We have since taken the required samples, as described in the last column of the table above. The sample results showed we are meeting drinking water standards.
   - We have since taken the required samples, as described in the last column of the table above. The sample for [contaminant] exceeded the limit. [Describe corrective action, use information from public notice prepared for violating the limit.]
   - We plan to take the required samples soon, as described in the last column of the table above.
2. **Provide public notification to your customers as soon as reasonably possible after you learn of the violation as follows:**

Community systems must use one of the following: • Hand or direct delivery • Mail, as a separate notice or included with the bill **For community systems**, this notice is appropriate for insertion in an annual notice or the Consumer Confidence Report (CCR), as long as public notification timing and delivery requirements are met [CFR 141.204(d)].	**Non-community** systems must use one of the following: • Posting in conspicuous locations • Hand delivery • Mail **For non-community systems**, if you post the notice, it must remain posted as long as the violation or situation persists; in no case should the notice be posted less than 7 days, even if the violation is resolved. [CFR 141.204(b)].
(Note: **Both** community and non-community systems must use *another* method reasonably calculated to reach others **IF** they would not be reached by one of the required methods listed above [CFR 141.204(c)]. Such methods could include newspapers, e-mail, or delivery to community organizations.	

   - **Both sides of this public notice/certification MUST be delivered to the persons served by the water system** in order for your customers to have access to the required **Contaminant Group List.**
   - If you mail, post, or hand deliver, print your notice on letterhead, if available.
   - Notify new billing customers or units prior to or at the time their service begins.
   - Provide multi-lingual notifications if 30% of the residents served are non-English speaking.
   - Should you decide not to use this enclosed notice and develop your own version instead, the mandatory language in ***bold italics*** may not be altered and you MUST include the ten required elements listed in CFR 141.205. A separate Public Notification Certification Form that is available on our web site or the certification located at the bottom of the sample notice provided MUST also be submitted.
3. **After issuing the "Notice to the Public" to your customers, sign and date the "Public Notification Certification" at the bottom of the notice. Within ten days after issuing the notice [CFR 141.31(d)], email the completed Public Notice/Certification form to PWSS.PN@ncdenr.gov <mailto:PWSS.PN@ncdenr.gov> or mail to the Public Water Supply Section, ATTN: Public Notification Rule Manager, 1634 Mail Service Center, Raleigh, NC 27699-1634 or use our new on-line ECERT application located on our website at: <https://pws.ncwater.org/ECERT/pages/default.aspx>. Keep a copy for your files.**

(08/2018)

E. CROSS CONNECTION & BACKFLOW CONTROL PROGRAM

Appendix E

Cross Connection and Backflow Control Program

STANDARD OPERATING

Town Of Holden Beach Cross Connection Ordinance:

The ordinance is designed to safeguard the Health Safety and Welfare of the citizens of Holden Beach, while providing compliance with the requirements under: (*Safe Drinking Water Act* (SDWA) (P.L. 93-523), the *North Carolina Administrative Code* (NCAC) (*Title 10, Chapter 10, Subchapter 10-D, Subparagraph .1006*), and the *North Carolina Building Code* (Volume II),

Town of Holden Beach

PUBLIC UTILITIES DEPARTMENT

CROSS-CONNECTIONS AND BACKFLOW PROTECTION POLICY

CONTENTS

Title: **CROSS-CONNECTION AND BACKFLOW PROTECTION POLICY**

A. **GENERAL** The intention of this policy to define the authority of the Town of Holden Beach, hereinafter referred to as the *Town*, as the water purveyor, in the elimination of all hazards, both actual and potential, to the potable water within the Town's public water supply system.

This ordinance will comply with the Federal *Safe Drinking Water Act* (SDWA) (P.L. 93-523), the *North Carolina Administrative Code* (NCAC) (*Title 10, Chapter 10, Subchapter 10-D, Subparagraph .1006*), and the *North Carolina Building Code* (Volume II) as they pertain to cross-connections with the public water supply system and will apply the principle that the degree of protection should be commensurate with the degree of the hazard or potential hazard to the public water supply system.

B. **PURPOSE** The purpose of this cross-connection and backflow protection policy for the Town's Public Utilities Department are as follows:

1. Protect the Town's public potable water supply against actual or potential contamination (i.e., cross-connections, backflow, backsiphonage) by isolating and containing, within the Consumer's premises or private property, contamination or pollution that has occurred or may occur because of some uncontrolled (i.e., undiscovered or unauthorized) cross-connection on the Consumer's premises or private property back into the public water supply.

2. Eliminate or control existing cross-connections, both actual and potential, (backflow, backsiphonage or any other source of water or process water used for any purpose whatsoever) which may jeopardize the potability of the Town's public water supply system.

3. Establish and maintain a continuing program of cross-connection control and inspection which will systematically and effectively prevent the contamination or pollution, either actual or potential, of all potable water systems connected to the Town's public water supply system.

4. Control cross-connections (i.e., backflow and backsiphonage) through cooperation between the Town and the Town's customers (Consumers). Responsibilities and duties of each will be set forth in this policy and their applicable regulations.

C. RESPONSIBILITIES. The Public Utilities Director, hereinafter referred to as *Director*, shall be responsible for the protection of the public potable water distribution system from contamination or pollution due to the backflow or backsiphonage of contaminants or pollution through the water service connection. If, in the judgment of the Director, or his duly appointed representative, an approved backflow prevention assembly is required (at the Consumer's water service connection; or, within the Consumer's private water system) for the safety of the water system, the Director, or his authorized representative, shall give notice, in writing, to said Consumer to install such an approved backflow prevention assembly(s) on his or her premises. The Consumer shall install, or have installed, within a period of time defined in this policy, such an approved backflow prevention assembly(s) at the Consumer's own expense. Failure, refusal, or inability on the part of the Consumer to install, have tested, and maintain said assembly(s), shall constitute grounds for enforcement (i.e., stipulated penalties, disconnection of water service, etc.) until such requirements have been satisfactorily met. Enforcement of this policy shall be administered by the Director or an authorized representative of the Town.

D. **DEFINITIONS**.

1. Air Gap (Separation). The term *"air gap"* shall mean a physical separation between the free flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An approved *"air gap"* shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the vessel, but in no case less than 1-inch (2.54 cm).

2. Approved. (1) The term *"approved"* as herein used in reference to water supply shall mean a water supply that has been approved by the North Carolina Division of Environmental Health, Public Water Supply Section. (2) The term *"approved"* as herein used in reference to an air gap, a double check valve assembly, a reduced pressure backflow prevention assembly or other backflow prevention assemblies or methods shall mean an approval by the Public Utilities Department based on a favorable report by an approved testing laboratory (i.e., FCCCHR-USC, Underwriters Laboratory, Factory Mutual, etc.).

3. Atmospheric Vacuum Breaker (AVB). A backflow prevention assembly used to prevent backsiphonage which is designed so as not to be subject to static line pressure. These devices are not approved in the Town's service areas except in special conditions approved by the Director, or by his authorized representative(s).

4. Auxiliary Water Supply. Any water supply on or available to the premises other than the purveyor's (Town) approved public water supply will be considered as an auxiliary water supply. These auxiliary waters may include, but not limited to, water from another purveyor's public potable water supply or any natural source(s) (i.e., well, spring, river, stream, pond, lake, re-use waters, or industrial fluids, etc.). These waters may be contaminated or polluted or they may be objectionable and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

42. Reduced Pressure Principle Detector Assembly (RPDA) (Approved). A specially designed assembly composed of a line-sized approved reduced pressure principle backflow prevention assembly with a specific bypass water meter and a meter-sized approved reduced pressure principle backflow prevention assembly. The meter shall register in U.S. gallons accurately for only very low rates of flow (up to three gallons per minute) and shall show a registration for all rates of flow. This assembly shall be used on fire protection systems.

43. **Service Connection**. The terminal end of a service connection from the public potable water system, (i.e., where the water purveyor may lose jurisdiction and sanitary control of the water at its point of delivery to the Consumer's water system). If a water meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the water meter.

44. **Thermal Expansion**. Expansion attributed to heating of water in an enclosed container such as a water heater.

45. **Unapproved Water Supply**. A water supply which has not been approved for human consumption by the State of North Carolina.

46. **Used Water**. Any water supplied by a water purveyor from a public potable water system to a Consumer's water system after it has passed through the service connection and is no longer under the control of the water purveyor (Town).

E. WATER SYSTEM.

1. The water system shall be considered as made up of two (2) parts: The Town's (water purveyor) System and the Consumer's System.

2. The source shall include all components of the facilities utilized in the treatment, storage, and delivery of water to the Town's distribution system.

3. The distribution system shall include the network of conduits used for the delivery of treated water from the source to the Consumer's System.

4. The Consumer's System shall include those parts of the facilities beyond the termination of the Town's distribution system (service connection) which are utilized in conveying potable water to points of use.

F. RIGHT OF ENTRY. The Director, or his authorized representative(s), shall have the right to enter any building, structure, or premises during normal business hours to perform any duty imposed upon him or her by this policy. These duties may include sampling and testing of water, or inspections and observations of all piping systems connected to the public water supply. Refusal to allow entry for these purposes shall result in enforcement action (disconnection of water services, stipulated penalties, etc.).

On request from the Director, the Consumer shall furnish to the Town any pertinent information regarding the water supply system on such property where cross-connections, either actual or potential, and backflow are deemed possible.

The Consumer's system should be open for inspection at all reasonable times to authorized representatives from the Town to determine whether unprotected cross-connections or other structural or sanitary hazards, including violations of this policy, exist. Refusal to allow entry for these purposes shall result in enforcement action (disconnection of water services, stipulated penalties, etc.). When such a condition becomes known, the Consumer shall be notified, in writing, to disconnect the unprotected cross-connection(s) within a time period established in this policy. The degree of protection required and the period of time required for conformance shall be commensurate with the actual or potential degree of hazard to the public potable water supply system.

1. Cross-connection with *private wells or other unapproved auxiliary water supplies* require immediate disconnection of unapproved source.

2. Cross-connection requiring correction through: (1) elimination, (2) air gap separation; (3) reduced pressure principle backflow prevention assembly (RP) or double check valve assembly (DCVA) for sizes 3/4" through 2" require thirty (30) day maximum conformance period.

3. Cross-connection requiring correction through reduced pressure principle backflow prevention assembly (RP) or double check valve assembly (DCVA) for sizes greater than 2" require one hundred twenty (120) day maximum conformance period.

4. Upon completion of the above requirements, the Consumer shall be required to submit, in writing, notification of compliance to the Director.

G. **BACKFLOW ASSEMBLY INSTALLATION.** An approved backflow prevention assembly shall also be installed, in accordance with manufacturer's installation instructions, on each Consumer's water system at or near the property line or immediately inside the building being served; but, in all cases, before the first branch line leading off the service line wherever the following conditions exist:

1. In the case of premises having: (1) internal cross-connections that can not be permanently corrected or protected against, or (2) intricate plumbing and piping arrangements or where entry to all portions of the premises is not readily accessible for inspection purposes, making it impracticable or impossible to ascertain whether or not dangerous cross-connections exits, the public water system shall be protected against backflow from the premises by installing and approved backflow prevention assembly in the service line commensurate with the degree of hazard.

5. Backflow. The undesirable reversal of flow of waters or mixtures of water and other liquids, gases, or other substances into the distribution lines of the potable supply of water from any source(s). See terms *Backpressure* and *Backsiphonage* (see D.9 and D.10, respectively).

