ENGINEERING REPORT

for

Town of River Bend, North Carolina

Water Treatment Improvements

September, 2025
Revised January, 2026

Rivers Project No. 2024135

DWI Project No. SRP-D-134-0033

Co-Funded with SRF Project No. SRF-D-2070

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Prepared by:

RIVERS & ASSOCIATES, INC.
107 E. Second Street, Greenville, NC
Phone: 252-752-4135

NORTH CAROLINA PROFESSIONAL SEAL 16744 ENGINEER GREGORY J. CHURCHILL

Gregory J. Churchill, P.E.
Principal
Date: 1-13-26

NORTH CAROLINA PROFESSIONAL SEAL 056646 ENGINEER KEVIN D. COOPER

Kevin D. Cooper, P.E.
Project Engineer
Date: 1-13-26

Submittal Checklist for Engineering Reports/Environmental Information Documents

(Last updated: December 2022)

This checklist must accompany the initial submittal of all Engineering Reports/Environmental Information Documents. If your submittal does not contain this checklist, the Project Manager will not start review until it is received.

A. Submittal (Project Engineer may request a hard copy if needed for ease of review)

Mode of submission: ☐ Email DWI Project Engineer ☒ Upload to the link provided by the DWI Project Engineer

B. Contact Information

Owner/ Recipient: Town of River Bend

Is the contact person (Elected Official or Authorized Representative) different from the application? ☐ Yes ☐ No

First Name	Last Name	Suffix	Position	
Delane	Jackson		Town Manager	☐ Elected Official ☒ Authorized Representative

Mailing Address 1	Mailing Address 2	City	State	Zip Code
45 Shoreline Drive		River Bend	NC	28562

E-Mail Address	Phone Number	Extension (if applicable)
manager@riverbendnc.org	252-638-3870	3

Consultant Information

Is the contact person different from the application? ☐ Yes ☒ No

Firm Name	First Name	Last Name	Suffix
Rivers & Associates, Inc.	Kevin	Cooper	

Mailing Address 1	Mailing Address 2	City	State	Zip Code
P.O. Box 929	107 E. 2nd Street	Greenville	NC	27858

E-Mail Address	Phone Number	Extension (if applicable)
kcooper@riversandassociates.com	252-752-4135	

Environmental Information Document Contact Information *(SRF and CDBG funded projects only)*

Did a separate firm prepare the Environmental Information Document? ☐ Yes ☒ No

If Yes, complete the information below. If No, then continue to Part C (Project Information).

Firm Name	First Name	Last Name	Suffix

Mailing Address 1	Mailing Address 2	City	State	Zip Code

E-Mail Address	Phone Number	Extension (if applicable)

C. Project Information

Project Name: Water Treatment Improvements
DWI Project No.(s): SRP-D-134-0033; SRF-D-2070
PWSID No. (for Drinking Water projects): 04-25-113

Project Type

Check all that apply in terms of project type.

☒ Drinking Water
☐ Wastewater
☐ Stormwater

D. Environmental Information (for SRF and CDBG funded projects only)

Check the box for the appropriate final information document required for the project and based upon the activities listed in Appendix A of the guidance or any discussion with Division staff. Note: Under the CDBG-I program, the Responsible Entity will be in charge of the environmental review process. The Consultant should check which environmental document the Responsible Entity is preparing.

Final Environmental Document

- ☐ Certificate of Exemption (CDBG-I only)
- ☐ Categorical Exclusion Subject to §58.5 (CDBG-I only)
- ☐ Categorical Exclusion (SRF only)
- ☐ Categorical Exclusion Not Subject to §58.5 (CDBG-I only)
- ☒ Finding of No Significant Impact
- ☐ Record of Decision

Check the box(es) for the river basin(s) where the project is found. This information is used for programmatic reporting purposes.

- ☐ Broad
- ☐ Cape Fear
- ☐ Catawba
- ☐ Chowan
- ☐ French Broad
- ☐ Hiwassee
- ☐ Little Tennessee
- ☐ Lumber
- ☒ Neuse
- ☐ New
- ☐ Pasquotank
- ☐ Roanoke
- ☐ Savannah
- ☐ Tar-Pamlico
- ☐ Watauga
- ☐ White Oak
- ☐ Yadkin

E. Funding Information

Estimated Project Cost: $20,843,600

Funding Source(s)

Funding Secured (amount should equal total of the funding sources listed below):

Check the box(es) for each secured source of funding, including those outside of the Division. Place the amount(s) in the appropriate column.

☒ Total amount financed by DWI	$ 10,429,895 $ 6,274,250 $ 4,139,455 $ **20,843,600**	☐ North Carolina Rural Center ☐ USDA Grant/Loan ☐ Bonds ☐ Local Funds ☐ Bank Loans ☐ Other, Specify:	$ $ $ $ $ $

Plan of action if secured funding is less than the project cost: N/A

F. Signature

This submittal checklist has been completed and is, to the best of my knowledge, accurate.

Signature: Kevin Cooper

Date: 10-6-25

Water Treatment Plant Construction/Modification/Rehabilitation

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APPENDICES

FIGURES

1.0 Executive Summary

1.1 Project Description

The proposed project includes new wells and 0.95 MGD water treatment plant (WTP) to serve the Town of River Bend, NC. The new filter-softener (FS) WTP will replace the Town's existing water supply and treatment process in order to provide improved finished water quality to Town residents and businesses. Treated waste byproduct from the filter backwash and softener regeneration process is proposed to be combined with the Town's existing wastewater treatment plant discharge into a new multi-port diffuser in the Trent River. The proposed project includes installation of one (1) test well and two (2) production wells which will withdraw from the Lower Castle Hayne Aquifer (LCHA). The LCHA has superior raw water quality compared to the Upper Castle Hayne (UCHA) currently utilized by the Town. Figure 4 is a vicinity map that depicts the location of the Town of River Bend. Figure 1 includes a schematic of the existing wells and WTPs. Figure 2 depicts the location of the proposed wells, WTP, pipelines and treated waste discharge.

The Town's existing raw water is supplied by three (3) Upper Castle Hayne Aquifer (UCHA)/River Bend strata groundwater wells to two (2) existing water treatment plants. The existing WTPs make use of pressure sand filters with Birm© media followed by injection of a sequestering agent for removal and sequestration of iron and manganese. Soluble iron and manganese in the raw water are precipitated utilizing caustic soda (sodium hydroxide) to adjust the pH followed by compressed air injection to increase the dissolved oxygen concentration. A sequestering agent is injected following filtration to bind the remaining iron and manganese ions into a stable, soluble complex in an effort to prevent unwanted precipitates and stains. The Town's existing facilities do not include softeners to reduce the hardness of the raw water. A combination of an inferior raw water quality from the existing UCHA water quality; aging wells, pumps, water treatment plant facilities and equipment; and lack of softening capability have resulted in numerous complaints about finished water quality from customers in recent years.

The proposed water treatment plant will include two (2) new LCHA raw water wells; forced draft aeration with potassium permanganate feed to precipitate iron and manganese; a raw water detention tank for settling of precipitated iron and manganese; a new water treatment facility to house filter feed/high service pumps, greensand filters, ion-exchange softeners, chemical feed systems, and operations office/laboratory. Primary disinfection will be accomplished using liquid sodium hypochlorite followed by the addition of ammonia to form chloramine to provide residual disinfection. Additional chemical feeds include fluoride, corrosion control and dechlorination. Two (2) filter backwash/softener regeneration waste settling ponds will be operated in series with effluent waste supernatant pump station to pump treated waste effluent for disposal through a combined WTP/WWTP multi-port diffuser in the Trent River.

1.2 Reasons for Project

Prior to the Town of River Bend being incorporated, the area was originally developed as a retirement community known as River Bend Plantation. Construction of the development began in the late 1960's, and continued to expand in subsequent years. The homeowners living in River Bend Plantation elected to pursue incorporation in the late 1970's, and the Town was subsequently chartered in 1981.

The water and sewer systems were originally constructed to support the River Bend Plantation development 40-50 years ago, and were later sold by the original developer to Carolina Water Service (CWS). In 1995, the Town of River Bend purchased the water and sanitary sewer utilities from CWS. Shortly afterward, the Town extended water service to customers throughout the Town, and constructed an additional 300,000-gallon elevated tank at the southern terminus of Plantation Drive. Portions of the original River Bend Plantation water system remain in service today.

The Town's existing three (3) production wells tap into the Upper Castle Hayne Aquifer (UCHA)/River Bend Strata. These wells are relatively shallow at 110 feet deep, and have limited yield due to minimal drawdown availability. In addition, the water quality tends to be high in iron, manganese and hardness. The Town of River Bend is the only water purveyor in the area that utilizes the River Bend strata. Other adjacent utilities draw from the LCHA. Due to its shallow depth, the UCHA is much more susceptible to contamination than the LCHA.

The Town has also experienced periodic customer complaints regarding random emergence of red or reddish-brown water at various locations throughout the distribution system. A Preliminary Water System Evaluation was conducted by Rivers & Associates, Inc. in 2020. The study suggests that the red/brown water issues are a result of limitations with the current water treatment process, and recommends WTP upgrades be considered moving forward. The Town's existing WTPs and associated pumping and treatment equipment have outlived their useful service lives, and the Town desires to replace their existing water supply and treatment system with a new source and treatment facilities.

1.3 Alternatives Evaluation

As part of the preliminary design, four (4) alternatives have been analyzed to select the most cost-effective, long-term solution to the identified problems. The options considered are: Alternative #1 – No Action, Alternative #2 – New Filter/Softener WTP, Alternative #3 – New Nanofiltration WTP, and Alternative #4 – Bulk Water Supply with Distribution System Upgrades.

Alternative #1 – No Action continues status quo operations of the raw water wells and two (2) existing WTPs. The Operators would continue diligent routine maintenance and/or equipment replacement as required in an effort to provide quality water to the Town. However, no

substantive rehabilitation and/or replacement of the water supply source would occur. In addition, no treatment improvements would be provided to further address water quality concerns.

Under this arrangement, operations would continue until a major, unanticipated malfunction occurs. This could be in the form of well/aquifer contamination, filter vessel failure, loss of equipment function, etc. Depending on the nature of the failure, a portion of the water supply and/or treatment system may be out of service for an extended period of time for demolition, repairs, replacement, installation, startup, etc. During this time, the Town's ability to meet customer demands would be severely inhibited.

The capital cost for the No-Action Alternative #1 is $0. Operations without improvements to the existing water supply and treatment facilities may continue for the short-term; however, it is not an acceptable alternative for the long-term. Eventually, substantive failures will occur to the aging wells, filter vessels, piping, mechanical and/or electrical equipment which could lead to substantive downtime and reactive efforts/costs for repairs or replacement. The net present value of costs for Alternative #1 is estimated to be $10,609,310. The No-Action Alternative is not a responsible alternative, and therefore is rejected.

Alternative #2 – New F/S WTP has been selected as the preferred alternative as it is a cost-effective method to provide the Town with a good quality, long-term, sustainable water supply. It is also preferred based on numerous non-monetary criteria including greater reliability, better aquifer sustainability, favorable residual waste disposal, ability to permit, ease of operation, etc. Filter-softener treatment technology is a commonly used water treatment process throughout eastern North Carolina, particularly when the LCHA is utilized as the raw water supply source. Transitioning to a F/S WTP is expected to be relatively straightforward for the Town's operators due to their prior experience operating water filtration processes. Alternative #2 includes a new wellfield to draw from the LCHA which has superior raw water quality to the UCHA currently utilized by the Town. The LCHA is a prolific aquifer which may reduce the number of wells required to meet design capacity. Alternative #2 also improves upon the Town's existing treatment methods by including a proven and dependable process to precipitate and remove iron and manganese, as well as to provide ion-exchange softening to reduce hardness of the raw water supply. A combination of the new wells and improved treatment works will provide a high-quality drinking water for the Town for many years to come. The net present value of costs for Alternative #2 is $30,590,824 and is selected as the preferred alternative.