6. **Backflow Prevention Assembly** (Approved). An assembly or means designed to prevent backflow into the potable water supply system. These assemblies shall be reviewed and approved by the Town and shall have been shown to meet or exceed the design and performance standards of the *American Society of Sanitary Engineers* (ASSE), *American Water Works Association* (AWWA), and/or the *Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California* (FCCCHR-USC). The approval of backflow prevention assemblies by the Public Utilities Department is based on a favorable report by an approved testing laboratory (i.e., FCCCHR-USC, Underwriters Laboratory, Factory Mutual, etc.), recommending such an approval. The following are approved methods for backflow prevention:

   a. *Air Gap (AG)* (see D.1);**Non Residential Use Only**

   b. *Reduced Pressure Principle Assembly (RP or RPZ)* (see D.41);

   c. *Double-Check Valve Assembly (DCVA)* (see D.23); **Pre-Approved Only**

   d. *Double-Check Detector Assembly* (fire system) (*DCDA*) (see D.22);

   e. *Reduced Pressure Principle-Detector Assembly* (fire system) (*RPDA*) (see D.42); and

   f. Pressure Vacuum Breaker (PVB) (see D.38).

7. **Backflow Prevention Assembly** (Unapproved). An assembly that has been investigated by the Town and has been determined to be unacceptable for installation within the Town's water system. Consideration for disapproval and removal from the "Approved List" shall be based upon, but not limited to, the following criteria:

   a. Poor performance standards (i.e., significant failure rate);
   b. Lack of or unavailability of repair parts; and/or,
   c. Poor service or response from assembly's manufacturing representative(s).

8. **Backflow Prevention Assembly Technician (Certified)**. A person that has proven his or her competency to the satisfaction of the State of North and is certified to make competent tests, or to repair, overhaul and make reports on backflow prevention assemblies shall be knowledgeable of applicable laws, rules, and regulation; shall be a licensed plumber or have had at least two (2) years experience under a licensed plumber

or plumbing contractor, or have equivalent qualifications acceptable to the State of North Carolina; and must hold a certificate of completion, from an acceptable training program (i.e. *NC AWWA*) in the testing, repair, and reporting of backflow prevention assemblies.

9. **Backpressure**. Backflow caused by a pump, elevated tank, boiler, or other means that could create pressure within the system greater than the supply pressure.

10. **Backsiphonage**. A reversal of the normal direction of flow in the lines due to a negative pressure (vacuum) being created in the supply line with the backflow source subject to atmospheric pressure.

11. **For Future Use.**

12. **Check Valve**. A device that is drip-tight in the normal direction of flow when the inlet pressure is at least one (1) psi and the outlet pressure is zero. The check valve shall permit no leakage in a direction reversed to the normal flow. The closure element (clapper, poppet, or other design) shall be internally spring loaded to promote rapid and positive closure. An approved check valve is just one component of an approved backflow prevention assembly (i.e., pressure vacuum breaker, double-check valve assembly, double-check detector assembly, reduced pressure principle assembly, or reduced pressure principle detector assembly).

13. **Consumer's Potable Water System**. That portion of the privately owned potable water system located between the point of delivery (service connection) and the point of use. This system shall include, but not limited to, the following: all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, store, or use potable water.

14. **Consumer's Water System**. Any water system located on the consumer's premises, whether supplied by a public potable water supply or an auxiliary water supply. The system or systems may be either a potable water system or an industrial piping system.

15. **Customer/Consumer**. Any person, firm, or corporation responsible for property at which water from the Town of Holden Beach public water supply system is received. In the absence of other parties or the failure of other parties to accept the responsibilities herein set forth, the owner of record shall be ultimately responsible.

16. **Containment**. Preventing the contamination/pollution of the public potable water supply by installing an approved backflow prevention assembly and /or method at the service connection. The term *"service protection"* shall mean the appropriate type or method of backflow protection at the service connection, commensurate with the degree of hazard of the consumer's potable water system.

17. Contamination. An impairment of the quality of the water which creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids, waste, etc.

18. Cross-Connection. Any unprotected, actual or potential connection or structural arrangement between a public or a Consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluids, gas, or substance other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel or change-over devices and other temporary or permanent devices through which or because of which backflow can or may occur are considered to be cross-connections. (1) The term *"direct cross-connection"* shall mean a cross-connection which is subject to both backsiphonage and backpressure. (2) The term *"indirect cross-connection"* shall mean a cross-connection which is subject to backsiphonage only.

19. **For Future Use**

20. **Cross-Connection, Direct**. Any arrangement of pipes, hoses, fixtures, or devices connecting a potable water supply to a non-potable source which is permanent (i.e., a boiler feed line connected directly to potable water line, etc.). This definition does not apply to any Town, municipal or volunteer personnel engaged in public fire protection.

21. **Cross-Connection, Indirect**. Any arrangement of pipes, hoses, fittings, or fixtures that may be temporary in nature (i.e., garden hose; hose connected directly to a fire hydrant for filling a tank, etc.) connecting to a potable water supply to a non-potable supply.

22. Director. Town of Holden Beach, Public Works Director, his successor or designee(s).

23. **Double-Check Valve Detector Assembly (DCDA)** (Approved). A double-check valve assembly, with a specific bypass water meter and a meter-sized approved double-check valve assembly. The meter shall register in U.S. gallons accurately for only very low rates of flow (up to 3-gallons per minute) and shall show a registration for all rates of flow. The unit shall include tightly closing shut-off valves located at each end of the assembly and each assembly shall be fitted with properly located test cocks. This assembly shall be used to protect against a non-health hazard on fire line systems.

24. **Double-Check Valve Assembly (DCVA)** (Approved). Any assembly composed of two (2) independently acting, approved check valves, including tightly closing resilient seated shut-off valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve.

25. Dual Check Valve. A self-closing device designed to permit flow in one (1) direction and close if there is a reversal of flow. A dual check valve is not an in-line testable device and is only allowed for residential use in ¾" and 1" meter assemblies, excluding irrigation systems.

26. Dwelling Unit. One or more rooms together, constituting a separate, independent housekeeping establishment for owner occupancy, or rental or lease on a weekly, monthly, or longer basis, and physically separated from other rooms or dwelling units which may be in the same structure, and containing independent cooking and sleeping facilities.

27. Fire System. A system of piping which may include sprinklers, hose connections, hydrants, or fixed spray nozzles that may be wet or dry, open or closed for the use of suppressing fires.

28. **Hazard, Degree of**. Either a pollutional (non-health) or contamination (health) hazard and is derived from the evaluation of conditions within a system. (1) *Health* - An actual or potential threat of contamination of a physical or toxic nature to the public potable water system or the Consumer's potable water system that would be a danger to health. (2) *Plumbing* - An internal or plumbing type cross-connection in a Consumer's potable water system that may be either a pollutional or a contamination type hazard. This includes, but not limited, to cross-connection to toilets, sinks, lavatories, wash trays and lawn sprinkling systems. Plumbing type cross-connections can be located in many types of structures including homes, apartment houses, hotels, and commercial or industrial establishments. Such a connection, if permitted to exist, must be properly protected by an appropriate type of backflow prevention assembly. (3) *Pollutional* - An actual or potential threat to the physical properties of the water system or the potability of the public or the Consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree or intensity of pollution to which the potable water system could be degraded under this definition would cause nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances. (4) *System* - An actual or potential threat of severe danger to the physical properties of the public or the Consumer's potable water system or of a pollution or contamination which would have a protracted effect on the quality of the potable water in the system.

29. **Industrial Fluids**. Deleted

30. **Industrial Piping System** Deleted

31. **Interconnection**. A connection between the Town's potable water supply system and an uncontrollable source of water, such as a private well. Interconnections are strictly PROHIBITED by this policy and State codes.

32. **Isolation**. The act of confining a localized hazard within a Consumer's water system by installing approved backflow prevention assemblies, or devices. The Town of may make recommendations, upon facility inspection, as to the usage of isolation devices/assemblies, but does not assume or have responsibility whatsoever for such installations.

33. **Laboratory, Testing** (Approved). Refers to *the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California* (FCCCHR-USC) or another lab having the equivalent facilities for both the laboratory and field evaluation of the assemblies approved by the AWWA and/or ASSE.

34. **Non-Potable Water**. A water supply which has not been approved for human consumption by the North Carolina, Division of Environmental Health, Public Water Supply Section.

35. **Pollution**. An impairment of the quality of the water to a degree which does not create a hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use.

36. **Potable Water**. Any public potable water supply which has been investigated and approved by the State of North Carolina Division of Environmental Health, Public Water Supply Section. The system must be operating under a valid health permit. In determining what constitutes an approved water supply, the North Carolina Division of Environmental Health, Public Water Supply Section has final judgment as to its safety and potability.

37. **Premises**. A building, complex or any other location that receives water provided by the Town of Holden Beach.

38. **Pressure Vacuum Breaker (PVB)** (Approved). A backflow prevention assembly suitable for continuous pressure, to be used to provide protection against backsiphonage.

39. **Public Potable Water System**. Any publicly or privately owned water system operated as a public utility, under a current permit, to supply water for domestic purposes. This system will include all sources, facilities, and appurtenances between the source and the point of delivery (service connection) such as valves, pumps, pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, treat, or store a potable water for public consumption or use.

40. **Purveyor, Water**. Owner or operator of a public potable water system, providing an Approved water supply to the public and permitted by the State of North Carolina to do So.

41. **Reduced Pressure Principle Prevention Assembly (RPZ or RP)** (Approved). An assembly containing two (2) independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit shall include properly located resilient seated test cocks and tightly closing resilient seated shut off valves at each end of the assembly. This assembly is designed to protect against a non-health (i.e., pollutant) or a health (i.e., contaminant). This assembly shall not be used for backflow protection of sewage or reclaimed water.

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Ownership, testing, and perpetual maintenance of the backflow prevention assemblies shall be the responsibility of the Consumer. All reduced pressure principle assemblies (RP) and double check valve assemblies (DCVA) shall be installed above ground in a protective enclosure or inside the building, if the building is less than 200 linear feet from the water main serving the Consumer. Pit and/or below grade installations are **PROHIBITED**. (Test and Maintenance of Backflow Prevention Assemblies, (RPZ) Valves, shall be the responsibility of the water Purveyor and compensated through Town's billing. The installer shall be responsible to ensure that the assembly is installed and working properly and shall furnish the following information to the Public Works Director within five (5) working days after a backflow prevention assembly is installed:

a. Owners name, address, phone number, and responsible contact.
b. Assembly location (specific).
c. Date of installation.
d. Installer's name, address, and phone number.
e. Installer's certification number.
f. Type of assembly.
g. Manufacturer.
h. Model number.
i. Serial number.
j. Inspected.

*All reduced pressure principle assemblies (RP) and double check valve assemblies (DCVA) are required to be inspected following installation by a purveyor.

All commercial and industrial Consumers connected to the public potable water system of the Town on or before the effective date of this policy, upon notification from the Town, shall Install or have installed an approved backflow prevention (containment) assembly, Commensurate with the degree of hazard. The period allowed for this installation shall <u>not</u> Exceed the following:

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Degree of Hazard	Time Frame, days
2" Service or Smaller:	
Low	60
Medium	60
High	30
Service Greater Than 2":	
Low	180
Medium	180
High	120

Submit plans and specifications sealed by a registered engineer to the Director for review and approval. Acquire all necessary permits prior to installation. Upon satisfactory installation of approved backflow prevention assembly and appurtenances, forward a certificate of completion to the Director.

H. **TYPE OF BACKFLOW ASSEMBLY**. The type of backflow prevention assembly to be installed to protect the public potable water supply required by this ordinance shall be commensurate with the degree of, either actual or potential, hazard. Any backflow prevention assembly required herein shall be a make, model, and size approved by the Town. The term *"approved backflow assembly"* shall mean an assembly that has been manufactured in full conformance with the standards established by the American Water Works Association (AWWA) entitled:

I. **TESTING & MAINTENANCE**. It shall be the responsibility of the Purveyor at any premise where backflow prevention assemblies are installed to have a field test performed by a certified backflow prevention assembly technician (tester) appointed by the Town of Holden Beach at least once per year for the life of the assembly. In instances where the Director deems the hazard to be great enough he may require field tests at more frequent intervals. These tests shall be at the expense of the Consumer (water user) and shall be performed by a certified technician (tester) approved by the State of North Carolina and Town of Holden Beach. It shall be the responsibility of the Director, or his authorized representative, to see that these tests are conducted in a timely manner.

All tests must be completed once a year. If problems are detected with the backflow prevention assembly(s), it is the responsibility of the Consumer to report these discrepancies to the Director within five (5) working days of detection. These assemblies shall be repaired, overhauled, or replaced at the expense of the Consumer whenever said assembly(s) are found to be defective. Records of such tests, repairs, overhauls, and replacements shall be kept by the purveyor and shall be made available to the consumer if requested.

All presently installed backflow prevention assemblies which do not meet the requirements of this ordinance but were approved devices for the purposes described herein at the time of the installation and which have been properly maintained, shall, except for the testing and maintenance requirements, be excluded from the requirements of this policy as long as the Director is assured that the affected backflow prevention devices/assemblies will satisfactorily protect the Town's water supply system. Whenever the existing device/assembly is moved from the present location or requires more than minimum maintenance or when the Director determines that the maintenance constitutes a hazard to health, the device/assembly in question shall be replaced with an approved backflow prevention assembly meeting or exceeding the requirements of this policy at the Consumer's expense.

When it is not possible to interrupt water service, provisions shall be made for a *"parallel installation"* of backflow prevention assemblies. The Director shall not accept an unprotected bypass around a backflow prevention assembly when the assembly is in need of testing, repair, or replacement.

When repair work is required on any approved backflow prevention assembly, whether determined through testing or routine inspection by the town , these repairs shall be completed within a specified period of time Commensurate with the degree of hazard at the Consumer's expense. In no case shall this period of time exceed thirty (30) days.

J. **CATEGORICAL FACILITIES** Approved backflow prevention assemblies shall be installed on the service connection to any premises that the Town has identified as having a potential for backflow, including but not limited to, the following:

1. Amusement Parks.
2. Automotive Plants.
3. Automotive Service Stations (dealerships, repair shops, etc.).
4. Auxiliary Water System.
5. Private Water Supply.
6. "Used Water", "Re-Use Water" and "Industrial Fluids".
7. Bakeries.
8. Beauty Shops/Barber Shops.
9. Beverage Bottling Plants.
10. Breweries.
11. Buildings (hotels, motels, apartments, public and private buildings or other structures having unprotected cross-connections).
12. Buildings of Five (5) or more stories above ground level.
13. Canneries, Packing Houses, and Rendering Plants.
14. Chemical Plants (manufacturing, processing, and compounding or treatment).
15. Chemically Contaminated Water System.
16. Commercial Car Washing Facilities.

17. Commercial Greenhouses.
18. Commercial Laboratories.
19. Commercial Sales Establishments (department stores, malls, etc.).
20. Concrete/Asphalt Plants.
21. Dairies and Cold Storage Plants.
22. Electroplating Processes.
23. Film Laboratories.
24. Fire Systems.
23. Hospitals, Medicall Buildings, Sanitariums, Morgues, Mortuaries, Autopsy Facilities, Funeral Homes, Nursing & Convalescent Homes, Medical Clinics and Veterinary Hospitals.
24. Industrial Facilities.
25. Irrigation Systems (lawn, commercial, etc.).
26. Laundries and Dye Works.
27. Metal Manufacturing, Cleaning, Processing, and Fabricating Plants.
28. Mobile Home Parks.
29. Motion Picture Studios.
30. Oil and Gas Production, Storage or Transmission Properties.
31. Painting and Staining Operations Related to Finished Woods and Metals.
32. Paper and Paper Product Plants.
33. Pest Control (exterminating & fumigating).
34. Pharmaceutical Manufacturing.
35. Plating Plants & Facilities.
36. Plastic Molding Facilities.
37. Power Plants.
38. Radioactive Materials or Substances (plants or facilities handling).
39. Restaurants.
40. Restricted, Classified, or Other Closed Facilities.
41. Rubber Plants (natural & synthetic).
42. Sand and Gravel Plants.
43. Schools and Colleges.
44. Swimming Pools.
45. Water Treatment Facilities
46. Waterfront & Port Facilities & Industries.
47. Wastewater Treatment and Storm Drainage Facilities.
48. Weaving, Spinning Operations.
49. Other premises specified by the Director, or his authorized representative, when the cause can be shown that a potential cross-connection hazard, not enumerated in the above list, exists.

All backflow prevention assemblies and installations shall be subject to approval and inspection by the Town.

K. **CONNECTION TO UNAPPROVED WATER SUPPLIES**. No person shall connect or cause to be connected any supply of water not approved by the State of North Carolina to the public potable water supplied by the Town. Any such connection allowed by the Town must be in conformance with the backflow prevention requirements set forth in this policy.

L. **FIRE PROTECTION SYSTEMS**. All connections to fire sprinkler systems hereinafter connected with the public water supply system shall be protected with an approved backflow prevention assembly (i.e., double check valve detection assembly, etc.) in conformance with specific standards established by the *American Water Works Association* (*AWWA*) (or subsequent versions) and the *National Fire Prevention Association* (*NFPA*) (or subsequent revisions). All fire systems using toxic additives or booster pumping facilities shall be required to be protected with an approved reduced pressure principle detector assembly (RPDA) at the main.

Except for an eminent health hazard as defined herein, as determined by the Director, or his authorized representative, any fire sprinkler system connected with the public potable water system of the Town on or before the effective date of this policy, shall have twenty-four (24) months to get into conformance with the provisions of this policy.

M. **CONTROLLED CROSS-CONNECTIONS (TEMPORARY)**. The purpose of this section is to describe an acceptable use of a controlled cross-connection (temporary) between the Town's water supply system and a non-potable source (i.e., filling a tank or tanker from a fire hydrant for use other than fire protection). This shall be accomplished through the use of an approved meter and a reduced pressure principle assembly (RP) or an air gap properly installed and maintained so that it will continuously afford the required protection. At no time shall this temporary cross-connection be unprotected.

N. **ENFORCEMENT**. Any person, firm, or corporation responsible for an installation or action found not to be in compliance with this policy shall be issued a Notice of Violation (NOV) specifying corrective action, if required, enforcement action to be taken by the Town, if required, and a specified period of time to achieve compliance, if required.

As provided herein, termination of water service is a remedy available to the Town to enforce any of the provisions of this policy. A violation of any of the provisions of this policy shall constitute a misdemeanor, punishable as provided in G.S. Section 14-4, with a fine not to exceed five hundred dollars ($500). Enforcement of this program shall be administered by the Director or by an authorized

1. **Direct Cross-Connection** - Any installation which remains in noncompliance after notice is given and the time prescribed in ***Section G.3*** shall be considered in violation of this policy and shall realize the disconnection of water service(s) until compliance is achieved and/or possible legal action. In addition, any person who shall continue any violation beyond the time limit provided for in the aforementioned NOV and ***Section G.3*** shall be subject to a penalty in the amount not to exceed one-hundred dollars ($100) for each violation. Each day in which any violation continues after the offender has been notified of the violation shall be deemed a separate offense.

2. **Indirect Cross-Connection** - Any installation or action found to be in noncompliance of this policy shall be considered in violation of the same. In addition, any person found to be in violation of this policy shall be fined in the amount not to exceed one-thousand dollars ($1000) for each violation. If the installation or action involves the theft of water said offender shall be charged according to state and local law and shall pay, in full, the cost for the estimated usage (See rate schedule currently in force) to the Town.

3. *Appeals of a violtation*. Any owner who has received an order under the enforcement section of this code may appeal from the order in writing to the Town's Clerk and Town Manager within 10 days of receipt of notice, in the absents of an appeal the order of the purveyor or his designee shall be final. The city council shall hear and render a decision in a reasonable time. Enforcement of this program shall be administered by the Director or by an authorized Representative.

The Town Manager, or his authorized representative, is authorized to make all necessary and reasonable rules and policies with respect to the enforcement of this policy. All such rules and Policies shall be consistent with the provisions of this policy and shall be effective upon the date of adoption by the Town of Board of Commissioners.

Any provision of this ordinance that make unlawful a condition existing upon or use made of real property may be enforced by injunction and order of abatement Pursuant to GS 160A-175(e).

The foregoing standard policy is hereby adopted by the Town of Holden Beach

F. ASBESTOS MONITORING / WAIVER APPROVAL

Appendix F

Asbestos Monitoring Waiver Approval

EMSL Analytical, Inc.

2800 Gateway Centre Blvd. Suite 600
Morrisville, NC 27560
(919)405-8900

ASBESTOS ANALYSIS - Distribution System

Note: All information must be supplied for compliance credit

Water System Number: NC04-10-060 **County: Brunswick**

Name of Water System: Town of Holden Beach

Sample Type: ☑ **Distribution (Compliance)** ☐ **Non-compliance**

Location Code: ASB **Tap Location: 055** **Street Address: 1048 Ocean Blvd West** **City: Holden Beach**

Check (√) if sample site is owned or controlled by water system. ☑

Check (√) if sample site is a daycare or a K-12 school. ☐

Collection Date (mm/dd/yyyy)	Collection Time (Specify AM or PM)
11/09/2022	08:30 AM

Facility ID No. (Distribution): D 0 1

Sample Point: ASB

Collected By: Chris Clemmons
(Please Print)

Mail Results to (water system representative):

Envirochem

6602 Windmill Way

Wilmington, NC 28405

Phone #: ( )

Fax #: ( )

Responsible Person's email:

Laboratory ID #: 3 7 7 9 2

Contam Code	Contaminant	Method Code	Required Reporting Limit (R.R.L.)	Analysis Started	Analysis Ended	Not Detected (i.e.< R.R.L)	Quantified Results [1, 2]	Allowable Limit
1094	ASBESTOS	100.2	0.2 MFL	11/10/2022 3:38 PM	11/23/2022 10:00 AM	☑	MFL	7 MFL

Notes: [1] MFL = Million Fibers per Liter > 10 µm.
[2] If result exceeds the allowable limit, the laboratory must report the analytical results to the State within 48 hours.

Laboratory Log #: 292209881

Certified By: Billy Barnes Billy Barnes
(Print and sign name)

COMMENTS: 22-22365/54854

ASBESTOS WAIVER REQUEST FOR DISTRIBUTION SYSTEM MONITORING

Note: This form must be completed by the system owner or designated person in responsible charge.

Water System Name:		Water System Number:
Owner:		County:
Address:	City:	State and Zip Code:

To request an asbestos monitoring waiver for your distribution system, complete all of the following:

1. Complete the Construction Materials Report below - check each box indicating the type of construction materials present in your distribution system, service lines, and home plumbing. If any other material is present in the system, check the box next to "Other" and list the material;
2. Complete all information in the Certification box - be sure to indicate whether or not the source water is in an asbestos vulnerable county (circle appropriate response); and
3. Submit the completed form to the Asbestos Rule Manager at the address located at the bottom of the page.