Alternative #3 – New Nanofiltration (NF) WTP was ultimately not selected due to the overall project costs associated with planning, design, permitting, and construction. Nanofiltration is an effective water treatment method that utilizes semipermeable membranes to remove contaminants from raw water. Due to the nature of the membranes, constituents must remain in an soluble form to avoid membrane fouling. For a water supply that is high in iron, pre-treatment in the form of iron filters may be required in advance of the NF membranes which can add significantly to the cost of this alternative. NF requires greater raw water capacity as

more waste concentrate reject water is generated from the NF process than with the F/S backwash/regeneration processes. Additionally, nanofiltration requires installation and operation of a pilot plant to confirm the expected performance and design parameters associated with the NF membranes. Although the cost of NF treatment is becoming more competitive, it is generally higher than that of a comparably sized F/S treatment plant. The net present value of costs for Alternative #3 is $32,871,610.

Alternative #4 – Bulk Water Supply with Distribution System Upgrades was not selected as the preferred alternative. There are three adjacent water systems that could potentially supply water to the Town of River Bend. These include the City of New Bern, Jones County, and Craven County. However, upon reaching out to each of these entities, only the City of New Bern had sufficient capacity to meet River Bend's demand requirements. In addition, the City indicated a willingness to serve as a wholesale supplier for the Town. New Bern has experienced significant growth in the western part of their water system which is in the vicinity of River Bend. While the City has plans to install hydraulic improvements in the area, they are not yet complete. Preliminary hydraulic modeling indicates that a new booster pump station would be required in order to meet the Town's demand at reasonable system operating pressures. This significantly increases the upfront capital costs for this alternative compared to a basic interconnect. The net present value of costs for Alternative #4 is $13,125,885

Although, the cost for Alternative #4 is lower than other alternatives, (1) the Town of River Bend would lose some autonomy to set and control water rates; (2) potential growth within the Town could be indirectly controlled by an outside political body; and (3) political animosity could be created between Municipal neighbors. The Town of River Bend has successfully operated their own in-town water and sanitary sewer systems for almost three decades. The expertise and willingness to continue doing so certainly appear to exist. Based on this, Alternative #4 was not selected.

1.4 Environmental Impacts/Mitigative Measures

Development of the F/S WTP alternative results in a project that is somewhat similar to the existing River Bend WTPs except that water softening will also be incorporated. WTP capacity will be limited to the total existing capacity of the two (2) existing WTPs. New well sites and raw water transmission improvements will be required, a finished water main will need to be extended to properly connect to the existing distribution system, and a treated waste effluent force main and multi-port diffuser will need to be extended to the permitted discharge location. The following permits are anticipated:

- USACE Nationwide 58 Permit
- 401 Water Quality Certification – NCDEQ DEMLR,
- Approval of Plans and Specifications – NCDEQ DWR PWSS,
- Erosion and Sedimentation Control Permit – NCDEQ DEMLR,
- State Stormwater Permit – NCDEQ DEMLR,
- Compliance with Neuse River Riparian Buffer Rules – NCDEQ DWR

- CAMA General Permit – NCDEQ DCM,
- Sewer Extension Permit – NCDEQ DWR
- NPDES Discharge Permit – NCDEQ DWR NPDES,
- NCDEQ DWR Authorization to Construct

The scope of the project includes new groundwater wells with capacity that exceeds 1.0 MGD; therefore, a Finding of No Significant Impact (FONSI) will be required per NCDEQ DWI requirements. The Environmental Information Document (EID) provided herein has been prepared to assist the Division with the required determination. Amy environmental issues or concerns that arise will be addressed during the design and permitting process. No issues are anticipated that are considered insurmountable.

1.5 Project Funding and User Fee Increases

The project is estimated to cost $20,843,600.00, and is being funded as follows:

Estimated Project Cost	**$20,843,600.00**	
Special Appropriation (SRP-D-134-0033)	$4,139,455.00	(Grant)
SRF-D-2070 (Fall 2024)	$3,500,000.00	(75% Princ. Forgiveness)
SRF-D-2070 (Fall 2024)	$6,929,895.00	(Loan)
SRF-D-2070 (Spring 2025)	$3,137,125.00	(50% Princ. Forgiveness)
SRF-D-2070 (Spring 2025)	$3,137,125.00	(Loan)
Total Funding Secured	**$20,843,600.00**	

User fees are anticipated to increase to pay for the loan principal as well as the new operation & maintenance costs for the proposed WTP. The new sewer bill for a 5,000-gallon per month residential user is estimated to be 2.24% of the Median Household Income (MHI). The combined water and sewer bill of a residential user is estimated to be 2.89% of the MHI. The financial burden due to a rate increase is considered to be "potentially significant" when the sewer bill accounts for 2% of the MHI or the combined water & sewer bill accounts for 4% of the MHI. Therefore, these proposed rate increases may be potentially significant particularly for customers who fall below the MHI. Ultimately, the improvements to water quality due to the project outweigh the potential financial burden to customers.

2.0 Current Situation

2.1 Water Treatment Plant Equipment Replacement

Table 2.1.1. General WTP Condition

Provide a brief description of the WTP condition as discussed in Section 3.3.2.1 of the guidance.

The existing treatment plants utilize pressure filters plus chemical addition to provide treatment and disinfection. Caustic soda is utilized to raise the pH of the raw water, and compressed air is injected to increase dissolved oxygen content to optimize oxidation of soluble iron ahead of the pressure filters. The filters incorporate Birm© sand filter media to capture oxidized iron particles. Polyphosphate is added post-filtration to act as a sequestering agent for any remaining soluble iron, as well as a scale inhibitor to reduce precipitation within the distribution system. Gas chlorine feeders are utilized to provide primary and residual disinfection of the finished water as it is introduced into the distribution system.

The current water treatment plants consist of aging equipment and infrastructure which are in poor condition. In addition, softening of the hard UCHA raw water supply is not provided by the Town. In recent years, the Town has experienced numerous complaints regarding poor finished water quality being supplied to customers.

The Town of River Bend's population has had an increasing trend since it was first incorporated. The population surged between 1997-2002 and consistently increased each decade until 2020. While the population increase has slowed in recent years, the Town continues to grow.

Provide the average daily flows for the past two years and the current flow.

Schematic layout Reference:	Figure 1	Supporting information Appendix Reference:	A & B

Year	ADF (MGD)	Year	ADF (MGD)
2024	0.3328	2023	0.3176

Current Average Day Demand (MGD):	0.3328
Current Capacity (MGD):	0.35 + 0.60 = 0.95
Percentage of Capacity Currently Utilized:	35%

Table 2.1.1. General WTP Condition	
Provide information related to any NOVs the WTP may have received or any special orders that may be in place.	
NOVs	Special Orders
Does the WTP have any NOVs? ☐ Yes ☒ No ☐ N/A (new construction only)	Does the WTP have any Special Orders or pending SOCs? ☐ Yes, Special Order is finalized ☐ Yes, Special Order is pending ☒ No ☐ N/A (new construction only)
If yes, then describe and provide supporting information in an appendix of the ER/EID.	*If yes, then describe and provide supporting information in an appendix of the ER/EID.*
Appendix Reference: N/A	Appendix Reference: N/A
Does the WTP currently have problems meeting SDWA primary and secondary standards?	☐ Yes ☒ No
Although the Town routinely meets regulatory standards for a water filtration plant, the emergence of red water in the distribution system and at customer's taps, along with the lack of softening continue to be a source of customer complaints.	

Table 2.1.2. Historical Water Demand Data

Provide historical flows in accordance with Section 3.3.2.2 of the guidance.

Historical Flow Appendix Reference: B

	Year	Annual Average Demand (MGD)	Maximum Daily Demand (MGD)	Peak hourly Demand (including Fire flow) (MGD)
1	2023	0.3176	0.8540	1.341
2	2024	0.3328	0.9080	1.422
	$Q_{2\text{-yr}}$:	**0.325**	0.881	1.382

Provide additional discussion of flow variations in accordance with Section 3.3.2.2 of the guidance.

Table 2.1.2. Historical Water Demand Data
Peak hourly demand was based on a diurnal peaking factor of 1.5. Fire flow demand is based on Table B105.1(1) of the North Carolina Fire Code for houses 0-3,600 sq. ft. The required fire flow is 1,000 gpm for a duration of 1-hour (60,000 gallons or 0.06 MGD). The vast majority of homes within the River Bend's service area fall within this size range.

Table 2.1.3a. Specific Equipment to be Replaced or Rehabilitated Description					
Groundwater Wells					
Picture Reference:	Appendix A	Diagram Reference:	NA	Additional Information Reference:	NA

Condition	**Age**	**Size**
☐ Good ☐ Fair ☒ Poor ☐ N/A	Well #1 - 40 years Well #2 - 48 years Well #3 – 42 years	0.37 MGD 0.26 MGD 0.37 MGD 1.00 MGD
Is this like for like replacement/no capacity increase required?		☒ Yes ☐ No

Additional Information

Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.

The proposed WTP will utilize greensand filters and zeolite softeners with associated chemical feeds in lieu of the existing Birm© filters with chemical treatment to provide removal of iron, manganese and hardness while providing primary and residual disinfection. The finished water production capacity of the existing WTPs is 0.95 MGD. The proposed WTP will match the existing plants' finished water capacity; however, additional raw water will be required in order to account for the increased backwash and softener regeneration requirements. The existing groundwater wells are located in the Upper Castle Hayne Aquifer (UCHA)/River Bend strata. The proposed wells are recommended to draw from the Lower Castle Hayne Aquifer (LCHA). The LCHA is a deeper aquifer that is anticipated to produce better quality raw water, offer better protection from potential contamination, and have increased drawdown capability that could produce better yields possibly with a fewer number of required production wells.

Table 2.1.3b. Specific Equipment to be Replaced or Rehabilitated Description					
Pressure Filters and Softeners					
Picture Reference:	Appendix A	Diagram Reference:	NA	Additional Information Reference:	NA

Condition	**Age**	**Size**
☐ Good ☐ Fair ☒ Poor ☐ N/A	Shoreline WTP - 53 years Rhems Fire Station WTP - 41 years	0.60 MGD 0.35 MGD 0.95 MGD
Is this like for like replacement/no capacity increase required?		☒ Yes ☐ No

Additional Information

Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.

A single 0.95 MGD WTP will replace the capacity provided by the two (2) existing WTPs. In lieu of the existing WTP process which utilizes Birm© filtration and chemical treatment, the proposed WTP will utilize greensand filters and zeolite softeners with associated chemical feeds to provide removal of iron, manganese and hardness while providing primary and secondary disinfection, corrosion protection, fluoridation, waste discharge dechlorination, etc. The proposed WTP will consist of three (3) equally sized filters with two (2) equally sized softeners to produce finished water to meet primary and secondary drinking water standards.

Table 2.1.3c. Specific Equipment to be Replaced or Rehabilitated Description					
Precipitation/Flocculation					
Picture Reference:	Appendix A	Diagram Reference:	NA	Additional Information Reference:	NA

Condition	**Age**	**Size**
☐ Good ☐ Fair ☒ Poor ☐ N/A	Shoreline WTP Sodium Hydroxide – 53 years Compressed Air Injection – 53 years Rhems Fire Station WTP Sodium Hydroxide – 41 years Compressed Air Injection – 41 years	0.60 MGD 0.35 MGD
Is this like for like replacement/no capacity increase required?		☒ Yes ☐ No

Additional Information

Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.
The Castle Hayne Aquifer is characterized by the presence of dissolved iron and manganese, that when precipitated forms fine pin floc which can prove challenging to remove. The proposed WTP process is expected to provide better and more consistent iron and manganese removal than the existing treatment process. The existing WTP process utilizes chemical addition ahead of the Birm© filters in an effort to maintain specific favorable ranges of pH and dissolved oxygen to facilitate precipitation and removal of iron and manganese on the Birm© filter media. The proposed treatment is a multi-step process that incorporates a forced draft aerator to begin the oxidation and precipitation process, and to strip hydrogen sulfide that may be present. Potassium permanganate, a strong oxidant, is injected below the aerator to advance the precipitation of iron and manganese while providing a continuous regeneration for the manganese dioxide coating on the greensand filter media. A raw water detention tank is provided below the aerator to provide quiescent settling of precipitated iron and manganese. The filter feed/high service pumps transmit water from the detention tank to and through the downstream filters and softeners to remove iron, manganese and hardness followed by subsequent chemical additions.