IMPORTANT NOTE: Until your request has been approved, your system will be placed on a routine monitoring schedule and will be required to perform asbestos monitoring in your distribution system by **December 31, 2022**. If your system is located in an asbestos vulnerable county and this waiver request is approved for your distribution system, you must still perform asbestos monitoring at each entry point by the December 31, 2022 deadline. You will be notified in writing as to whether or not a waiver has been approved for your distribution system. ***Please keep a copy for your records.***

Construction Materials Report

☐ Lead pipe, piping with lead-lined interior, or lead joint pipe in the distribution mains	☐ Copper from piping and alloys, service lines and home plumbing
☐ Lead service lines (water main to meter and/or meter to customer's building)	☐ Glass
☐ Lead goosenecks/pigtails	☐ Coal tar lined pipes and tanks
☐ Lead from solder, caulking, alloys and home plumbing	☐ Asbestos cement pipe
☐ Galvanized piping, service lines, and home plumbing	☐ Vinyl lined asbestos cement pipe
☐ Brass	☐ Cement (non-asbestos)
Ferrous piping materials ☐ Steel ☐ Cast Iron ☐ Ductile Iron	Plastic ☐ PVC ☐ Polybutylene ☐ Polyethylene or Cross-linked polyethylene (PEX)
☐ Other:	

Certification

County Location of System's Source Water: _____

Based upon the above Construction Materials Report and the fact that our system's source(s) water ***Is / Is not*** (please circle one) *located in one of the asbestos vulnerable counties* (listed on back of this form), *I am requesting a distribution system asbestos waiver for the nine-year period of January 1, 2020 through December 31, 2028. I understand that if my system is located in an asbestos vulnerable county, I must still sample for asbestos at each entry point by the December 31, 2022 deadline.*

Form Completed by: _____ _____
(Print Name) (Signature)

System Affiliation of Person Completing This Form: ☐ Owner or ☐ Responsible person

Phone Number: _____ Email: _____ Date Completed: _____

Return this form to: Public Water Supply Section, 1634 Mail Service Center, Raleigh, NC 27699-1634
(Attention: Asbestos Rule Manager)

05/2019

IMPORTANT NOTE: If your system is located in one of the asbestos vulnerable counties listed below and this waiver request is approved for your distribution system, you must still perform asbestos monitoring at each entry point to the distribution system by the **December 31, 2022** deadline.

Asbestos Vulnerable Counties

03	Alleghany
05	Ashe
06	Avery
11	Buncombe
12	Burke
13	Cabarrus
17	Caswell
18	Catawba
22	Clay
29	Davidson
30	Davie
34	Forsyth
39	Granville
41	Guilford
42	Halifax
44	Haywood
49	Iredell
50	Jackson
57	Macon
58	Madison
60	Mecklenburg
61	Mitchell
80	Rowan
88	Transylvania
90	Union
91	Vance
92	Wake (north corridor*)
99	Yadkin

***The Wake County "north corridor" is bounded by longitudes 78°33' to 78°49' and latitudes 35°52' to 36°05'**

G. MONITORING SCHEDULE

Appendix G

Monitoring Schedule

Water System Detail Information

Water System No.:	NC0410060	Federal Type:	C
Water System Name:	HOLDEN BEACH, TOWN OF	Federal Source:	SWP
Principal County Served:	BRUNSWICK	System Status:	A
Principal City Served:	HOLDEN BEACH	Activity Date:	06-01-1980

Water System Contacts

Type	Contact	Communication
AC - Administrative Contact	CLEMMONS, CHRIS 110 ROTHSCHILD ST HOLDEN BEACH, NC 28462-5037	Phone Type: BUS - Business; Value: 910-842-6488
EC - Emergency Contact	CLEMMONS, CHRIS 110 ROTHSCHILD ST HOLDEN BEACH, NC 28462-5037	Phone Type: BUS - Business; Value: 910-842-6488
EC - Emergency Contact	CUNNINGHAM, SCOTT ,	
OW - Owner	HOLDEN BEACH, TOWN OF 110 ROTHSCHILD ST ATTN: DAVID HEWETT, TOWN MANAGER HOLDEN BEACH, NC 28462-5037	Phone Type: BUS - Business; Value: 910-842-6488
PL - Physical Location Contact	NC0410060 - LOCATION 1044 SABBATH HOME RD	

HOLDEN BEACH, NC 28462

Annual Operating Period(s)

Eff. Begin Date	Eff. End Date	Start Month/Day	End Month/Day	Type	Population
11-01-2023	No End Date	1/1	12/31	R	6299

Service Connection(s)

Type	Count	Meter Type	Meter Size
RS	2480	ME	0

Service Area(s)

Code	Name
R	RESIDENTIAL AREA

Water System Facilities

Fac. ID	Facility Name	Type Status Avail.	Unit Process Name Treatment Objective Name Treatment Process Name
001A	BRUNSWICK COUNTY WATER SYSTEM A	CC - A - P	
001B	BRUNSWICK COUNTY WATER SYSTEM B	CC - A - P	
D01	DISTRIBUTION SYSTEM	DS - A - P	
L01	STORAGE_ELEVATED	ST - A - P	

Water System Facility Flows

Supplying Facility ID No.	Supplying Facility Name	Receiving Facility ID No.	Receiving Facility Name
CC - 001A	BRUNSWICK COUNTY WATER SYSTEM A	DS - D01	DISTRIBUTION SYSTEM

CC - 001B	BRUNSWICK COUNTY WATER SYSTEM B	DS - D01	DISTRIBUTION SYSTEM

Water Purchases

Water System No.	Water System Name	Water Finish
NC0410045	BRUNSWICK COUNTY WATER SYSTEM	Finished Water
NC0410045	BRUNSWICK COUNTY WATER SYSTEM	Finished Water

Buyers of Water

Water System No.	Name

No Buyers

Routine TCR Sample Schedules

Begin Date	End Date	Requirements
07-01-2016	Continuous	7 RT/MN
02-01-2014	06-30-2016	6 RT/MN
02-01-2013	01-31-2014	7 RT/MN
01-01-1991	01-31-2013	6 RT/MN

Repeat TCR Sample Schedules

Begin Date	End Date	Requirements	Original Sample ID/Date

No Repeat TCR Schedules

Group Non-TCR Sample Schedules

Facility	Begin/End Date	Init MP Begin Dt	Seasonal	State Year	Req.	Code	Analyte Group Name
D01	10-01-2013 Continuous	10-01-2013	9/1- 9/30	0	2 RT/QT	CDBP	CDS FOR DBP

D01	06-01-2025 09-30-2025	01-01-2023	6/1- 9/30	3	20 RT/3Y	CL90	CDS FOR LEAD COPPER

Individual Non-TCR Sample Schedules

Facility	Begin/End Date	Init MP Begin Dt	Seasonal	State Year	Req.	Code	Analyte Name

Group Violations

Fed. Fiscal Year	Det. Date	Viol. Type	Viol. Name	An. Group	An. Group Name
2019	10-18-2018	27	MONITORING, ROUTINE (DBP), MAJOR	CDBP	CDS FOR DBP

Individual Violations

Viol. No.	Det. Date	Viol. Type	Viol. Name	An. Code	An. Name
1996-141696	11-05-1996	MC	STATE - MAXIMUM CONTAMINANT LEVEL	2950	TTHM
1996-39096	07-25-1996	MC	STATE - MAXIMUM CONTAMINANT LEVEL	2950	TTHM
1996-69796	05-03-1996	MC	STATE - MAXIMUM CONTAMINANT LEVEL	2950	TTHM
1996-82896	02-15-1996	MC	STATE - MAXIMUM CONTAMINANT LEVEL	2950	TTHM
1993-213893	07-01-1993	MC	STATE - MAXIMUM CONTAMINANT LEVEL	2950	TTHM

1992-311892	05-25-1993	MC	STATE - MAXIMUM CONTAMINANT LEVEL	2950	TTHM
1986-186	03-31-1986	03	MONITORING, ROUTINE MAJOR	3000	COLIFORM (PRE-TCR)
2019-2168008	11-20-2018	71	CCR REPORT	7000	CONSUMER CONFIDENCE RULE
2004-304	10-23-2003	26	MONITORING (TCR), REPEAT MINOR	3100	COLIFORM (TCR)
1992-43792	01-20-1992	MR	STATE - MONITORING AND REPORTING	3100	COLIFORM (TCR)
1992-292	01-20-1992	23	MONITORING (TCR), ROUTINE MAJOR	3100	COLIFORM (TCR)
1986-295186	04-16-1986	MR	STATE - MONITORING AND REPORTING	3000	COLIFORM (PRE-TCR)

Recent Positive TCR Sample Results

Type/ RP Loc	Sample No.	Date	Sample Point	Sample Pt. Description	Lab ID	Result / Analyte / Method / MP

PBCU Sample Summary Results

MP Begin Date	Type	# Samples	Measure	Units	Analyte Code/Name
01-01-2020 12-31-2022	AL	0 Exceeding Action Level			CU90 - COPPER SUMMARY
01-01-2020 12-31-2022	95%	20	0.106	MG/L	CU90 - COPPER SUMMARY

01-01-2020 12-31-2022	90%	20	0.096	MG/L	CU90 - COPPER SUMMARY
01-01-2020 12-31-2022	95%	20	0	MG/L	PB90 - LEAD SUMMARY
01-01-2020 12-31-2022	AL	0 Exceeding Action Level			PB90 - LEAD SUMMARY
01-01-2020 12-31-2022	90%	20	0	MG/L	PB90 - LEAD SUMMARY
01-01-2017 12-31-2019	95%	20	0.144	MG/L	CU90 - COPPER SUMMARY
01-01-2017 12-31-2019	90%	20	0.139	MG/L	CU90 - COPPER SUMMARY
01-01-2017 12-31-2019	AL	0 Exceeding Action Level			CU90 - COPPER SUMMARY
01-01-2017 12-31-2019	95%	20	0	MG/L	PB90 - LEAD SUMMARY
01-01-2017 12-31-2019	AL	1 Exceeding Action Level			PB90 - LEAD SUMMARY
01-01-2017 12-31-2019	90%	20	0	MG/L	PB90 - LEAD SUMMARY
01-01-2014 12-31-2016	90%	20	0.157	MG/L	CU90 - COPPER SUMMARY
01-01-2014 12-31-2016	AL	0 Exceeding Action Level			CU90 - COPPER SUMMARY
01-01-2014 12-31-2016	95%	20	0.158	MG/L	CU90 - COPPER SUMMARY

01-01-2014 12-31-2016	AL	0 Exceeding Action Level			PB90 - LEAD SUMMARY
01-01-2014 12-31-2016	90%	20	0	MG/L	PB90 - LEAD SUMMARY
01-01-2014 12-31-2016	95%	20	0.005	MG/L	PB90 - LEAD SUMMARY
01-01-2011 12-31-2013	95%	20	0.26	MG/L	CU90 - COPPER SUMMARY
01-01-2011 12-31-2013	AL	0 Exceeding Action Level			CU90 - COPPER SUMMARY
01-01-2011 12-31-2013	90%	20	0.221	MG/L	CU90 - COPPER SUMMARY
01-01-2011 12-31-2013	AL	1 Exceeding Action Level			PB90 - LEAD SUMMARY
01-01-2011 12-31-2013	90%	20	0.003	MG/L	PB90 - LEAD SUMMARY
01-01-2011 12-31-2013	95%	20	0.003	MG/L	PB90 - LEAD SUMMARY
01-01-2008 12-31-2010	AL	0 Exceeding Action Level			CU90 - COPPER SUMMARY
01-01-2008 12-31-2010	90%	20	0.088	MG/L	CU90 - COPPER SUMMARY
01-01-2008 12-31-2010	95%	20	0.093	MG/L	CU90 - COPPER SUMMARY
01-01-2008 12-31-2010	95%	20	0.006	MG/L	PB90 - LEAD SUMMARY

01-01-2008 12-31-2010	90%	20	0	MG/L	PB90 - LEAD SUMMARY
01-01-2008 12-31-2010	AL	1 Exceeding Action Level			PB90 - LEAD SUMMARY
01-01-2005 12-31-2007	AL	0 Exceeding Action Level			CU90 - COPPER SUMMARY
01-01-2005 12-31-2007	90%	20	0.084	MG/L	CU90 - COPPER SUMMARY
01-01-2005 12-31-2007	95%	20	0.123	MG/L	CU90 - COPPER SUMMARY
01-01-2005 12-31-2007	95%	20	0.007	MG/L	PB90 - LEAD SUMMARY
01-01-2005 12-31-2007	AL	0 Exceeding Action Level			PB90 - LEAD SUMMARY
01-01-2005 12-31-2007	90%	20	0.007	MG/L	PB90 - LEAD SUMMARY
07-01-2004 12-31-2004	90%	1	0.003	MG/L	PB90 - LEAD SUMMARY

Recent Primary/Secondary Sample Results

Fac./ Site	Sample No.	Date	An. Code	Analyte	Result	Unit	Method

Recent SOC Sample Results

Fac./ Site	Sample No.	Date	An. Code	Analyte	Result	Unit	Method

Recent RVOC Sample Results

Fac./ Site	Sample No.	Date	An. Code	Analyte	Result	Unit	Method

NC0410060 HOLDEN BEACH, TOWN OF Community

Facility ID: D01 DISTRIBUTION SYSTEM

Sampling point: selected by user

Analyte code	Analyte	begin date	end date	samples req'd	sample freq.	samples collected
3100	Total Coliform	12/1/23	12/31/23	7	MN	0

Routine or temporary routine coliform schedules are shown. If total coliform is detected in a sample, systems are required to collect 3 repeat samples within 24 hours of learning of the positive result and may be required to collect source water samples.