Table 2.1.3d. Specific Equipment to be Replaced or Rehabilitated Description					
Disinfection					
Picture Reference:	Appendix A	Diagram Reference:	NA	Additional Information Reference:	NA
Condition		**Age**		**Size**	
☐ Good ☐ Fair ☒ Poor ☐ N/A		Shoreline WTP Chlorine Gas – 53 Years Rhems Fire Station WTP Chlorine Gas – 41 Years		0.60 MGD 0.35 MGD	
Is this like for like replacement/no capacity increase required?				☒ Yes ☐ No	
Additional Information					
Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.					
The existing River Bend WTPs utilize gas chlorine for disinfection. Although this is a highly effective disinfectant, it is extremely dangerous to the surrounding residential community in the event that a leak were to develop. As such, the proposed WTP will utilize liquid sodium					

hypochlorite as the primary disinfectant which is a much safer alternative. Ammonia will be added to form chloramine for residual disinfection. Chloramine is an effective alternative to reduce disinfection byproducts (DBPs) such as Total Trihalomethanes (TTHMs) and Haloacetic Acids (HAAs). DBPs are formed as a result of the interaction of chlorine with organic precursors that are frequently present in Castle Hayne Aquifer groundwater.

Table 2.1.3e Specific Equipment to be Replaced or Rehabilitated Description					
Waste Handling Equipment					
Picture Reference:	Appendix A	Diagram Reference:	NA	Additional Information Reference:	NA
Condition		**Age**		**Size**	
☐ Good ☐ Fair ☒ Poor ☐ N/A		Shoreline WTP Pump – 25 Years Waste Holding Tank – 25 years Rhems Fire Station WTP Pump – 25 Years Waste Holding Tank – 25 years		0.60 MGD 0.35 MGD	
Is this like for like replacement/no capacity increase required?				☒ Yes ☐ No	
Additional Information					
Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.					

Filter backwash from each of the existing WTPs is discharged to below ground settling tanks with integral baffles to allow quiescent settling of precipitated iron and manganese prior to the supernatant overflowing into the wetwell portion of the tank. A float controlled simplex submersible pump transmits the treated supernatant waste flow from each WTP to its NPDES permitted discharge location at (1) the community boating canal at Plantation Drive and (2) a tributary to the boating canal located behind the Rhems Fire Department. The proposed WTP will utilize two (2) geomembrane lined settling lagoons operated in series. Filter backwash and softener regeneration wastewater will be discharged into the first lagoon to allow quiescent settling of precipitated iron and manganese and homogenization into a brackish waste stream. An elevated overflow pipe from the first lagoon will allow supernatant to flow by gravity into the second lagoon where additional settling time is provided. An elevated overflow pipe from the second lagoon will allow supernatant to flow by gravity into the wetwell of a duplex submersible supernatant waste pump station. The float operated submersible pumps will transmit the treated supernatant waste flow to a new combined, multi-port diffuser located in the Trent River. The new diffuser will be designed to replace the two existing WTP discharges and

the existing WWTP diffuser to the Trent River. The proposed modification to the existing NPDES discharge will require preparation, submittal and approval of a Cornell Mixing Zone Expert System (CORMIX) model, an Engineering Alternative Analysis (EAA) and NPDES permit application for NPDES review, public hearing and final approval.

3.0 Proposed Water Treatment Plant

Table 3.0.1. New WTP Requirements

Map Reference:	Figure 2	Appendix Reference:	Appendix B, C, & F	Additional Information Reference:	NA

Is this a new WTP construction in an existing site?	☐ Yes ☒ No
Is this a new WTP construction in a proposed site?	☒ Yes ☐ No
If answer to above question is Yes, is necessary easements acquired?	☒ Yes ☐ No

For new WTP construction, provide additional information on how water demands in the area are met currently

As outlined in Table 2.1.3, the Average Daily Demand (ADD) of the past two years was approximately 0.326 MGD. The average Maximum Daily Demand of the last two years was 0.881 MGD. The Town's current WTPs have a combined capacity of 0.95 MGD. As such, the ADD and MDD are approximately 34% and 93% of current and proposed WTP capacity.

Discuss availability and type of source water and raw water quality characteristics

The highest quality, abundant water source in eastern North Carolina is groundwater; and therefore, is commonly utilized for raw water supply. The quantity and quality of groundwater can vary significantly depending on the location of the wellfield and the aquifers that are available for consideration.

The existing River Bend production wells tap into the Upper Castle Hayne Aquifer/River Bend strata. These wells are relatively shallow at 110 feet deep, and have limited yields due to minimal drawdown capability. Individual yields of these shallow wells average less than 250 gallons per minute (gpm). In addition, the water-quality tends to be high in iron, manganese and hardness. The Town of River Bend is the only municipal water system in the local area that utilizes the River Bend strata. Treatment is required in order to produce potable quality drinking water. Due to the shallow aquifer depth, this aquifer is much more susceptible to contamination than the LCHA.

Lying beneath the Lower Castle Hayne Aquifer is the Beaufort Aquifer. In this part of the North Carolina Coastal Plain, portions of the Beaufort Aquifer can be brackish. Given the presence of fresh groundwater sources, it is not recommended to utilize a brackish aquifer. A brackish water

supply would require an increased level of treatment using Reverse Osmosis to produce a potable quality drinking water. The Lower Castle Hayne Aquifer produces greater yields averaging on the order of 500 – 1,000 gpm due to the greater depth and available drawdown. Historically, aquifer testing has shown that groundwater sampled from the Lower Castle Hayne Aquifer exhibits superior water quality to that contained in the shallower Upper Castle Hayne Aquifer at a similar location. As such, the water-quality of the Lower Castle Hayne water is anticipated to be superior to that of the River Bend Strata expressed in the form of lower iron, manganese and reduced hardness. Treatment is required in order to produce a potable quality drinking water meeting primary and secondary drinking water standards.
Discuss any potential challenges in meeting SDWA standards based on raw water quality characteristics
The greatest challenge to meet SDWA standards is to achieve secondary treatment standards for iron, manganese and hardness, and to ensure that Disinfection Byproducts in the distribution system, such as Total Trihalomethanes and Haloacetic Acids, are maintained within safe thresholds. With a properly designed water treatment/disinfection process, primary and secondary standards can certainly be met on a routine and consistent basis.

3.1 Population and Water Demand

Table 3.1.1 Current Population Data

Provide historical census information in accordance with Section 3.3.3 of the guidance	
Supporting document Appendix Reference:	D
Census Year	*Population in the Service Area*
1990	2,414
2000	2,944
2010	3,119
2020	2,900
If service area includes more than one municipality, discuss how breakdown of population data in accordance with Section 3.3.2.2 of the guidance.	
N/A	

Table 3.1.2 Current Water Demand

Provide historical census information in accordance with Section 3.3.4 of the guidance.

Supporting document Appendix Reference:	B

	Average Daily Demand (MGD)	*Max Daily Demand (MGD)*
Residential Demand	0.1361	0.2382
Commercial Demand	0.0163	0.0285
Industrial Demand	0.0000	0.0000
Bulk Sales	0.0000	0.0000
Institutional	0.0085	0.0149
System Process	0.0960	0.0960
Unaccounted For	0.0758	0.2126
Total Current Demand	0.3327	0.5902

Discuss the methodology for estimating/calculating the flow breakdown and comment whether this use pattern will continue in accordance with Section 3.3.2.2 of the guidance.

Average daily demand for each customer class is from the 2024 Local Water Supply Plan (LWSP). The maximum daily demand for each customer class is unknown; and therefore, was estimated using a peaking factor computed from the ratio of the Max Daily Demand to Average Daily Demand per the 2024 LWSP. The MDD/ADD peaking factor computes to approximately 1.75.

Unaccounted for water was determined by subtracting the totals of customer, system process, and fire flow demands from the average daily and maximum daily demands.

Table 3.1.3 Population and Flow Projections		
Project Service Area Population and residential demands for the next 20 years in accordance with Section 3.4.1 of the guidance.		
Supporting document Appendix Reference:		B & D
Year	*Service area Population (Projected)*	*Future Residential Demand*
Current Year	2,874	0.1466
Year 5	2,917	0.1487
Year 10	2,961	0.1510
Year 15	3,005	0.1533
Year 20	3,050	0.1556
State Assumptions and discuss methodology used for population projections. Provide percentage growth per year and justify that using U.S. Census data or data from state Data center (SDC). If alternate population growth rate is used, you must compare it with SDC projections and justify the alternate growth rate.		
According to the NC Office of State Budget and Management (NC OSBM), the population of River Bend is estimated to be 2,874 per the July 2023 standard estimate. Residential demand is estimated at 51 gallons per day per capita as stated in the 2024 Local Water Supply Plan. Rivers & Associates prepared a Water Supply Study for the Town which was published in 2024. In the study, Rivers analyzed Census data and NC OSBM data for the surrounding area, and estimated that the population of River Bend to grow by approximately 3% per decade for the next 20-years. The proposed WTP will have a finished water capacity of 0.95 MGD which is equivalent to the combined capacity of the Town's two existing WTP facilities. This capacity should be adequate to satisfy customer demands for average and maximum daily demand over the 20-year planning period.		

Table 3.1.4 Design Flow Analysis		
Project Service Area Population and residential demands for the next 20 years in accordance with Section 3.4.1 of the guidance.		
Supporting document Appendix Reference:		B
Year	*Design Flow (Year 20)*	*% change from the current Flow*
Residential Flow	0.1556	14%

Table 3.1.4 Design Flow Analysis		
Commercial Flow	0.0163	0%
Industrial	0.0000	0%
Bulk Sales	0.0000	0%
Institutional	0.0085	0%
System Process	0.0960	0%
Unaccounted for	0.0775	2%
Total	0.3539	6.4%
If design demand is based on a flow other than Year 20 flows, you must provide a justification.		
Design demand for the service area is based on the projected demand for 2050 as estimated per the NC OSBM and 2024 Local Water Supply Plan. Population projections utilizing NC OSBM residential estimates are more conservative than those in the Local Water Supply Plan. Therefore, the 20-year population in Table 3.1.3 was multiplied by the per capita demand from the 2024 Local Water Supply Plan for a residential demand of 0.1556. The Town of River Bend is primarily a residential community. There is not sufficient land within River Bend's Town or Extraterritorial Jurisdiction Limits zoned or anticipated to support significant industrial or commercial growth.		

4.0 Purpose and Need for Project

Table 4.1 Need for the Project		
Project is driven by (check all that Apply):		
Public Health ☒	Aging Infrastructure ☒	System Management Issues ☐
Does the project accommodate Future Growth?	☐ Yes	☒ No
If "Yes", the Total Project cost associated with growth (capacity increase) should not be more than 30% of total project cost.		
Provide a detailed statement of purpose and need of the project based on the above listed, or any other important factors.		
Supporting Appendix Reference:	A & E	
Prior to municipal incorporation of the Town of River Bend, the area was developed as a retirement community known as River Bend Plantation. The development was originally constructed in the late 1960's and continued to expand in subsequent years. The homeowners living in River Bend Plantation elected to pursue incorporation in the late 1970's, and the Town was subsequently chartered in 1981.		

The water system was originally constructed to support the River Bend Plantation development 40-50 years ago and was later sold by the original developer to Carolina Water Service (CWS). In 1995, the Town of River Bend purchased the water utilities from CWS.

The well pumps and associated electrical equipment are 40-42 years old. Portions of the existing WTP facilities are 41-53 years old. The existing WTPs, wells, and associated pumping and treatment equipment have outlived their useful service lives.

The Town has experienced periodic customer complaints regarding random emergence of red or reddish-brown water at various locations throughout the distribution system. A Preliminary Water System Evaluation was conducted by Rivers & Associates, Inc. in 2020. The study suggests that the red/brown water issues are a result of limitations with the current water treatment process, and suggests WTP upgrades be considered moving forward.

On July 17, 2024, Mr. Clif Whitfield, P.G., Assistant Regional Engineer with NCDEQ PWSS of the Washington Regional Office, met with Brandon Mills, PWD, ORC, to conduct a routine inspection of the Town's public water system. During this inspection, Mr. Whitfield noticed the deteriorating condition of the existing Water Treatment Plants and the marginal ability of the WTPs to adequately remove manganese. He subsequently wrote a letter to the Town recommending that the River Bend move forward with installation of new wells in order to evaluate water quality and determine the type of treatment required at a new WTP

The goal of this project is to replace aging infrastructure, secure a higher-quality, long-term water supply source, and to improve treatment capability. While the proposed WTP is anticipated to have adequate capacity to supply the anticipated 20-year future demand, it is not the primary goal of this project. The proposed WTP will have a finished water capacity equivalent to the combined finished water capacity of the Town's existing WTP's.

5.0 Alternatives Analysis

5.1 Alternatives Description

Table 5.1.1 Alternatives Description
No-Action Alternative

Provide a description of the above alternative in accordance with Sections 3.6.1.1 through 3.6.1.8 of the guidance.
Supporting Information Appendix Reference: A & E
Description

The No-Action alternative would consist of leaving the existing wells and Water Treatment Plants in service with no improvements.

Is Figure Included? ☐ Yes ☒ No	If Yes, Figure #: N/A
Alternative Feasibility: ☐ Feasible	☒ Infeasible
Capital Cost: $0	**Present Worth:** $10,598,363

Environmental Impact Description
Provide a qualitative description of the environmental impacts and compare the impacts to that of the Preferred Alternative.
The No-Action alternative will have no environmental impacts related to heavy construction unlike the Preferred Alternative. The primary impact would be to the health of the River Bend community if there were a major equipment failure at either WTP. As the majority of the WTP components have performed past their useful service life, the risk of failure is significant. The Preferred Alternative includes a new LCHA groundwater supply, new treatment plant, new equipment and controls, and improved treatment process with new service life which will mitigate these concerns.

Environmental Impact Analysis
☐ Greater than Preferred Alternative
☒ Less than Preferred Alternative
☐ Same as Preferred Alternative

Acceptance/Rejection
Alternative: ☐ Accepted ☒ Rejected

Rationale for Acceptance/Rejection
Discuss the rationale for acceptance/rejection of the above-referenced alternative.
The No-Action alternative would continue the status quo operations of the two (2) existing WTPs. The Operators would continue diligent routine maintenance and/or equipment replacement as required in an effort to provide drinking water to their customers that meets EPA drinking water standards. However, no substantive rehabilitation and/or replacement of treatment components would occur. In addition, no treatment improvements would be provided in order to address current water quality concerns

Table 5.1.2. Alternatives Description **(Preferred)** **New Filter/Softener Water Treatment Plant**	
Provide a description of the above alternative in accordance with Sections 3.6.1.1 through 3.6.1.8 of the guidance.	
Supporting Information Appendix Reference:	F

Description

This alternative includes the design and construction of a new LCHA wellfield to supply a new Filter/Softener WTP. A test well and production wells will be drilled into the LCHA. A minimum of two (2) new production wells are preliminarily estimated to supply sufficient raw water to the WTP to meet the finished water requirement plus filter backwash and softener regeneration waste byproduct water. The finished water treatment capacity will be 0.95 MGD which is equivalent to the sum of the Town's current WTP capacities.

The proposed WTP will include the following major components:

- Forced draft aeration to begin precipitation of iron and manganese and to strip away any hydrogen sulfide present in the raw water.
- Potassium permanganate chemical feed to precipitate iron and manganese out of the raw water.
- Detention tank to allow for quiescent settling of precipitated iron and manganese prior to filtration.
- Dual filter feed/high service pumps to transmit raw water from the detention tank through the treatment process and into the elevated tank and distribution system.
- Three (3) equally sized greensand filters to remove iron and manganese.
- Two (2) equally sized zeolite ion-exchange softeners to reduce overall hardness to an acceptable level. Treated water of the desired hardness will be obtained by blending softened water with softener bypass water from the filters.
- Bulk salt tank and brine pumps to transmit brine to regenerate the softener resin.
- Chemical addition including polyphosphate for corrosion control, fluoride to prevent dental caries, sodium hypochlorite for primary disinfection followed by ammonia to form chloramine for residual disinfection of the distribution system.

Table 5.1.2. Alternatives Description (Preferred)	
• Two (2) geomembrane lined ponds operated in series for settling of precipitated iron and manganese and homogenization of filter backwash and softener regeneration wastewater. • One (1) submersible duplex waste supernatant pump station to transmit treated supernatant waste to the proposed discharge location. • Waste discharge force main and multi-port diffuser to discharge treated waste from the WTP and existing WWTP to the Trent River.	
Is Figure Included? ☒ Yes ☐ No	If Yes, Figure #: 2
Alternative Feasibility: ☒ Feasible	☐ Infeasible
Capital Cost: $19,682,000	**Present Worth:** $30,428,309
Environmental Impact Description	
Provide a qualitative description of the environmental impacts and compare the impacts to that of the Preferred Alternative.	
This alternative will involve heavy construction and associated environmental impacts. These include clearing and grubbing of existing vegetation, grading, erosion, air pollution, noise pollution, etc. Small areas of wetlands are present on the WTP site and access road from the WTP to the remote well site. The WTP and well sites will be designed to minimize impacts to wetlands as much as possible. Where wetlands must be disturbed, a Nationwide Permit will be pursued through application to the US Army Corp of Engineers. Mitigation credits will be purchased if required. No jurisdictional streams are located on the WTP and/or remote well site. The waste discharge will consist of a homogenous solution of brine from softener regeneration and freshwater supernatant from filter backwash. The proposed waste discharge will combine with the existing WWTP discharge into a new multi-port diffuser into the Trent River. The Trent River at the point of discharge is classified as SB; Sw; NSW. A CORMIX dilution model will be required to determine the optimal location and discharge requirements to ensure proper dilution and assimilation into a regulatory mixing zone.	
Environmental Impact Analysis	

Table 5.1.2. Alternatives Description (Preferred)
☐ Greater than Preferred Alternative ☐ Less than Preferred Alternative ☐ Same as Preferred Alternative ☒ Preferred Alternative
Acceptance/Rejection
Alternative: ☒ Accepted ☐ Rejected
Rationale for Acceptance/Rejection
Discuss the rationale for acceptance/rejection of the above-referenced alternative.
The Filter/Softener WTP alternative is the preferred alternative. This alternative replaces aging infrastructure and incorporates an improved treatment process to the Town's existing treatment process, and will ensure a high quality, long-term water supply for the future.

Table 5.1.3. Alternatives Description **New Nanofiltration Water Treatment Plant**	
Provide a description of the above alternative in accordance with Sections 3.6.1.1 through 3.6.1.8 of the guidance.	
Supporting Information Appendix Reference:	F
Description	
This alternative includes the design and construction of a new Nanofiltration WTP. Freshwater from the LCHA is anticipated as the water supply source. The LCHA is expected to produce the highest quality and quantity of raw water. A test well and a minimum of two (2) production wells will be drilled into the LCHA to meet the finished water requirement plus concentrate reject waste stream. The finished water treatment capacity would also be 0.95 MGD which is equivalent to the sum of the Town's current WTP capacities. The proposed Nanofiltration WTP would be expected to include the following major components: • Pretreatment cartridge filters to avoid fouling the membranes. • Nanofiltration feed pumps to transport raw water through the membranes.	

Table 5.1.3. Alternatives Description

- Dual nanofiltration membrane skids.
- Degasifier tower.
- Bioscrubber odor control.
- High service pump station a finished water transmission main.
- Wastewater pump station and concentrate force main to discharge location.
- Chemical feed including caustic soda for pH control, scale inhibitors to prevent fouling of the membrane, calcium carbonate to restore hardness to an acceptable level, polyphosphate for corrosion control, and sodium hypochlorite for disinfection.
- Clean-in-place skid.

Is Figure Included? ☒ Yes ☐ No	If Yes, Figure #: 3
Alternative Feasibility: ☒ Feasible ☐ Infeasible	
Capital Cost: $21,334,957	**Present Worth:** $31,869,356

Environmental Impact Description

Provide a qualitative description of the environmental impacts and compare the impacts to that of the Preferred Alternative.

From an environmental and permitting perspective, the Nanofiltration alternative is practically identical to the F/S alternative. As such, environmental concerns are very similar. However, the NF alternative will produce a greater volume of fresh waste concentrate which may not be as favorable for discharge into the brackish receiving waters of the Trent River.

Environmental Impact Analysis

☒ Greater than Preferred Alternative
☐ Less than Preferred Alternative
☐ Same as Preferred Alternative
☐ Preferred Alternative

Acceptance/Rejection

Alternative: ☐ Accepted ☒ Rejected

Rationale for Acceptance/Rejection

Discuss the rationale for acceptance/rejection of the above-referenced alternative.

The Nanofiltration WTP was not selected as the preferred alternative for both monetary and non-monetary reasons. The Nanofiltration WTP will produce finished water to meet EPA

Table 5.1.3. Alternatives Description
drinking water standards at a greater cost than the Filter-Softener WTP. The Nanofiltration alternative also introduces greater uncertainty than the Filter-Softener option. A test well study, nanofiltration pilot plant study and CORMIX dilution modeling will be required. The pilot plant study will be required to confirm the expected performance and design parameters associated with the Nanofiltration membranes, as well as to evaluate the waste concentrate constituents that must be properly disposed of in the Trent River.

Table 5.1.4. Alternatives Description	
Bulk Water Supply with Distribution System Upgrades	
Provide a description of the above alternative in accordance with Sections 3.6.1.1 through 3.6.1.8 of the guidance.	
Supporting Information Appendix Reference:	F
Description	
Of the three (3) neighboring public water supply systems located near the Town of River Bend, only the City of New Bern has the treatment capacity available to supply the Town's water needs. The City's Public Utilities Director has indicated his belief that New Bern officials and staff would be willing to serve as a bulk water supplier to River Bend via an interconnect between the adjacent water systems. In order to accommodate the transmission of bulk water to the Town and maintain demand and residual pressure requirements, preliminary hydraulic evaluation suggests that a booster pump station and 10" transmission main would require installation between the City's planned western elevated storage tank and the Town of River Bend's existing 100,000-gallon elevated storage tank. Construction of the City of New Bern's western EST is expected within the next couple of years.	
Is Figure Included? ☐ Yes ☒ No	If Yes, Figure #: NA
Alternative Feasibility: ☒ Feasible	☐ Infeasible
Capital Cost: $8,370,745	**Present Worth:** $16,934,956
Environmental Impact Description	

Table 5.1.4. Alternatives Description
Provide a qualitative description of the environmental impacts and compare the impacts to that of the Preferred Alternative.
Compared to the Preferred Alternative, a bulk water supply option would be less environmentally impactful. Construction activities would be limited to installation of the booster pump station and linework for the 10" water main. The elevated storage tank discussed above is already a part of the City of New Bern's proposed system improvements and would not be the responsibility of River Bend. This alternative also does not require a waste stream to be discharged into surface water.
Environmental Impact Analysis
☐ Greater than Preferred Alternative ☒ Less than Preferred Alternative ☐ Same as Preferred Alternative ☐ Preferred Alternative
Acceptance/Rejection
Alternative: ☐ Accepted ☒ Rejected
Rationale for Acceptance/Rejection
Discuss the rationale for acceptance/rejection of the above-referenced alternative.
Transitioning to bulk water supply from the City of New Bern to the Town of River Bend has many pros and cons. The pros include (1) eliminating the Town's responsibility for operation and maintenance of their WTPs, (2) availability of additional time to allow the Public Works Department staff to address other needs within the Town, and (3) reduced liability for adhering to an NPDES discharge permit. Cons include (1) potential loss of autonomy, (2) control of water rates by an outside entity, (3) the Town's ability to grow being impacted by an outside political body, and (4) potential political animosity with a neighboring community due to wholesale rate negotiations. The Town of River Bend has successfully operated their own in-town water and sanitary sewer systems for almost three decades. The expertise, willingness and resolve to continue doing so certainly appear to exist.