CDBP	Disinfection Byproducts	12/1/23	12/31/23	2	QT	0
CL90	Lead and Copper	6/1/25	9/30/25	20	3Y	0

H. EMERGENCY RESPONSE PLAN

Appendix H

Emergency Response Plan

Emergency Response Plan & Procedures

CONTAMINATION OF WATER SOURCE (GROUNDWATER WELLS)

POSSIBLE CAUSES: Spills, Backflow, Back-siphonage, Biological, Terrorism or Chemical Contamination

Actions: Shut pump down and valve off to isolate from system

The Operator in Responsible Charge (ORC) or back-up should notify the Town Manager or Board of Commissioners (verbally and in writing) of contamination of water supply.

Notify NCDEQ (Water Supply Section) Contact government agencies (see below)

for advice and assistance.

Notify all users. Contact local media for public service announcement, if customers cannot be notified by phone or door-to-door

Arrange for alternate source of water if necessary --- i.e., bottled water, bulk hauler, or storage tank.

Contacts:

NCDEQ (Water Supply Section) Wilmington, NC Office (during normal working hours) Raleigh, NC Office (weekends, holidays, or if Wilmington, NC Office cannot be reached)

Brunswick County Emergency Management Bolivia, NC,

Holden Beach Police Department,

Brunswick county Health Department

Contact others as necessary, depending on severity. See Contact List for phone numbers.

ELEVATED STORAGE TANK DAMAGE

POSSIBLE CAUSES: Structural Failure, Tornado, Hurricane, Plane Crash, or Terrorist Activity.

Actions: Shut off valves to isolate damaged tank.

The Operator in Responsible Charge (ORC) should notify the Town Manager or Board of Commissioners (verbally and in writing) of falling water supply.

Contacts: **Notify NCDEQ (Water Supply Section)** Contact government agencies (see below) for advice and assistance.

Notify Government agencies for advice and assistance.

Contact local media for public service announcement if customers cannot be notified by phone or door-to-door.

Possible Actions: Arrange for alternate source of water if necessary --- i.e., emergency connection with state approval, portable potable water system, bottled water, bulk hauler, or storage tank.

See Contact List for phone numbers.

LOSS OF SOURCE

POSSIBLE CAUSES: Dewatering of Aquifer, Pump Damage or Power Outage

Actions:

Contact Town Manager

Notify NCDEQ (Water Supply Section) Contact government agencies (see below) for advice.

Contacts:

Contact local media for public service announcement, if customers cannot be notified by phone or door-to-door.

Possible Actions:

Arrange for an alternate water source (if necessary) NCDEQ, Brunswick County Emergency Management (if necessary)

See Contact List for phone numbers.

FIRE DEMANDING EXTREME AMOUNTS OF WATER

Actions:

The Operator in Responsible Charge (ORC) should notify the Town Manager or Board of Commissioners

Contact Brunswick County and arrange for additional pumping from the Bell Swamp Station.

Begin enforcement of Emergency Water Conservation and Restriction ordinance, if applicable

Contact: local media for public service announcement if customers cannot be notified by phone or door-to-door

Contact NCDEQ Regional office or Raleigh, Brunswick County Emergency Management (if necessary)

Contact Police Department and Fire Department See Contact List for phone numbers.

DROUGHT CONDITION OR WATER SUPPLY SHORTAGE FROM BRUNSWICK

Actions:

The Operator in Responsible Charge (ORC) should notify the Town Manager or Board of Commissioners (verbally and in writing) of failing water supply.

Initiate Emergency Water Shortage Response Plan once a water shortage is declared. (Refer to Water Shortage Policy contained within this emergency response plan)

Begin enforcement of Emergency Water Conservation and Restriction ordinance, if applicable.

Contact:

NCDEQ Regional or Raleigh, Brunswick County Emergency Management (if necessary)

Contact local television and radio media for assistance with public notification of drought condition or water shortage for any cause.

Possible Actions: Arrange for alternate source of water if necessary --- i.e., bottled water, bulk hauler, or storage tank.

See Contact List for phone numbers.

FLOOD CONDITIONS/HURRICANE

Actions:

ORC should contact the Town Manager and the EOC if Activated.

Notify all users of the potential for groundwater well contamination, failure of pumps, or loss of power, etc.

Advise customers to store some drinking water in advance of the potential for flooding and to boil any suspect water for two minutes when notified or after any loss of pressure.

Phone government contacts are listed below.

Contact

Local media for public service announcement if customers cannot be notified by phone or door-to-door.

Arrange for alternate source of water if necessary --- i.e., emergency pipeline with Public Water Supply approval only, bottled water, bulk hauler, or storage tank.

NCDEQ Regional or State office in Raleigh (although they usually contact you during this type of emergency, Brunswick County Emergency Management, Police (for assistance in public notification).

See Contact List for phone numbers.

BROKEN WATER MAIN / CONTAMINATION OF WATER

Possible Causes: Mini-Quakes, Excessive Vibration, Floods, and Trees Uprooted due to Tornado or Hurricane, or simply broken due to age.

Actions: Contact maintenance crew to repair from contact list or call out sheet if safe to do so Valve off area of damaged main but maintain enough pressure on the line to prevent potential backflow.

Notify Town Hall and Police Department of water outage, what area will be affected, and approximate length of outage. (If possible, have personnel go door to door to advise customers of outage and approximate length of outage.

Contact:

NCDEQ Regional or State office in Raleigh if contamination of water main occurs or length of outage will be substantial.

Submit Boil Water Notice and follow up sampling protocol by guidelines from NCDEQ.

Contact local television and radio media for assistance with public notification of contamination or lengthy outages.

See Contact List for phone numbers.

HYDRANT DAMAGE

POSSIBLE CAUSES:

Vehicular Accident, Water Hammer, Restraint Failure, Falling Trees or Structures due to Tornado or Hurricane, or Soil Failure due to Flooding or Heavy Rains.

Actions:

Contact maintenance crew to repair. Use contact list or callout sheet if safe to do so.
Valve off damaged hydrants and mains, if also damaged.

Notify Town Hall and Police Department of water outage, what area will be affected, and approximate length of outage. (If possible have personnel go door to door to advise customers of outage and approximate length of outage.)

Contact:

NCDEQ Regional or State office in Raleigh if contamination of water main occurs or length of outage will be substantial.

Submit Boil Water Notice and follow up sampling protocol by guidelines from NCDEQ.

Contact local television and radio media for assistance with public notification of contamination or lengthy outages.

See Contact List for phone numbers.

I. UTILITY RATES & FEES

Appendix I

Utility Rates and Fees

PRIVILEGE LICENSE FEES

Off-Premises Unfortified Wine, Off-Premises Fortified Wine or Both	$10.00
Off-Premises Malt Beverages	$5.00
On-Premises Malt Beverages	$15.00
On-Premises Unfortified Wine, On-Premises Fortified Wine or Both	$15.00

WATER RATES

Basic Rates	
Base rate per month per dwelling unit, business or commercial service – includes initial 2,000 gallons	$22.72
Each 1,000 gallons for 2,001 – 6,000 gallons	$5.46
Each 1,000 gallons over 6,000 gallons	$6.46
Base rate for meters installed for additional services as defined in §51.03(A)(2) of the Code of Ordinances	$7.50
Each 1,000 gallons for 0 – 6,000 gallons	$5.46
Each 1,000 gallons over 6,000 gallons	$6.46
Tap Fees	
Fees in subdivisions where the water line and meter box have not been installed by the developer:	
Standard ¾ inch tap	$2,500.00
Standard 1 inch tap	$2,800.00
Larger diameter taps	Actual cost of equipment, materials and labor + 10%
Y-Off Existing Line ¾ Inch Tap	$1,000.00
Y-Off Existing Line 1 inch tap	$1,200.00
Fees in subdivisions where the water line and meter box were installed by the developer ¾ inch tap	$500.00
Fees in subdivisions where the water line and meter box were installed by the developer 1 inch tap	$600.00
Service Fees	
Cut-off	$50.00
Reconnect	$50.00
Suspension of service	$100.00
Special meter reading	$5.00

Special meter reading – findings show meter was over-read	$0.00

WASTEWATER RATES

Basic Rates	
Base charge per month per dwelling unit, individually metered based on water usage, business or commercial service – includes the initial 2,000 gallons	$14.10
Each 1,000 gallons for 2,001 – 6,000 gallons	$6.45
Each 1,000 gallons over 6,000 gallons	$7.45
Tap Fees	
Residential dwelling unit – per bedroom	$100.00
Commercial unit – Actual fee based upon the peak usage design daily flow per 15A NCAC 18A, 1949 Sewage Flow Rated for Design Units, Laws and Rules for Sewage Treatment and Disposal Systems	$500.00 minimum
Per gallon flow for each unit or type of operation	$2.50

WATER AND SEWER SYSTEM DEVELOPMENT FEES

Development Fees	
Water System Development Fee	$460 per bedroom
Sewer System Development Fee	$2,240 per bedroom

*Credit for those who have paid already the sewer share fee previously authorized by Town of Holden Beach Ordinance 02-13 dated 10-14-02 "Chapter 52-04 – Share Fees" will be given on a per bedroom basis in an amount equal to $2,240 per bedroom, up to a maximum five-bedroom house. Houses with more than five bedrooms will be assessed the $2,240 per bedroom sewer system development fee for each additional bedroom.

These Water and Sewer System Development Fees are effective October 1, 2021. See old schedule for rates prior to October 1st.