Table 5.1.4. Alternatives Description
The bulk water supply option is only economically preferred if the Town were unable to obtain sufficient grant funding for the WTP construction. The Town has been awarded partial grant funding via NC Legislative Special Appropriation and partial grant and loan funding through the Division of Water Infrastructure. Based on the pros, cons and financial considerations, this alternative is not preferred by the Town.

Table 5.2.1. Capital Costs
Water Treatment Improvements
Town of River Bend

Complete the areas shown in gray below. Where shown, use pulldown menu to select options. The spreadsheet will calculate the capital

	No Action			
Project Administration ($):	$0			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
NA	$0	NA	0	$0

[a]Unit costs are in today's dollars, not future dollars.

Total Construction Cost:	**$0**
Construction Contingency Cost:	**$0**
Project Administration Cost:	**$0**
Total Capital Cost:	**$0**

Construction Contingency 10%

Table 5.2.2. Project Cost Life Cycle Assumptions
Water Treatment Improvements
Town of River Bend
No Action

Complete the areas shown in gray.

Component	Expected Life Cycle	Replacement Expected?†	Rationale for Expected Life Cycle
Well Pumps	25	1	Well pumps generally last up to 25 years with proper maintenance. The existing well pumps are anywhere from 42-48 years old.
Well Head Piping	50	1	Well head piping is constructed of ductile iron which generally has a life span of 50+ years. The well head piping and valves are between 42 48 years old
Well Head Valves	25	1	Valves generally have a lifespan of 25 years or more
Filter Vessels	25	1	The filter vessels generally have a lifespan of 25 or more years. The filters are between 41-53 years old.
Face Piping & Valves	50	1	Face piping is constructed of ductile iron which generally has a life span of 50+ years. The well head piping and valves are between 37-53 years old
Chemical Feed Pumps	10	1 & 11	The chemical feed pumps are as old as other WTP components. New chemical feed pumps will be required for the liquid chemical feed.
Chlorine Gas System	10	1 & 11	The existing disinfection system utilizes chlorine gas. The typical lifespan for a chlorine gas system is at least 10 years.
Waste Handling Tanks	25	1	Below grade steel tanks generally have a lifespan of 25 years. The existing tanks are 25 years old

Waste Handling Pumps	25	1	Pumps generally have a life span of 25 years. The current pumps are 25 years old
WTP Electrical and Generators	25	1	Generators generally have a lifespan of 20-30 years. The existing generators are between 37-53 years old
Well Electrical and Generators	25	1	Generators generally have a lifespan of 20-30 years. The existing generators are between 42-48 years old

[†]Period for replacement would be Years 1 through 20 only.

Table 5.2.3. Replacement Costs (Years 1 to 5)
Water Treatment Improvements
Town of River Bend
No Action

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 1	2	3	4	5
Well Pumps	$100,000	LS	1	$98,186	$0	$0	$0	$0
Well Head Piping & Valves	$60,000	LS	1	$58,912	$0	$0	$0	$0
Filter Vessels	$325,000	LS	1	$319,106	$0	$0	$0	$0
Face Piping & Valves	$100,000	LS	1	$98,186	$0	$0	$0	$0
Chemical Feed Pumps	$15,000	LS	1	$14,728	$0	$0	$0	$0
Chlorine Gas System	$80,000	LS	1	$78,549	$0	$0	$0	$0
Waste Handling Tanks	$100,000	LS	1	$98,186	$0	$0	$0	$0
Waste Handling Pumps	$20,000	LS	1	$19,637	$0	$0	$0	$0
WTP Electrical and Generators	$410,000	LS	1	$402,565	$0	$0	$0	$0
Well Electrical and Generators	$250,000	LS	1	$245,466	$0	$0	$0	$0
Total Present Value of Replacement Costs (Years 1 to 5):				**$1,433,523**	**$0**	**$0**	**$0**	**$0**

Table 5.2.4. Replacement Costs (Years 6 to 10)
Water Treatment Improvements
Town of River Bend
No Action

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 6	7	8	9	10
Well Pumps	$100,000	LS	1	$0	$0	$0	$0	$0
Well Head Piping & Valves	$60,000	LS	1	$0	$0	$0	$0	$0
Filter Vessels	$325,000	LS	1	$0	$0	$0	$0	$0
Face Piping & Valves	$100,000	LS	1	$0	$0	$0	$0	$0
Chemical Feed Pumps	$15,000	LS	1	$0	$0	$0	$0	$0
Chlorine Gas System	$80,000	LS	1	$0	$0	$0	$0	$0
Waste Handling Tanks	$100,000	LS	1	$0	$0	$0	$0	$0
Waste Handling Pumps	$20,000	LS	1	$0	$0	$0	$0	$0
WTP Electrical and Generators	$410,000	LS	1	$0	$0	$0	$0	$0
Well Electrical and Generators	$250,000	LS	1	$0	$0	$0	$0	$0
Total Present Value of Replacement Costs (Years 6 to 10):				**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.5. Replacement Costs (Years 11 to 15)
Water Treatment Improvements
Town of River Bend
No Action

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 11	12	13	14	15
Well Pumps	$100,000	LS	1	$0	$0	$0	$0	$75,993
Well Head Piping & Valves	$60,000	LS	1	$0	$0	$0	$0	$0
Filter Vessels	$325,000	LS	1	$0	$0	$0	$0	$0
Face Piping & Valves	$100,000	LS	1	$0	$0	$0	$0	$0
Chemical Feed Pumps	$15,000	LS	1	$12,265	$0	$0	$0	$0
Chlorine Gas System	$80,000	LS	1	$65,412	$0	$0	$0	$0
Waste Handling Tanks	$100,000	LS	1	$0	$0	$0	$0	$0
Waste Handling Pumps	$20,000	LS	1	$0	$0	$0	$0	$0
WTP Electrical and Generators	$410,000	LS	1	$0	$0	$0	$0	$0
Well Electrical and Generators	$250,000	LS	1	$0	$0	$0	$0	$0
Total Present Value of Replacement Costs (Years 11 to 15):				**$77,677**	**$0**	**$0**	**$0**	**$75,993**

Table 5.2.6. Replacement Costs (Years 16 to 20)
Water Treatment Improvements
Town of River Bend
No Action

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 16	17	18	19	20
Well Pumps	$100,000	LS	1	$0	$0	$0	$0	$0
Well Head Piping & Valves	$60,000	LS	1	$0	$0	$0	$0	$0
Filter Vessels	$325,000	LS	1	$0	$0	$0	$0	$0
Face Piping & Valves	$100,000	LS	1	$0	$0	$0	$0	$0
Chemical Feed Pumps	$15,000	LS	1	$0	$0	$0	$0	$0
Chlorine Gas System	$80,000	LS	1	$0	$0	$0	$0	$0
Waste Handling Tanks	$100,000	LS	1	$0	$0	$0	$0	$0
Waste Handling Pumps	$20,000	LS	1	$0	$0	$0	$0	$0
WTP Electrical and Generators	$410,000	LS	1	$0	$0	$0	$0	$0
Well Electrical and Generators	$250,000	LS	1	$0	$0	$0	$0	$0
Total Present Value of Replacement Costs (Years 16 to 20):				**$0**	**$0**	**$0**	**$0**	**$0**
Total Present Value of Replacement Costs (Life of Project):								**$1,587,193**

Table 5.2.7. Present Value of Operations and Maintenance Costs (Years 1-10)
Water Treatment Improvements
Town of River Bend
No Action

Complete the cells shown in gray below.

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 0.04875

				Present Value of O&M Costs for Year:									
Component	**Unit Cost**	**Unit**	**Quantity**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Administrative & Finance	$507,000	LS	1	$483,851	$461,759	$440,675	$420,554	$401,352	$383,027	$365,538	$348,848	$332,920	$317,719
Testing	$9,200	LS	1	$8,780	$8,379	$7,996	$7,631	$7,283	$6,950	$6,633	$6,330	$6,041	$5,765
Contracted Services	$6,550	LS	1	$6,251	$5,966	$5,693	$5,433	$5,185	$4,948	$4,722	$4,507	$4,301	$4,105
Chemicals	$13,132	LS	1	$12,532	$11,960	$11,414	$10,893	$10,396	$9,921	$9,468	$9,036	$8,623	$8,229
Supplies & Materials	$15,800	LS	1	$15,079	$14,390	$13,733	$13,106	$12,508	$11,937	$11,392	$10,871	$10,375	$9,901
Utilities	$11,000	LS	1	$10,498	$10,018	$9,561	$9,124	$8,708	$8,310	$7,931	$7,569	$7,223	$6,893
Maintenance & Repair - Building	$2,500	LS	1	$2,386	$2,277	$2,173	$2,074	$1,979	$1,889	$1,802	$1,720	$1,642	$1,567
Maintenance & Repair - Equipment	$4,600	LS	1	$4,390	$4,190	$3,998	$3,816	$3,641	$3,475	$3,317	$3,165	$3,021	$2,883
Building & Equipment Rental	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permit Fees	$2,240	LS	1	$543,767	$2,040	$1,947	$1,858	$1,773	$1,692	$1,615	$1,541	$1,471	$1,404
Miscellaneous	$1,478	LS	1	$1,411	$1,346	$1,285	$1,226	$1,170	$1,117	$1,066	$1,017	$971	$926
Capital Outlay - Equipment	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Outlay - Grounds & Buildings	$2,500	LS	1	$2,386	$2,277	$2,173	$2,074	$1,979	$1,889	$1,802	$1,720	$1,642	$1,567
Capital Outlay - Wells/Pumps	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Distribution System Maintenance	$58,000	LS	1	$55,352	$52,824	$50,413	$48,111	$45,914	$43,818	$41,817	$39,908	$38,086	$36,347
Total Present Value of Yearly O&M Expenses (Years 1-10):				**$1,146,682**	**$577,426**	**$551,061**	**$525,900**	**$501,888**	**$478,972**	**$457,103**	**$436,232**	**$416,314**	**$397,306**

Table 5.2.8. Present Value of Operations and Maintenance Costs (Years 11-20)
Water Treatment Improvements
Town of River Bend
No Action

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 0.04875

				Present Value of O&M Costs for Year:									
Component	**Unit Cost**	**Unit**	**Quantity**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Administrative & Finance	$507,000	LS	1	$303,212	$289,368	$276,156	$263,547	$251,513	$240,030	$229,070	$218,611	$208,629	$199,104
Testing	$9,200	LS	1	$5,502	$5,251	$5,011	$4,782	$4,564	$4,356	$4,157	$3,967	$3,786	$3,613
Contracted Services	$6,550	LS	1	$3,917	$3,738	$3,568	$3,405	$3,249	$3,101	$2,959	$2,824	$2,695	$2,572
Chemicals	$13,132	LS	1	$7,854	$7,495	$7,153	$6,826	$6,515	$6,217	$5,933	$5,662	$5,404	$5,157
Supplies & Materials	$15,800	LS	1	$9,449	$9,018	$8,606	$8,213	$7,838	$7,480	$7,139	$6,813	$6,502	$6,205
Utilities	$11,000	LS	1	$6,579	$6,278	$5,992	$5,718	$5,457	$5,208	$4,970	$4,743	$4,526	$4,320
Maintenance & Repair - Building	$2,500	LS	1	$1,495	$1,427	$1,362	$1,300	$1,240	$1,184	$1,130	$1,078	$1,029	$982
Maintenance & Repair - Equipment	$4,600	LS	1	$2,751	$2,625	$2,506	$2,391	$2,282	$2,178	$2,078	$1,983	$1,893	$1,806
Building & Equipment Rental	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permit Fees	$2,240	LS	1	$1,340	$1,278	$1,220	$1,164	$1,111	$1,060	$1,012	$966	$922	$880
Miscellaneous	$1,478	LS	1	$342,099	$844	$805	$768	$733	$700	$668	$637	$608	$580
Capital Outlay - Equipment	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Outlay - Grounds & Buildings	$2,500	LS	1	$1,495	$1,427	$1,362	$1,300	$1,240	$1,184	$1,130	$1,078	$1,029	$982
Capital Outlay - Wells/Pumps	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Distribution System Maintenance	$58,000	LS	1	$34,687	$33,103	$31,592	$30,149	$28,773	$27,459	$26,205	$25,009	$23,867	$22,777
Total Present Value of Yearly O&M Expenses (Years 11-20):				**$720,380**	**$361,853**	**$345,331**	**$329,563**	**$314,516**	**$300,155**	**$286,451**	**$273,371**	**$260,890**	**$248,978**
												Total Present Value of Annual O&M Costs (Life of Project):	**$8,930,373**

Table 5.2.9. Present Value of Intermittent Operations and Maintenance Costs (Years 1-10)
Water Treatment Improvements
Town of River Bend
No Action

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 0.04875

Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year: 1	2	3	4	5	6	7	8	9	10
Filter Media	$15,000	EA	6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$56,400
Total Present Value of Intermittent Operations & Maintenace Costs (Years 1-10):				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$56,400**

Table 5.2.10. Present Value of Intermittent Operations and Maintenance Costs (Years 11-20)
Water Treatment Improvements
Town of River Bend
No Action

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 0.04875

Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year: 11	12	13	14	15	16	17	18	19	20
Filter Media	$15,000	EA	6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$35,344
Total Present Value of Intermittent Operations & Maintenace Costs (Years 11-20):				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$35,344**
Total Present Value of Intermittent Operations & Maintenance Costs (Life of Project):													**$91,744**

Table 5.2.11. Capital Costs Water Treatment Improvements Town of River Bend				
Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the c				
Alternative:	**Filter-Softener Water Treatment Plant (Preferred)**			
Project Administration ($):	$2,887,915			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
New Well Field Construction				
Mobilization and Bonding	$ 41,000.00	LS	1	$ 41,000.00
Test Well Pilot Hole, Driller's Log and Formation Samples	$ 75.00	LF	360	$ 27,000.00
Test Well Gamma and Electric Logs	$ 15.00	LF	360	$ 5,400.00
Test Well 12" Pit Casing	$ 230.00	LF	40	$ 9,200.00
6" Test Well Casing and Reducer	$ 60.00	LF	250	$ 15,000.00
4.5" Test Well Screen	$ 230.00	LF	70	$ 16,100.00
4.5" Test Well Tailpiece/Cellar	$ 80.00	LF	5	$ 400.00
Temporary Zone Testing	$ 34,700.00	LS	1	$ 34,700.00
Test Well Development and Water Quality Sampling	$ 57,800.00	LS	1	$ 57,800.00
Test Well Aquifer Pump Test	$ 985.00	HR	6	$ 5,910.00
Test Well Aquifer Recovery Test	$ 600.00	HR	0.5	$ 300.00
Abandon Lower Pilot Hole with Cement Grout	$ 17.50	LF	40	$ 700.00
Production Well Pilot Hole, Driller's Log and Formation Samples	$ 85.00	LF	640	$ 54,400.00
Production Well Gamma and Electric Logs	$ 25.00	LF	640	$ 16,000.00
Production Well 24" Pit Casing	$ 575.00	LF	80	$ 46,000.00
10" Production Well Casing	$ 175.00	LF	500	$ 87,500.00
10" Production Well Screen	$ 460.00	LF	140	$ 64,400.00
10" Production Well Tailpiece/Cellar	$ 400.00	LF	10	$ 4,000.00
Production Well Development and Water Quality Sampling	$ 63,550.00	EA	2	$ 127,100.00
Production Well Aquifer Pump Test	$ 695.00	HR	48	$ 33,360.00
Production Well Aquifer Recovery Test	$ 285.00	HR	6	$ 1,710.00
Temporary Ditch Crossing	$ 8,100.00	EA	2	$ 16,200.00
Erosion Control	$ 70,100.00	LS	1	$ 70,100.00

Table 5.2.11. Capital Costs Water Treatment Improvements Town of River Bend				
Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the c				
Alternative:	**Filter-Softener Water Treatment Plant (Preferred)**			
Project Administration ($):	$2,887,915			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
Site Clearing Allowance	$ 58,100.00	LS	1	$ 58,100.00
Select Borrow Material	$ 470,000.00	LS	1	$ 470,000.00
CABC	$ 54,600.00	LS	1	$ 54,600.00
Grading	$ 20,000.00	LS	1	$ 20,000.00
Electrical Service Entrance Allowance	$ 50,000.00	LS	1	$ 50,000.00
Testing Allowance (Chemical)	$ 13,000.00	EA	2	$ 26,000.00
Well Head and Raw Water Main Construction				
Mobilization and Bonding	$ 77,500.00	LS	1	$ 77,500.00
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$ 750,800.00
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$ 11,600.00
WTP Tie-In	$ 11,600.00	EA	1	$ 11,600.00
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$ 63,000.00
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$ 651,750.00
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$ 10,380.00
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$ 4,600.00
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$ 11,600.00
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$ 37,500.00
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$ 37,500.00
Stabilization Stone (Trench)	$ 115.00	CY	100	$ 11,500.00
Erosion Control	$ 12,700.00	LS	1	$ 12,700.00
Asphalt Pavement Replacement	$ 230.00	LF	200	$ 46,000.00
Electrical Service Entrance Allowance	$ 23,100.00	LS	1	$ 23,100.00
Testing Allowance	$ 11,600.00	LS	1	$ 11,600.00
Telemetry Allowance	$ 86,600.00	LS	1	$ 86,600.00
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$ 231,000.00
Water Treatment Plant Construction				
Mobilization and Bonding	$ 277,400.00	LS	1	$ 277,400.00
Site Work	$ 598,500.00	LS	1	$ 598,500.00

Table 5.2.11. Capital Costs Water Treatment Improvements Town of River Bend				
Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the c				
Alternative:	**Filter-Softener Water Treatment Plant (Preferred)**			
Project Administration ($):	$2,887,915			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
Water Treatment Plant Building	$ 370.00	SF	5400	$ 1,998,000.00
WTP Equipment (Filters, Softeners, Face Piping, Valves, Chemical Feed Equipment, Controls, etc.)	$ 2,913,800.00	LS	1	$ 2,913,800.00
Brine System	$ 186,900.00	LS	1	$ 186,900.00
Aeration/Detention Tank	$ 594,300.00	LS	1	$ 594,300.00
Yard Piping	$ 290,900.00	LS	1	$ 290,900.00
Electrical, WTP Generator and ATS	$ 1,338,800.00	LS	1	$ 1,338,800.00
SCADA & Telemetry	$ 420,000.00	LS	1	$ 420,000.00
Testing Allowance	$ 110,300.00	LS	1	$ 110,300.00
Equipment Allowance	$ 78,800.00	LS	1	$ 78,800.00
Utility Service Entrance Allowance	$ 42,000.00	LS	1	$ 42,000.00
Undercut Excavation w/ Select Backfill	$ 42,000.00	LS	1	$ 42,000.00
Erosion Control Measures	$ 63,000.00	LS	1	$ 63,000.00
Settling Basin and Backwash Waste Force Main/Discharge Construction				
Mobilization and Bonding	$ 112,400.00	LS	1	$ 112,400.00
Geo-Membrane-Lined Backwash Settling Basins	$ 473,600.00	LS	1	$ 473,600.00
Supernatant Pump Station	$ 577,500.00	LS	1	$ 577,500.00
6” PVC/RJPVC Force Main and Valves	$ 128.00	LF	7985	$ 1,022,080.00
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$ 117,600.00
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$ 48,000.00
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$ 140,000.00
10” Fusible PVC Directional Bore	$ 528.00	LF	700	$ 369,600.00
Asphalt Removal and Replacement	$ 230.00	LF	310	$ 71,300.00
Asphalt Drive Removal and Replacement	$ 115.00	LF	520	$ 59,800.00
Concrete Drive Removal and Replacement	$ 175.00	LF	120	$ 21,000.00
Replace RCP Culvert beneath Driveway	$ 1,160.00	EA	21	$ 24,360.00

Table 5.2.11. Capital Costs
Water Treatment Improvements
Town of River Bend

Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the c

Alternative:	**Filter-Softener Water Treatment Plant (Preferred)**			
Project Administration ($):	$2,887,915			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
Automatic Combination ARV/Vacuum Valve and Vault	$ 23,100.00	EA	4	$ 92,400.00
Additional DIP Fittings	$ 25.00	LB	2550	$ 63,750.00
Erosion Control Measures	$ 26,000.00	LS	1	$ 26,000.00
Stabilization Stone	$ 120.00	CY	50	$ 6,000.00
Select Backfill	$ 45.00	CY	170	$ 7,650.00
Testing Allowance	$ 17,300.00	LS	1	$ 17,300.00
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$ 11,600.00
Remove Existing 8” Outfall	$ 57,800.00	LS	1	$ 57,800.00
Remove and Replace Existing Multiport Diffuser	$ 86,600.00	LS	1	$ 86,600.00
Miscellaneous Construction				
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	$ 438,000.00	LS	1	$ 438,000.00
Galvanized Water Service Line Replacement	$ 21,000.00	LS	1	$ 21,000.00

[a]Unit costs are in today's dollars, not future dollars.

Total Construction Cost:	**$16,323,350**
Construction Contingency Cost:	**$1,632,335**
Project Administration Cost:	**$2,887,915**
Total Capital Cost:	**$20,843,600**

Construction Contingency: 10.0%

Table 5.2.12. Project Cost Life Cycle Assumptions Water Treatment Improvements Town of River Bend Filter-Softener Water Treatment Plant (Preferred)			
Complete the areas shown in gray.			
Component	**Expected Life Cycle**	**Replacement Expected?†**	**Rationale for Expected Life Cycle**
New Well Field Construction			
Test Well/Production Well Pit Casing	50		Test well & production well pit casing will be steel which have a life cycle of 50+ years
Test Well/Production Well Casings and Reducers	50		Test well and production well casings will be PVC which have a life cycle of 50+ years
Test Well/Production Well Screens and Tailpieces	50		Test well and production well screens will be PVC which have a life cycle of 50+ years
Well Head and Raw Water Main Construction			
Wellhead, Pump, Electrical and Site Improvements	25		Well Pumps and Electrical Equipment have an average life cycle of 25 years on average
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years
Gate Valves	25		Valves generally have a lifespan of 25 years or more
Air Release Valves	25		Valves generally have a lifespan of 25 years or more
Steel Casing (Jack and Bore)	50		Steel casing pipes have a lifespan of 50+ years
Generator	25		Generators generally have a lifespan of 20-30 years.
Water Treatment Plant Construction			
Water Treatment Plant Building	50		The WTP building will have a lifespan of 50+ years
Filter/High Service Pumps	20	20	The filter/high service pumps will have a lifespan of 20-25 years.

Filter/Softener Vessels	25		Filter/Softener vessels generally have a lifespan of 25 or more years.
Filter/Softener Face Piping	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years
Filter/Softener Valves	30		Valves associated with the filter/softener face piping will be more easily accessible for maintenance than valves for water mains. They will also be exercised more often and therefore will last 30+ years.
Chemical Feed Pumps	10	10, 20	Chemical feed pumps generally have a lifespan of 10-15 years.
Sensors and Controls	20	20	Sensors are anticipated to be replaced every 20-25 years.
Brine System	25		The brine system will have a life cycle of about 25 years
Detention Tank	50		Steel tanks have a lifespan of 50+ years
Aerator	25		The aerator will have a lifespan of between 25-30 years.
Yard Piping	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years
Electrical, WTP Generator and ATS	25		Generators generally have a lifespan of 20-30 years.
SCADA & Telemetry	20	20	SCADA software regularly becomes outdated as new software becomes available. Physical infrastructure for SCADA & Telemetry has a longer lifespan than software typically about 20+ years
Settling Basin and Backwash Waste Force Main/Discharge Construction			
Geo-Membrane-Lined Backwash Settling Basins	25		Geo-Membrane textiles have a lifespan of 25+ years
Supernatant Pump Station	25		The pump station will have a life cycle of 25-30 years
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years

Steel Casing (Jack and Bore)	50		Steel casing pipes have a lifespan of 50+ years
Automatic Combination ARV/Vacuum Valve and Vault	25		Valves generally have a lifespan of 25 years or more
Miscellaneous Construction			
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	20	20	The emergency interconnect will have a life cycle of approximately 20 years.
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years

[†]Period for replacement would be Years 1 through 20 only.