J. DEBT SERVICE

Appendix J

Debt Service

Town of Holden Beach, NC

Debt Service By Issue for All Types from 07/01/2022 to 07/01/2038

All Types

Schedule	Maturity Dates
Profile as Of	07/01/2023
Frequency	Annual
First Period End	07/01/2023
End Date	07/01/2038

	Interest rate	FY 24	FY 25	FY 26	FY 27	FY 28
EOC 2015 Note - Real Estate	2.420%	93,334.83	93,334.83	-	-	-
VAC TRUCK 2021 Capital lease	2.100%	64,770.39	64,770.39	64,770.40	-	-
2005 Sanitary Sewer Revolving Loan	2.205%	177,691.67	174,016.67	170,341.67	-	-
2004 Sanitary Sewer Revolving Loan	2.205%	415,821.67	415,821.66	415,821.66	-	-
2019B Taxable Enterprise Systems Revenue Refunding Bonds	2.347%	518,964.01	519,407.29	519,176.31	519,505.64	520,152.04
LS REIMBURSEMENT 2021 Note - Sanitary Sewer	1.920%	150,153.55	147,864.05	145,574.54	143,285.03	140,995.53
LS REIMBURSEMENT 2021A Note	2.290%	68,120.49	66,928.91	65,737.33	64,545.75	63,354.16
Annual Debt Payment		**1,488,856.61**	**1,482,143.79**	**1,381,421.91**	**727,336.42**	**724,501.73**

FY 29	FY 30	FY 31	FY 32	FY 33	FY 34	FY 35	FY 36	FY 37	FY 38
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
517,583.78	-	-	-	-	-	-	-	-	-
138,706.02	136,416.51	134,127.00	131,837.49	129,547.99	127,258.48	124,968.97	122,679.46	120,389.95	-
62,162.58	60,971.00	59,779.41	58,587.82	57,396.24	56,204.66	55,013.08	53,821.50	52,629.92	-
718,452.38	**197,387.51**	**193,906.41**	**190,425.31**	**186,944.23**	**183,463.14**	**179,982.05**	**176,500.96**	**173,019.87**	-

K. ADUIT REPORTS FY2019-2023

Appendix K

Audit FY 2019-2023

TOWN OF HOLDEN BEACH, NORTH CAROLINA Schedule 11

Water and Sewer Fund

Schedule of Revenues and Expenditures

Budget and Actual (Non - GAAP)

For the Fiscal Year Ended June 30, 2019

	2019		
	Budget	Actual	Variance Positive (Negative)
Revenues:			
Operating revenues:			
Water and sewer charges	$ 1,925,347	$ 1,796,500	$ (128,847)
Tap and connection fees	99,250	58,925	(40,325)
Impact fees	-	3,143	3,143
Other operating charges	106,694	124,084	17,390
Total operating revenues	2,131,291	1,982,652	(148,639)
Nonoperating revenues:			
Interest earnings	500	59,458	58,958
FEMA reimbursements	9,316	9,316	-
Sale of capital assets	-	3,801	3,801
Capital charges	1,582,616	1,610,610	27,994
Total revenues	3,723,723	3,665,837	(61,687)
Expenditures:			
Water and sewer administration:			
Salaries and employee benefits	59,008	62,184	(3,176)
Operating expenditures	73,080	65,141	7,939
Total expenditures	132,088	127,325	4,763
Operations:			
Salaries and employee benefits	221,288	203,195	18,093
Operating expenses	1,217,810	1,396,530	(178,720)
Capital outlay	1,914,945	1,713,091	201,854
Total expenditures	3,354,043	3,312,816	41,227
Non-Operating:			
City capital charges	1,151,941	1,151,940	1
Total expenditures	1,151,941	1,151,940	1
Debt services:			
Principal retirement	709,647	709,647	-
Interest and other charges	44,281	44,281	-
	753,928	753,928	-
Total expenditures	5,392,000	5,346,009	45,991
Revenues over (under) expenditures	(1,668,277)	(1,680,172)	(15,696)

TOWN OF HOLDEN BEACH, NORTH CAROLINA Schedule 11
Water and Sewer Fund
Schedule of Revenues and Expenditures (Continued)
Budget and Actual (Non - GAAP)
For the Fiscal Year Ended June 30, 2019

	2019		
	Final Budget	Actual	Variance Positive (Negative)
Other financing sources (uses):			
Transfers (to) from other funds:			
Capital Reserve Funds	$ (188,575)	$ (38,599)	$ 149,976
Appropriated fund balance	1,856,852	-	(1,856,852)
Total	1,668,277	(38,599)	(1,706,876)
Revenues and other sources over (under) expenditures and other uses	$ -	(1,718,771)	$ (1,722,572)
Reconciliation from budgetary basis (modified accrual) to full accrual:			
Reconciling items:			
Principal retirement		709,647	
Depreciation		(508,004)	
Deferred outflows of resources for contributions made to pension plan in the current year		12,393	
Pension expense		(14,719)	
Capital outlay		1,603,287	
Change in net position		$ 83,833	

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER AND SEWER FUND
SCHEDULE OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2020

	Budget	Actual	Variance Over/Under
Revenues:			
Operating revenues:			
Water and sewer charges	$ 1,740,710	$ 1,864,675	$ 123,965
Tap and connection fees	90,750	91,700	950
Other operating charges	127,451	176,334	48,883
Total operating revenues	1,958,911	2,132,709	173,798
Non-operating revenues:			
Interest earnings	1,500	32,745	31,245
FEMA reimbursements	241	-	(241)
Capital charges	1,582,616	1,629,266	46,650
Total non-operating revenues	1,584,357	1,662,011	77,654
Total revenues	3,543,268	3,794,720	251,452
Expenditures:			
Water and sewer administration:			
Salaries and employee benefits	62,199	58,333	3,866
Operating expenditures	78,382	104,785	(26,403)
Total water and sewer administration	140,581	163,118	(22,537)
Operations:			
Salaries and employee benefits	248,858	214,298	34,560
Operating expenditures	1,143,845	1,104,447	39,398
Capital outlay	2,608,534	1,051,677	1,556,857
Total operations	4,001,237	2,370,422	1,630,815
Non-operating:			
County capital charges	1,149,320	1,127,097	22,223

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER AND SEWER FUND
SCHEDULE OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2020

	Budget	Actual	Variance Over/Under
Debt service:			
Principal retirement	727,786	727,786	-
Interest and other charges	26,146	16,734	9,412
Total debt service	753,932	744,520	9,412
Total expenditures	6,045,070	4,405,157	1,639,913
Revenues over (under) expenditures	(2,501,802)	(610,437)	1,891,365
Other Financing Sources (Uses):			
Transfers (to) from other funds:			
Capital reserve funds	(40,000)	(64,900)	(24,900)
Appropriated fund balance	2,541,802	-	(2,541,802)
Total other financing sources (uses)	2,501,802	(64,900)	(2,566,702)
Revenues and other financing sources over (under) expenditures and other financing uses	$ -	(675,337)	$ (675,337)
Reconciliation from Budgetary Basis (Modified Accrual) to Full Accrual:			
Reconciling items:			
Principal retirement		727,786	
Depreciation		(542,655)	
Net revenue from capital reserve consolidation		509	
Capital reserve transfers-intrafund		64,900	
Change in deferred outflows of resources - pensions		(9,795)	
Change in deferred inflows of resources - pensions		(561)	
Change in net pension liability		(303)	
Capital outlay not capitalized		(36,664)	
Capital outlay		1,051,677	
Change in net position		$ 579,557	

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER CAPITAL RESERVE FUND
SCHEDULE OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCE - BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2020

	Budget	Actual	Variance Over/Under
Revenues:			
Interest income	$ 26,976	$ 210	$ (26,766)
Other Financing Sources (Uses):			
Transfer to other funds	(26,976)	-	26,976
Transfer from other funds	-	19,000	19,000
Total	(26,976)	19,000	45,976
Net change in fund balance	$ -	$ 19,210	$ 19,210

TOWN OF HOLDEN BEACH, NORTH CAROLINA

SEWER CAPITAL RESERVE FUND
SCHEDULE OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCE - BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2020

	Budget	Actual	Variance Over/Under
Revenues:			
Interest income	$ 44,523	$ 299	$ (44,224)
Other Financing Sources (Uses):			
Transfer to other funds	(44,523)	-	44,523
Transfer from other funds	-	45,900	45,900
Total	(44,523)	45,900	90,423
Net change in fund balance	$ -	$ 46,199	$ 46,199

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER AND SEWER FUND
SCHEDULE OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2021

	Budget	Actual	Variance Over/Under
Revenues:			
Operating revenues:			
Water and sewer charges	$ 2,355,349	$ 1,893,652	$ (461,697)
Tap and connection fees	76,000	95,200	19,200
Other operating charges	152,652	119,992	(32,660)
Total operating revenues	2,584,001	2,108,844	(475,157)
Non-operating revenues:			
Interest earnings	10,211	1,212	(8,999)
FEMA reimbursements	18,597	18,838	241
Capital charges	1,156,390	1,208,292	51,902
Total non-operating revenues	1,185,198	1,228,342	43,144
Total revenues	3,769,199	3,337,186	(432,013)
Expenditures:			
Water and sewer administration:			
Salaries and employee benefits	63,718	63,890	(172)
Operating expenditures	88,187	66,337	21,850
Total water and sewer administration	151,905	130,227	21,678
Operations:			
Salaries and employee benefits	304,923	281,352	23,571
Operating expenditures	1,836,565	1,117,492	719,073
Capital outlay	2,345,983	1,933,716	412,267
Total operations	4,487,471	3,332,560	1,154,911
Non-operating:			
County capital charges	1,144,390	1,127,038	17,352

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER AND SEWER FUND
SCHEDULE OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2021

	Budget	Actual	Variance Over/Under
Debt service:			
Principal retirement	117,817	117,817	-
Interest and other charges	20,844	10,718	10,126
Total debt service	138,661	128,535	10,126
Total expenditures	5,922,427	4,718,360	1,204,067
Revenues over (under) expenditures	(2,153,228)	(1,381,174)	772,054
Other Financing Sources (Uses):			
Transfers (to) from other funds:			
Capital reserve funds	(77,800)	(54,300)	23,500
Capital lease proceeds	323,852	305,193	(18,659)
Appropriated fund balance	1,907,176	-	(1,907,176)
Total other financing sources (uses)	2,153,228	250,893	(1,902,335)
Revenues and other financing sources over (under) expenditures and other financing uses	$ -	(1,130,281)	$ (1,130,281)
Reconciliation from Budgetary Basis (Modified Accrual) to Full Accrual:			
Reconciling items:			
Principal retirement		117,817	
Capital lease proceeds		(305,193)	
Depreciation		(564,067)	
Net revenue from capital reserve consolidation		59	
Capital reserve transfers - intrafund		54,300	
Change in deferred outflows of resources - pensions		9,269	
Change in compensated absences		1,080	
Change in deferred inflows of resources - pensions		1,069	
Change in net pension liability		(17,748)	
Capital outlay not capitalized		(70,711)	
Capital outlay		1,933,716	
Change in net position		$ 29,310	

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER CAPITAL RESERVE FUND
SCHEDULE OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCE - BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2020

	Budget	Actual	Variance Over/Under
Revenues:			
Interest income	$ 59,733	$ 20	$ (59,713)
Other Financing Sources (Uses):			
Transfer to other funds	(99,733)	-	99,733
Transfer from other funds	40,000	16,500	(23,500)
Total	(59,733)	16,500	76,233
Net change in fund balance	$ -	$ 16,520	$ 16,520

TOWN OF HOLDEN BEACH, NORTH CAROLINA

SEWER CAPITAL RESERVE FUND
SCHEDULE OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCE - BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2021

	Budget	Actual	Variance Over/Under
Revenues:			
Interest income	$ 22,310	$ 39	$ (22,271)
Other Financing Sources (Uses):			
Transfer to other funds	(60,110)	-	60,110
Transfer from other funds	37,800	37,800	-
Total	(22,310)	37,800	60,110
Net change in fund balance	$ -	$ 37,839	$ 37,839

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER AND SEWER FUND
SCHEDULE OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2022

	Budget	Actual	Variance Over/Under
Revenues:			
Operating revenues:			
Water and sewer charges	$ 2,217,520	$ 2,260,502	$ 42,982
Tap and connection fees	86,000	95,626	9,626
Other operating charges	152,652	61,175	(91,477)
Total operating revenues	2,456,172	2,417,303	(38,869)
Non-operating revenues:			
Interest earnings	10,212	10,971	759
Lease revenue	-	59,758	59,758
Capital charges	1,202,071	1,270,322	68,251
Total non-operating revenues	1,212,283	1,341,051	128,768
Total revenues	3,668,455	3,758,354	89,899
Expenditures:			
Water and sewer administration:			
Salaries and employee benefits	67,224	59,591	7,633
Operating expenditures	101,216	72,610	28,606
Total water and sewer administration	168,440	132,201	36,239
Operations:			
Salaries and employee benefits	365,650	359,967	5,683
Operating expenditures	1,399,829	1,261,172	138,657
Capital outlay	2,120,994	254,855	1,866,139
Total operations	3,886,473	1,875,994	2,010,479
Non-operating:			
County capital charges	1,190,070	1,120,506	69,564
Debt service:			
Principal retirement	143,983	143,983	-
Interest and other charges	40,230	39,248	982
Total debt service	184,213	183,231	982
Total expenditures	5,429,196	3,311,932	2,117,264

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER AND SEWER FUND
SCHEDULE OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2022

	Budget	Actual	Variance Over/Under
Revenues over (under) expenditures	(1,760,741)	446,422	2,207,163
Other Financing Sources (Uses):			
Transfers (to) from other funds:			
Capital reserve funds (intrafund, net)	(146,435)	(146,435)	-
Loan proceeds	1,907,176	2,569,190	662,014
Total other financing sources (uses)	1,760,741	2,422,755	662,014
Revenues and other financing sources over (under) expenditures and other financing uses	$ -	2,869,177	$ 2,869,177
Reconciliation from Budgetary Basis (Modified Accrual) to Full Accrual:			
Reconciling items:			
Principal retirement		143,983	
Loan proceeds		(2,569,190)	
Depreciation		(622,111)	
Net revenue from capital reserve consolidation		65	
Capital reserve transfers - intrafund		146,435	
Capital items charged to operating expenses		24,552	
Change in deferred outflows of resources - pensions		10,389	
Change in compensated absences		(3,830)	
Change in deferred inflows of resources - pensions		(46,553)	
Change in net pension liability		42,376	
Capital outlay not capitalized		(232,892)	
Capital outlay		254,855	
Change in net position		$ 17,256	

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER AND SEWER FUND
SCHEDULE OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2023

	Budget	Actual	Variance Over/Under
Revenues:			
Operating revenues:			
Water and sewer charges	$ 2,498,240	$ 2,268,460	$ (229,780)
Tap and connection fees	86,000	65,911	(20,089)
Other operating charges	164,501	61,917	(102,584)
Total operating revenues	2,748,741	2,396,288	(352,453)
Non-operating revenues:			
Interest earnings	10,212	54,077	43,865
Sale of capital assets	7,988	7,100	(888)
Lease revenue	-	59,758	59,758
Capital charges	1,429,575	1,495,831	66,256
Total non-operating revenues	1,447,775	1,616,766	168,991
Total revenues	4,196,516	4,013,054	(183,462)
Expenditures:			
Water and sewer administration:			
Salaries and employee benefits	68,869	72,921	(4,052)
Operating expenditures	101,447	81,340	20,107
Total water and sewer administration	170,316	154,261	16,055
Operations:			
Salaries and employee benefits	365,901	355,572	10,329
Operating expenditures	1,865,218	1,538,230	326,988
Capital outlay	3,732,079	255,201	3,476,878
Total operations	5,963,198	2,149,003	3,814,195
Non-operating:			
County capital charges	988,132	988,131	1
Debt service:			
Principal retirement	320,817	320,817	-
Interest and other charges	192,769	192,769	-
Total debt service	513,586	513,586	-

TOWN OF HOLDEN BEACH, NORTH CAROLINA

WATER AND SEWER FUND
SCHEDULE OF REVENUES AND EXPENDITURES
BUDGET AND ACTUAL (NON-GAAP)
FOR THE YEAR ENDED JUNE 30, 2023

	Budget	Actual	Variance Over/Under
Total expenditures	7,635,232	3,804,981	3,830,251
Total revenues	(3,438,716)	208,073	3,646,789
Other Financing Sources (Uses):			
Transfers (to) from other funds:			
Capital reserve funds (intrafund, net)	44,714	44,714	-
Loan proceeds	3,166,843	-	(3,166,843)
Subscription liability issued	-	5,132	5,132
Appropriated fund balance	227,159	-	(227,159)
Total other financing sources (uses)	3,438,716	49,846	(3,388,870)
Revenues and other financing sources over (under) expenditures and other financing uses	$ -	257,919	$ 257,919
Reconciliation from Budgetary Basis (Modified Accrual) to Full Accrual:			
Reconciling items:			
Principal retirement		320,817	
Depreciation and amortization		(633,325)	
Net revenue from capital reserve consolidation		106,255	
Capital reserve transfers - intrafund		(44,714)	
Change in deferred outflows of resources - pensions		27,623	
Change in compensated absences		4,579	
Change in deferred inflows of resources - pensions		47,763	
Subscription liabilities issued		(5,132)	
Subscription assets capitalized		5,132	
Principal payments- subscriptions		3,061	
Change in net pension liability		(84,138)	
Capital outlay not capitalized		(117,854)	
Capital outlay		250,069	
Change in net position		$ 138,055	

L. BULK SERVICE AGREEMENT BRUNSWICK COUNTY

Appendix L

Bulk Water Service Agreement
Brunswick County

WHOLESALE BULK WATER SERVICE AGREEMENT
(EXCLUSIVE WITH MINIMUM PURCHASES)

THIS WHOLESALE BULK WATER SERVICE AGREEMENT, (this "Agreement") dated as of the 1st day of September, 2021, by and between the COUNTY OF BRUNSWICK, a political subdivision of the State of North Carolina (the "County"), and the TOWN OF HOLDEN BEACH, a municipal corporation organized under the laws of the State of North Carolina (the "Town") is made pursuant to North Carolina General Statutes, Article 20, Part 1 of Chapter 160A; Article 16, Part 1 of Chapter 160A; and Article 15 of Chapter 153A, and in consideration of the promises made to one another in this Agreement, as follows:

WHEREAS, City desires to obtain an adequate and dependable water supply from the County; and

WHEREAS, County owns and operates a water system with a capacity currently capable of serving the present customers of the County's system and the estimated number of water users to be served by the Town; and

WHEREAS, Town acknowledges and understands that this Agreement establishes a minimum amount of treated water that the Town is obligated to pay for; and

WHEREAS, Town acknowledges and understands that County determines the rates to be paid by the Town; and

WHEREAS, Town is voluntarily entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained, the County agrees to furnish water, and Town agrees to pay for water, upon the terms and conditions and for the consideration hereinafter set forth, to wit:

SECTION 1
DEFINITION OF TERMS

1.1 Definitions. The following terms and expressions as used in this Agreement, unless the context clearly shows otherwise, shall have the following meanings:

(a) "Monthly Minimum Usage" means the minimum amount of treated water Town must compensate the County for during the Monthly Payment Period, and each month thereafter, regardless of whether Customer actually takes such quantity of water.

(b) "Monthly Payment" means the amount of money to be paid to the County by Town during each Monthly Payment Period.

(c) "Monthly Payment Period" means any calendar month.

(d) "Agreement Date" means the effective date of this Agreement asset forth on the first page hereof.

(e) "Customer" means any customer with which the County contracts with to furnish water.

(f) "Daily Average" means the total annual volume delivered to the Town divided by the number of days in the calendar year, provided at the Point(s) of Delivery.

(g) "Emergency Condition" means a condition that threatens the public health, safety, or welfare.

(h) "Town's Peaking Factor" means the annual peak day demand of the Town as determined from the total water volume going through all of the Town's Point(s) of Delivery during the peak day divided by annual average daily demand.

(i) "Point of Delivery" means the metering point(s) between the provision of service by the County to Town, all facilities upstream of which shall be the sole responsibility of the County, and all facilities downstream of which shall be the sole responsibility of the Town. There may be multiple Point of Delivery locations for the Town. The meter, meter vault, associated check valves, and valves are the property of the County.

(j) "System" means, collectively, the water storage, treatment, transmission, distribution, and supply components comprising an entity's potable water infrastructure.

SECTION 2
WATER SERVICE

2.1 Minimum Take-or-Pay Quantity. The County agrees to sell to the Town at the Point(s) of Delivery defined hereafter, and Town agrees to purchase and take at said Point(s) of Delivery, treated water provided at a rate no greater than the Maximum Instantaneous Demand and pressure stated herein. Town agrees to pay the monthly Minimum Usage Charge as indicated on the County's published rate and fee sheet (with payment required whether or not the actual amount is taken) as consideration for the provision of treated water.

2.2 Minimum meter size. The minimum meter size for new or replacement meters shall be 8". No meter shall be downsized without mutual agreement from both parties.

2.3 Maximum Instantaneous Demand. The maximum instantaneous demand through any single meter of Town during the term of this Agreement shall not exceed either the maximum instantaneous demand capacity of the meter according to the manufacturer's meter specifications or the following standard maximum instantaneous demands based on meter size, whichever is less:

Meter Size	Rate
6"	900 gpm
8"	1700 gpm
10"	2200 gpm
12"	3100 gpm

County shall not be obligated to supply water at a rate in excess of the maximum instantaneous demand specified herein. In the event that a meter registers in excess of the maximum instantaneous demand rate three or more times in any thirty-day period, the County shall have the right to install a larger size meter and appurtenances at the Town's expense. The Town shall be obligated to pay monthly fees based on the new meter size in accordance with the County's standard rate and fee sheet.

2.4 Daily Demand. In order to provide for the public health and welfare, the County will use its best efforts to develop additional treatment capacity for all customers of the water system as needed to meet the water treatment needs of all customers and will use sound financial planning to provide funds through rates, user fees, and related charges to provide the requisite facilities to meet such needs. The daily supply available to each customer is subject to limitations upon the County's ability to meet such demands caused by (a) the amount of raw water available to the

County through its wells and from its allocated capacity in the Lower Cape Fear Water & Sewer Authority raw water system, (b) the amount of water available from the Cape Fear River as part of the regulatory-determined "safe yield" or actually available during drought conditions, (c) the obligations of the County pursuant to Water Service Agreements to deliver treated water to other customers, (d) the capacity of the water system, (e) completion of any improvements the County elects to make to enable it to provide additional treated water to its Customers. Upon request by the County, Town shall provide a map detailing areas supplied or to be supplied by the Town as well as updated, estimated peak day demands and annual water system demands for the current year and the next four years at a minimum.

2.5 Quality. The County agrees to furnish the Town, at the Point of Delivery specified herein, potable treated water meeting applicable quality standards of the North Carolina Department of Environmental Quality, Division of Water Resources. It is acknowledged by both parties that currently the County primarily uses chloramines as a residual disinfectant but must change to free chlorine for some period each year and this may result in changes in taste and odor. The County will provide advance notification of these changes to the Town. The Town acknowledges that the water quality and responsibility for flushing downstream of the Point(s) of Delivery is the Town's responsibility.

2.6 Point(s) of Delivery. The Points of Delivery for the Town are located at: 127 Jordan Blvd. under the Holden Beach bridge (8" meter) and the end of Seagull Dr. (8" two-way meter). Town agrees to contract with the County for storage capacity or construct adequate water storage so that the maximum rate of delivery will not exceed the maximum instantaneous demand stated herein and so that the Town's Peaking Factor does not exceed 3.0(annual peak day demand divided by annual average daily demand).

New points of delivery providing water service to locations within the jurisdiction of the Town may be approved by the County. Town agrees to furnish the site at the Point of Delivery. Town shall design and construct a separate vault for the new Point of Delivery in accordance with County specifications and details. The County will review and approve the design prior to construction. The vault will include the billing meter, control valve, isolation valves, various appurtenances, and appropriate SCADA equipment. The Town shall bear all costs associated with such installation and shall deed and dedicate the facilities to the County upon completion and acceptance by the County.