Table 5.2.13. Replacement Costs (Years 1 to 5)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 1	2	3	4	5
New Well Field Construction								
Test Well 12" Pit Casing	$ 230.00	LF	40	$0.00	$0.00	$0.00	$0.00	$0.00
6" Test Well Casing and Reducer	$ 60.00	LF	250	$0.00	$0.00	$0.00	$0.00	$0.00
4.5" Test Well Screen	$ 230.00	LF	70	$0.00	$0.00	$0.00	$0.00	$0.00
4.5" Test Well Tailpiece/Cellar	$ 80.00	LF	5	$0.00	$0.00	$0.00	$0.00	$0.00
Production Well 24" Pit Casing	$ 575.00	LF	80	$0.00	$0.00	$0.00	$0.00	$0.00
10" Production Well Casing	$ 175.00	LF	500	$0.00	$0.00	$0.00	$0.00	$0.00
10" Production Well Screen	$ 460.00	LF	140	$0.00	$0.00	$0.00	$0.00	$0.00
10" Production Well Tailpiece/Cellar	$ 400.00	LF	10	$0.00	$0.00	$0.00	$0.00	$0.00
Well Head and Raw Water Main Construction								
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
WTP Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
6" PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$0.00	$0.00	$0.00	$0.00	$0.00
10" PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$0.00	$0.00	$0.00	$0.00	$0.00
6" Gate Valve w/ Box	$ 3,460.00	EA	3	$0.00	$0.00	$0.00	$0.00	$0.00
10" Gate Valve w/ Box	$ 4,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$0.00	$0.00	$0.00	$0.00	$0.00
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$0.00	$0.00	$0.00	$0.00	$0.00
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Water Treatment Plant Construction								
Water Treatment Plant Building	$ 370.00	SF	5,400	$0.00	$0.00	$0.00	$0.00	$0.00
Filter/High Service Pumps	$ 100,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Filter/Softener Vessels	$ 325,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Filter/Softener Face Piping	$ 40,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Filter/Softener Valves	$ 60,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Chemical Feed Pumps	$ 1,500.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Sensors and Controls	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Brine System	$ 186,900.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Detention Tank	$ 569,300.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Aerator	$ 25,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Yard Piping	$ 290,900.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Electrical, WTP Generator and ATS	$ 1,338,800.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA & Telemetry	$ 420,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00

Table 5.2.13. Replacement Costs (Years 1 to 5)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 1	2	3	4	5
Settling Basin and Backwash Waste Force Main/Discharge Construction								
Geo-Membrane-Lined Backwash Settling Basins	$ 473,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Supernatant Pump Station	$ 577,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
6” PVC/RJPVC Force Main and Valves	$ 128.00	LF	7985	$0.00	$0.00	$0.00	$0.00	$0.00
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$0.00	$0.00	$0.00	$0.00	$0.00
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$0.00	$0.00	$0.00	$0.00	$0.00
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$0.00	$0.00	$0.00	$0.00	$0.00
10” Fusible PVC Directional Bore	$ 528.00	LF	700	$0.00	$0.00	$0.00	$0.00	$0.00
Automatic Combination ARV/Vacuum Valve and Vault	$ 23,100.00	EA	4	$0.00	$0.00	$0.00	$0.00	$0.00
Additional DIP Fittings	$ 25.00	LB	2550	$0.00	$0.00	$0.00	$0.00	$0.00
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Miscellaneous Construction								
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	$ 438,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Galvanized Water Service Line Replacement	$ 21,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 1 to 5):				**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.14. Replacement Costs (Years 6 to 10)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 6	7	8	9	10
New Well Field Construction								
Test Well 12” Pit Casing	$ 230.00	LF	40	$0	$0	$0	$0	$0
6” Test Well Casing and Reducer	$ 60.00	LF	250	$0	$0	$0	$0	$0
4.5” Test Well Screen	$ 230.00	LF	70	$0	$0	$0	$0	$0
4.5” Test Well Tailpiece/Cellar	$ 80.00	LF	5	$0	$0	$0	$0	$0
Production Well 24” Pit Casing	$ 575.00	LF	80	$0	$0	$0	$0	$0
10” Production Well Casing	$ 175.00	LF	500	$0	$0	$0	$0	$0
10” Production Well Screen	$ 460.00	LF	140	$0	$0	$0	$0	$0
10” Production Well Tailpiece/Cellar	$ 400.00	LF	10	$0	$0	$0	$0	$0
Well Head and Raw Water Main Construction								
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$0	$0	$0	$0	$0
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
WTP Tie-In	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$0	$0	$0	$0	$0
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$0	$0	$0	$0	$0
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$0	$0	$0	$0	$0
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$0	$0	$0	$0	$0
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$0	$0	$0	$0	$0
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$0	$0	$0	$0	$0
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$0	$0	$0	$0	$0
Water Treatment Plant Construction								
Water Treatment Plant Building	$ 370.00	SF	5,400	$0	$0	$0	$0	$0
Filter/High Service Pumps	$ 100,000.00	EA	2	$0	$0	$0	$0	$0
Filter/Softener Vessels	$ 325,000.00	LS	1	$0	$0	$0	$0	$0
Filter/Softener Face Piping	$ 40,000.00	LS	1	$0	$0	$0	$0	$0
Filter/Softener Valves	$ 60,000.00	LS	1	$0	$0	$0	$0	$0
Chemical Feed Pumps	$ 1,500.00	EA	2	$0	$0	$0	$0	$2,498
Sensors and Controls	$ 80,000.00	LS	1	$0	$0	$0	$0	$0
Brine System	$ 186,900.00	LS	1	$0	$0	$0	$0	$0
Detention Tank	$ 569,300.00	LS	1	$0	$0	$0	$0	$0
Aerator	$ 25,000.00	LS	1	$0	$0	$0	$0	$0
Yard Piping	$ 290,900.00	LS	1	$0	$0	$0	$0	$0
Electrical, WTP Generator and ATS	$ 1,338,800.00	LS	1	$0	$0	$0	$0	$0
SCADA & Telemetry	$ 420,000.00	LS	1	$0	$0	$0	$0	$0

Table 5.2.14. Replacement Costs (Years 6 to 10)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 6	7	8	9	10
Settling Basin and Backwash Waste Force Main/Discharge Construction								
Geo-Membrane-Lined Backwash Settling Basins	$ 473,600.00	LS	1	$0	$0	$0	$0	$0
Supernatant Pump Station	$ 577,500.00	LS	1	$0	$0	$0	$0	$0
6” PVC/RJPVC Force Main and Valves	$ 128.00	LF	7985	$0	$0	$0	$0	$0
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$0	$0	$0	$0	$0
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$0	$0	$0	$0	$0
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$0	$0	$0	$0	$0
10” Fusible PVC Directional Bore	$ 528.00	LF	700	$0	$0	$0	$0	$0
Automatic Combination ARV/Vacuum Valve and Vault	$ 23,100.00	EA	4	$0	$0	$0	$0	$0
Additional DIP Fittings	$ 25.00	LB	2550	$0	$0	$0	$0	$0
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$0	$0	$0	$0	$0
Miscellaneous Construction								
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	$ 438,000.00	LS	1	$0	$0	$0	$0	$0
Galvanized Water Service Line Replacement	$ 21,000.00	LS	1	$0	$0	$0	$0	$0
Total Present Value of Replacement Costs (Years 6 to 10):				**$0**	**$0**	**$0**	**$0**	**$2,498**

Table 5.2.15. Replacement Costs (Years 11 to 15)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 11	12	13	14	15
New Well Field Construction								
Test Well 12” Pit Casing	$ 230.00	LF	40	$0	$0	$0	$0	$0
6” Test Well Casing and Reducer	$ 60.00	LF	250	$0	$0	$0	$0	$0
4.5” Test Well Screen	$ 230.00	LF	70	$0	$0	$0	$0	$0
4.5” Test Well Tailpiece/Cellar	$ 80.00	LF	5	$0	$0	$0	$0	$0
Production Well 24” Pit Casing	$ 575.00	LF	80	$0	$0	$0	$0	$0
10” Production Well Casing	$ 175.00	LF	500	$0	$0	$0	$0	$0
10” Production Well Screen	$ 460.00	LF	140	$0	$0	$0	$0	$0
10” Production Well Tailpiece/Cellar	$ 400.00	LF	10	$0	$0	$0	$0	$0
Well Head and Raw Water Main Construction								
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$0	$0	$0	$0	$0
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
WTP Tie-In	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$0	$0	$0	$0	$0
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$0	$0	$0	$0	$0
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$0	$0	$0	$0	$0
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$0	$0	$0	$0	$0
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$0	$0	$0	$0	$0
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$0	$0	$0	$0	$0
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$0	$0	$0	$0	$0
Water Treatment Plant Construction								
Water Treatment Plant Building	$ 370.00	SF	5,400	$0	$0	$0	$0	$0
Filter/High Service Pumps	$ 100,000.00	EA	2	$0	$0	$0	$0	$0
Filter/Softener Vessels	$ 325,000.00	LS	1	$0	$0	$0	$0	$0
Filter/Softener Face Piping	$ 40,000.00	LS	1	$0	$0	$0	$0	$0
Filter/Softener Valves	$ 60,000.00	LS	1	$0	$0	$0	$0	$0
Chemical Feed Pumps	$ 1,500.00	EA	2	$0	$0	$0	$0	$0
Sensors and Controls	$ 80,000.00	LS	1	$0	$0	$0	$0	$0
Brine System	$ 186,900.00	LS	1	$0	$0	$0	$0	$0
Detention Tank	$ 569,300.00	LS	1	$0	$0	$0	$0	$0
Aerator	$ 25,000.00	LS	1	$0	$0	$0	$0	$0
Yard Piping	$ 290,900.00	LS	1	$0	$0	$0	$0	$0
Electrical, WTP Generator and ATS	$ 1,338,800.00	LS	1	$0	$0	$0	$0	$0
SCADA & Telemetry	$ 420,000.00	LS	1	$0	$0	$0	$0	$0

Table 5.2.15. Replacement Costs (Years 11 to 15)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 11	12	13	14	15
Settling Basin and Backwash Waste Force Main/Discharge Construction								
Geo-Membrane-Lined Backwash Settling Basins	$ 473,600.00	LS	1	$0	$0	$0	$0	$0
Supernatant Pump Station	$ 577,500.00	LS	1	$0	$0	$0	$0	$0
6” PVC/RJPVC Force Main and Valves	$ 128.00	LF	7985	$0	$0	$0	$0	$0
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$0	$0	$0	$0	$0
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$0	$0	$0	$0	$0
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$0	$0	$0	$0	$0
10” Fusible PVC Directional Bore	$ 528.00	LF	700	$0	$0	$0	$0	$0
Automatic Combination ARV/Vacuum Valve and Vault	$ 23,100.00	EA	4	$0	$0	$0	$0	$0
Additional DIP Fittings	$ 25.00	LB	2550	$0	$0	$0	$0	$0
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$0	$0	$0	$0	$0
Miscellaneous Construction								
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	438000	LS	1	$0	$0	$0	$0	$0
Galvanized Water Service Line Replacement	21000	LS	1	$0	$0	$0	$0	$0
Total Present Value of Replacement Costs (Years 11 to 15):				**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.16. Replacement Costs (Years 16 to 20)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 16	17	18	19	20
New Well Field Construction								
Test Well 12” Pit Casing	$ 230.00	LF	40	$0	$0	$0	$0	$0
6” Test Well Casing and Reducer	$ 60.00	LF	250	$0	$0	$0	$0	$0
4.5” Test Well Screen	$ 230.00	LF	70	$0	$0	$0	$0	$0
4.5” Test Well Tailpiece/Cellar	$ 80.00	LF	5	$0	$0	$0	$0	$0
Production Well 24” Pit Casing	$ 575.00	LF	80	$0	$0	$0	$0	$0
10” Production Well Casing	$ 175.00	LF	500	$0	$0	$0	$0	$0
10” Production Well Screen	$ 460.00	LF	140	$0	$0	$0	$0	$0
10” Production Well Tailpiece/Cellar	$ 400.00	LF	10	$0	$0	$0	$0	$0
Well Head and Raw Water Main Construction								
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$0	$0	$0	$0	$0
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
WTP Tie-In	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$0	$0	$0	$0	$0
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$0	$0	$0	$0	$0
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$0	$0	$0	$0	$0
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$0	$0	$0	$0	$0
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$0	$0	$0	$0	$0
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$0	$0	$0	$0	$0
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$0	$0	$0	$0	$0
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$0	$0	$0	$0	$0
Water Treatment Plant Construction								
Water Treatment Plant Building	$ 370.00	SF	5,400	$0	$0	$0	$0	$0
Filter/High Service Pumps	$ 100,000.00	EA	2	$0	$0	$0	$0	$138,696
Filter/Softener Vessels	$ 325,000.00	LS	1	$0	$0	$0	$0	$0
Filter/Softener Face Piping	$ 40,000.00	LS	1	$0	$0	$0	$0	$0
Filter/Softener Valves	$ 60,000.00	LS	1	$0	$0	$0	$0	$0
Chemical Feed Pumps	$ 1,500.00	EA	2	$0	$0	$0	$0	$2,080
Sensors and Controls	$ 80,000.00	LS	1	$0	$0	$0	$0	$55,478
Brine System	$ 186,900.00	LS	1	$0	$0	$0	$0	$0
Detention Tank	$ 569,300.00	LS	1	$0	$0	$0	$0	$0
Aerator	$ 25,000.00	LS	1	$0	$0	$0	$0	$0
Yard Piping	$ 290,900.00	LS	1	$0	$0	$0	$0	$0
Electrical, WTP Generator and ATS	$ 1,338,800.00	LS	1	$0	$0	$0	$0	$0
SCADA & Telemetry	$ 420,000.00	LS	1	$0	$0	$0	$0	$291,262