2.7 Water Pressure. County shall furnish water at operating pressures as required by the North Carolina Department of Environmental Quality, Division of Water Resources at the Point(s) of Delivery. If Town requires a greater pressure than that which meets the regulatory requirements, then Town shall bear the cost of

providing such greater pressure. Emergency failures of pressure or supply due to line breaks, power failure, flood, fire and use of water to fight fire, earthquake, hurricane, unavailability or contamination of raw water, or other catastrophe shall excuse County from this provision for such reasonable period of time as may be necessary to effectuate repairs and restore service.

2.8 Meter Reading. The County shall provide a meter reading at or near the end of each calendar month that may be used in conjunction with the previous reading to approximate the flow through the meter during the calendar month. The Town shall have access to the meter for reading purposes only, but all adjustments and maintenance shall be performed by the County.

2.9 Testing of meters. The County may, at any point, and the Town may request in writing not more than once in any twelve (12) month time period, the County to test or return the meter to the manufacturer for assessment. If upon any test, the percentage of inaccuracy of any billing meter equipment is found to be in excess of three percent (3%), registration thereof shall be corrected for a period extending back to the time when such inaccuracy began, if such time is ascertainable, and if such time is not ascertainable, then for a period extending back one-half (1/2) of the time elapsed since the last date of calibration, but in no event further back than a period of twelve (12) months. If for any reason any billing meters are out of repair so that the amount of water delivered cannot be ascertained or computed from the reading thereof, the water delivered through the period such billing meters are out of service or out of repair shall be estimated upon the basis of the best data available. Otherwise, the amount of water delivered during such period may be estimated (i) by correcting the error if the percentage of the error is ascertainable by calibration tests or mathematical calculation, or (ii) estimating the quantity of delivery by deliveries during the preceding periods under similar conditions when the billing meter or meters were registering accurately. The cost of meter testing or assessment performed at the request of the Town shall be borne by the County if the meter is found to be reading in excess of 103% of actual flow amounts through the meter; otherwise these costs shall be paid by the Town.

2.10 County as Exclusive Water Provider. The Town shall not acquire or produce water from any source other than the County; provided however, the Town may at all times without the County's consent obtain treated water from, and maintain, repair and replace treated water systems in existence and owned and operated by the Town at the time the Town first purchased water from the County. Increasing the capacity of these systems is allowed only with written authorization from the County.

2.11 Temporary Interruptions. The County may at any time shut off water due to accident, emergency, for the purpose of making connections, alterations, repairs, and changes to the water system. The County will use its best efforts to give notice in advance of water service interruptions when such interruptions can be reasonably expected. It is the obligation of the Town to protect Town's facilities so that damage will not occur if water is shut off without notice.

2.12 Curtailment. It is recognized by both parties that curtailment measures may have to be implemented to meet an emergency condition. If the County reduces the amount of treated water available to its customers, it will reduce the supply available to each user in accordance with the latest approved Water Shortage Response Plan. The Town agrees to approve and enforce the County's Water Shortage Response Plan and Water Ordinance, or similar Plan and Ordinance no less stringent, for its own ratepayers.

2.13 County Facilities. In the event that the Town annexes or otherwise expands their boundaries into areas served by County facilities, Town acknowledges the County's right to provide service within these areas.

SECTION 3
PAYMENT AND BILLING

3.1 Rates and Fees. Rates and fees are determined using the cost of service principles as described in manual M-1 by the American Water Works Association (AWWA), as they may be amended from time to time. The County shall review and amend its rates and fees on an annual basis and shall publish these prior to July 1st of each year. Town agrees to pay applicable wholesale rates, fees, and charges assessed by the County as indicated on the approved Rate and Fee schedule. Current wholesale rates, which are subject to change, include a Base Service Charge, Minimum Usage Charge, and a volumetric rate per 1000 gallons used.

3.2 Billing. On a monthly basis, County shall bill Town for water service provided through each bulk meter. The bills shall be payable within 30 days of the date of the invoice.

3.3 Maximum Daily Demand. It is recognized by the County and the Town that the Town's Water Service Agreement constitutes an essential part of the County's financing plan and Capital Improvement Plan. The Town shall make payment each month throughout the term of this Agreement in accordance with the County's published rates and fees. The size and number of meters (Points of Delivery) impact the revenue available for expansion, operation, and maintenance of the system and may not be altered without the County's consent.

3.4 Limitation on Resale. After the date of this Agreement, unless required to do otherwise by an applicable regulatory authority or a court of competent jurisdiction, Town shall not enter into, renew, or amend with regard to volume of water to be supplied, any agreement to provide wholesale or new retail water for use outside its corporate boundaries unless each such agreement is approved by the County. The Town may continue to provide water service to locations that it currently serves outside of its corporate boundaries as of the date of this agreement. Town shall not become a party to any contract for the sale of water to another water provider ("water-wheeling"). The County will use its best efforts to furnish and remain in a position to furnish water sufficient for all reasonable treated water requirements of Town, but its obligation shall be limited to the amount of treated water available to it from the System during routine operation.

SECTION 4
TERM, TERMINATION, AND RENEWAL OF AGREEMENT

4.1 This Water Service Agreement shall be in full force and effect for a period ending June 30, 2061. Following the term, this Agreement shall automatically renew for one (1) year terms unless a party gives notice to the other party of non-renewal not less than one hundred eighty (180) days prior to expiration of the then-current term.

4.2 This Agreement may otherwise be terminated only by mutual agreement of the parties. A mutually agreeable termination of this Agreement will be on such terms as the parties may agree at the time in question. Each party hereto reserves to itself all legal rights and remedies available at law or in equity in the event of any other breach of this Agreement by the other.

4.3 This Agreement may be renewed or amended by mutual agreement of the parties, adopted with the same formality as the original.

SECTION 5
REPRESENTATIONS AND COVENANTS

5.1 Each party to this Agreement represents to the other party each of the following as of the effective date of this Agreement, and covenants with the other party that each such representation will remain true and correct:

5.1.1 It has full power and authority to enter into this Agreement, and to enter into and carry out the transactions contemplated by this Agreement.

5.1.2 It has by proper action authorized the execution and delivery of this Agreement and is not in default under any provisions of this Agreement.

5.1.3 The execution, delivery, and performance of this Agreement does not violate or conflict with or require any consent or waiver under any of the terms or conditions in its governing documents or any material Agreement to which it is a party or by which any of its assets are bound or affected, or any law, rule, regulation, order, writ, judgment, decree or other legal or regulatory determination applicable to it.

5.1.4 This Agreement constitutes a legal, valid and binding obligation enforceable at law and in equity in accordance with its terms and, to the extent that certain remedies under this Agreement require or may require enforcement by a court, such principles of equity as the court having jurisdiction may impose.

5.1.5 It will comply with all applicable federal, state and local laws with respect to any activities conducted under or pursuant to this Agreement.

5.1.6 No elected or appointed official or employee has any interest (financial, employment, or other) in the transactions contemplated by this Agreement.

5.1.7 It will take no act (or engage in any failure to act) that will prevent, delay, obstruct, frustrate, or otherwise impair or undermine the activities conducted under or pursuant to this Agreement, except as may be necessary to enforce this Agreement or ensure compliance with applicable laws, regulations, and ordinances.

SECTION 6
MISCELLANEOUS PROVISIONS

6.1 Exhibits. All exhibits, if any, referenced in this Agreement are incorporated herein by reference as integral parts of this Agreement.

6.2 Amendment to Agreement. This Agreement may be modified or amended only by written amendments that are approved and signed on behalf of both Parties in the same manner as original adoption.

6.3 No assignment without consent. Neither party shall assign this Agreement (or assign any right or delegate any obligation contained herein whether such assignment is of service, of payment or otherwise) without the prior written consent of the other party hereto. Any such assignment without the prior written

consent of the other party hereto shall be void. An assignee shall acquire no rights, and County shall not recognize any assignment in violation of this provision.

6.4 Governing law and venue. This Agreement shall be governed by applicable federal law and by the laws of the State of North Carolina without regard for its choice of law provisions. All actions relating in any way to this Agreement shall be brought in the General Court of Justice of the State of North Carolina in Brunswick County or in the Federal District Court for the Eastern District of North Carolina, Wilmington division.

6.5 Dispute resolution. Should a dispute arise as to the terms of this Agreement, both parties agree that neither may initiate binding arbitration. The parties may agree to non-binding mediation of any dispute prior to the bringing of any suit or action.

6.6 Governmental Immunity. Each party, to the extent applicable, does not waive its governmental immunity by entering into this Agreement and fully retains all immunities and defenses provided by law with regard to any action based on this Agreement.

6.7 Non-Waiver. Failure by a party at any time to require the performance of any of the provisions of this Agreement shall in no way affect the party's right hereunder to enforce the same, nor shall any waiver by a party of any breach be held to be a waiver of any succeeding breach or a waiver of this Section.

6.8 No Third-Party Beneficiaries. Nothing in this Agreement shall give any person other than the parties any rights to enforce any provision of this Agreement. There are no intended third-party beneficiaries of this Agreement.

6.9 Entire Agreement. This Agreement constitutes the entire agreement between the parties with respect to the subject matter herein. There are no other representations, understandings or agreements between the parties with respect to

such subject matter. This Agreement supersedes all prior agreements, negotiations, representations and proposals, written or oral.

6.10 Headings. The headings in this Agreement are for convenience of reference only and shall not define or limit any of the terms or provisions hereof.

6.11 Severability. The invalidity of one or more of the phrases, sentences, clauses or sections contained in this Agreement shall not affect the validity of the remaining portion of the Agreement so long as the material purposes of this Agreement can be determined and effectuated. If a provision of this Agreement is held to be unenforceable, then both parties shall be relieved of all obligations arising under such provision, but only to the extent that such provision is unenforceable, and this Agreement shall be deemed amended by modifying such provision to the extent necessary to make it enforceable while preserving its intent.

6.12 Notices

a. Delivery of Notices. Any notice, consent or other communication required or contemplated by this Agreement shall be in writing, and shall be delivered in person, by U.S. mail, by overnight courier, by electronic mail or by facsimile to the intended recipient at the address set forth below.

b. Effective Date Of Notices. Any notice shall be effective upon the date of receipt by the intended recipient; provided that any notice which is sent by facsimile or electronic mail shall also be simultaneously sent by mail deposited with the U.S. Postal Service or by overnight courier.

c. Notice Address. Communications that relate to any breach, default, termination, delay in performance, prevention of performance, modification, extension, amendment or waiver of any provision of this Agreement shall be sent to:

i. For the County: Brunswick County Manager
P.O. Box 249
Bolivia, NC 28422
Fax: 910-253-2022

ii. For the Town: Town of Holden Beach Manager
110 Rothschild Street
Holden Beach, NC 28462

6.13 Signatures. This Agreement, together with any amendments or modifications, may be executed in one or more counterparts, each of which shall be deemed an original and all of which shall be considered one and the same agreement.

This Agreement may also be executed electronically. By signing electronically, the parties indicate their intent to comply with the Electronic Commerce in Government Act (N.C.G.S § 66-358.1 et seq.) and the Uniform Electronic Transactions Act (N.C.G.S § 66-311 et seq.). Delivery of an executed counterpart of this Agreement by either electronic means or by facsimile shall be as effective as a manually executed counterpart.

BRUNSWICK COUNTY

By: _____

Printed Name: Randy Thompson

Title: Chairman

Date: 8/2/21

TOWN OF HOLDEN BEACH

By: _____

Printed Name: Alan Holden

Title: Mayor

Date: July 20, 2021

"This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act."

_____

Julie A. Miller, Director of Fiscal Operations
Brunswick County, North Carolina

APPROVED AS TO FORM:

_____

Robert V. Shaver, Jr., County Attorney /
Bryan W. Batton, Assistant County Attorney

This document had been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act