Table 5.2.16. Replacement Costs (Years 16 to 20)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 16	17	18	19	20
Settling Basin and Backwash Waste Force Main/Discharge Construction								
Geo-Membrane-Lined Backwash Settling Basins	$ 473,600.00	LS	1	$0	$0	$0	$0	$0
Supernatant Pump Station	$ 577,500.00	LS	1	$0	$0	$0	$0	$0
6” PVC/RJPVC Force Main and Valves	$ 128.00	LF	7985	$0	$0	$0	$0	$0
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$0	$0	$0	$0	$0
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$0	$0	$0	$0	$0
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$0	$0	$0	$0	$0
10” Fusible PVC Directional Bore	$ 528.00	LF	700	$0	$0	$0	$0	$0
Automatic Combination ARV/Vacuum Valve and Vault	$ 23,100.00	EA	4	$0	$0	$0	$0	$0
Additional DIP Fittings	$ 25.00	LB	2550	$0	$0	$0	$0	$0
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$0	$0	$0	$0	$0
Miscellaneous Construction								
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	438000	LS	1	$0	$0	$0	$0	$303,745
Galvanized Water Service Line Replacement	21000	LS	1	$0	$0	$0	$0	$0
Total Present Value of Replacment Costs (Years 16 to 20):				**$0**	**$0**	**$0**	**$0**	**$791,262**
Total Present Value of Replacement Costs (Life of Project):								**$793,760**

Table 5.2.17. Present Value of Operations and Maintenance Costs (Years 1-10)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Complete the cells shown in gray below.

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 4.875%

				Present Value of O&M Costs for Year:									
Component	**Unit Cost**	**Unit**	**Quantity**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Administrative & Finance	$507,000	LS	1	$483,851	$461,759	$440,675	$420,554	$401,352	$383,027	$365,538	$348,848	$332,920	$317,719
Testing	$6,440	LS	1	$6,146	$5,865	$5,598	$5,342	$5,098	$4,865	$4,643	$4,431	$4,229	$4,036
Contracted Services	$13,100	LS	1	$12,502	$11,931	$11,386	$10,866	$10,370	$9,897	$9,445	$9,014	$8,602	$8,209
Chemicals	$26,264	LS	1	$25,065	$23,920	$22,828	$21,786	$20,791	$19,842	$18,936	$18,071	$17,246	$16,459
Supplies & Materials	$23,700	LS	1	$22,618	$21,585	$20,600	$19,659	$18,761	$17,905	$17,087	$16,307	$15,563	$14,852
Utilities	$27,500	LS	1	$26,244	$25,046	$23,903	$22,811	$21,770	$20,776	$19,827	$18,922	$18,058	$17,233
Maintenance & Repair - Building	$2,500	LS	1	$2,386	$2,277	$2,173	$2,074	$1,979	$1,889	$1,802	$1,720	$1,642	$1,567
Maintenance & Repair - Equipment	$6,900	LS	1	$6,585	$6,284	$5,997	$5,724	$5,462	$5,213	$4,975	$4,748	$4,531	$4,324
Building & Equipment Rental	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permit Fees	$2,240	LS	1	$2,138	$2,040	$1,947	$1,858	$1,773	$1,692	$1,615	$1,541	$1,471	$1,404
Miscellaneous	$2,956	LS	1	$2,821	$2,692	$2,569	$2,452	$2,340	$2,233	$2,131	$2,034	$1,941	$1,852
Capital Outlay - Equipment	$10,000	LS	1	$9,543	$9,108	$8,692	$8,295	$7,916	$7,555	$7,210	$6,881	$6,566	$6,267
Capital Outlay - Grounds & Buildings	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Outlay - Wells/Pumps	$10,000	LS	1	$9,543	$9,108	$8,692	$8,295	$7,916	$7,555	$7,210	$6,881	$6,566	$6,267
Distribution System Maintenance	$58,000	LS	1	$55,352	$52,824	$50,413	$48,111	$45,914	$43,818	$41,817	$39,908	$38,086	$36,347
Total Present Value of Yearly O&M Expenses (Years 1-10):				**$664,794**	**$634,440**	**$605,472**	**$577,827**	**$551,444**	**$526,265**	**$502,237**	**$479,305**	**$457,420**	**$436,535**

Table 5.2.18. Present Value of Operations and Maintenance Costs (Years 11-20)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate Based on Municipal Cost Index: 0.09% EPA Discount Rate: 4.875%

				Present Value of O&M Costs for Year:									
Component	**Unit Cost**	**Unit**	**Quantity**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Administrative & Finance	$507,000	LS	1	$303,212	$289,368	$276,156	$263,547	$251,513	$240,030	$229,070	$218,611	$208,629	$199,104
Testing	$6,440	LS	1	$3,851	$3,676	$3,508	$3,348	$3,195	$3,049	$2,910	$2,777	$2,650	$2,529
Contracted Services	$13,100	LS	1	$7,834	$7,477	$7,135	$6,810	$6,499	$6,202	$5,919	$5,649	$5,391	$5,144
Chemicals	$26,264	LS	1	$15,707	$14,990	$14,306	$13,652	$13,029	$12,434	$11,866	$11,325	$10,808	$10,314
Supplies & Materials	$23,700	LS	1	$14,174	$13,527	$12,909	$12,320	$11,757	$11,220	$10,708	$10,219	$9,752	$9,307
Utilities	$27,500	LS	1	$16,446	$15,696	$14,979	$14,295	$13,642	$13,019	$12,425	$11,858	$11,316	$10,800
Maintenance & Repair - Building	$2,500	LS	1	$1,495	$1,427	$1,362	$1,300	$1,240	$1,184	$1,130	$1,078	$1,029	$982
Maintenance & Repair - Equipment	$6,900	LS	1	$4,127	$3,938	$3,758	$3,587	$3,423	$3,267	$3,118	$2,975	$2,839	$2,710
Building & Equipment Rental	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permit Fees	$2,240	LS	1	$1,340	$1,278	$1,220	$1,164	$1,111	$1,060	$1,012	$966	$922	$880
Miscellaneous	$2,956	LS	1	$1,768	$1,687	$1,610	$1,537	$1,466	$1,399	$1,336	$1,275	$1,216	$1,161
Capital Outlay - Equipment	$10,000	LS	1	$5,981	$5,707	$5,447	$5,198	$4,961	$4,734	$4,518	$4,312	$4,115	$3,927
Capital Outlay - Grounds & Buildings	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Outlay - Wells/Pumps	$10,000	LS	1	$5,981	$5,707	$5,447	$5,198	$4,961	$4,734	$4,518	$4,312	$4,115	$3,927
Distribution System Maintenance	$58,000	LS	1	$34,687	$33,103	$31,592	$30,149	$28,773	$27,459	$26,205	$25,009	$23,867	$22,777
Total Present Value of Yearly O&M Expenses (Years 11-20):				**$416,603**	**$397,581**	**$379,428**	**$362,104**	**$345,571**	**$329,792**	**$314,734**	**$300,364**	**$286,649**	**$273,561**
Total Present Value of Annual O&M Costs (Life of Project):													**$8,842,126**

Table 5.2.19. Present Value of Intermittent Operations and Maintenance Costs (Years 1-10)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 0.04875

Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year: 1	2	3	4	5	6	7	8	9	10
Filter Media	$ 25,000.00	EA	3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$47,000
Softener Media	$ 20,000.00	EA	2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,067
Total Present Value of Intermittent Operations & Maintenace Costs (Years 1-10):				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$72,066**

$0

Table 5.2.20. Present Value of Intermittent Operations and Maintenance Costs (Years 11-20)
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 0.04875

Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year: 11	12	13	14	15	16	17	18	19	20
Filter Media	$ 20,000.00	EA	3	$0	$0	$0	$0	$0	$0	$0	$0	$0	$23,563
Softener Media	$ 20,000.00	EA	2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$15,708
Total Present Value of Intermittent Operations & Maintenace Costs (Years 11-20):				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$39,271**
Total Present Value of Intermittent Operations & Maintenance Costs (Life of Project):													**$111,337**

Table 5.2.21. Capital Costs Water Treatment Improvements Town of River Bend				
Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the				
Alternative:	**Nanofiltration Water Treatment Plant**			
Project Administration ($):	$2,902,500			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
New Well Field Construction				
Mobilization and Bonding	$ 41,000.00	LS	1	$ 41,000.00
Test Well Pilot Hole, Driller's Log and Formation Samples	$ 75.00	LF	360	$ 27,000.00
Test Well Gamma and Electric Logs	$ 15.00	LF	360	$ 5,400.00
Test Well 12" Pit Casing	$ 230.00	LF	40	$ 9,200.00
6" Test Well Casing and Reducer	$ 60.00	LF	250	$ 15,000.00
4.5" Test Well Screen	$ 230.00	LF	70	$ 16,100.00
4.5" Test Well Tailpiece/Cellar	$ 80.00	LF	5	$ 400.00
Temporary Zone Testing	$ 34,700.00	LS	1	$ 34,700.00
Test Well Development and Water Quality Sampling	$ 57,800.00	LS	1	$ 57,800.00
Test Well Aquifer Pump Test	$ 985.00	HR	6	$ 5,910.00
Test Well Aquifer Recovery Test	$ 600.00	HR	0.5	$ 300.00
Abandon Lower Pilot Hole with Cement Grout	$ 17.50	LF	40	$ 700.00
Production Well Pilot Hole, Driller's Log and Formation Samples	$ 85.00	LF	640	$ 54,400.00
Production Well Gamma and Electric Logs	$ 25.00	LF	640	$ 16,000.00
Production Well 24" Pit Casing	$ 575.00	LF	80	$ 46,000.00
10" Production Well Casing	$ 175.00	LF	500	$ 87,500.00
10" Production Well Screen	$ 460.00	LF	140	$ 64,400.00
10" Production Well Tailpiece/Cellar	$ 400.00	LF	10	$ 4,000.00
Production Well Development and Water Quality Sampling	$ 63,550.00	EA	2	$ 127,100.00
Production Well Aquifer Pump Test	$ 695.00	HR	48	$ 33,360.00
Production Well Aquifer Recovery Test	$ 285.00	HR	6	$ 1,710.00
Temporary Ditch Crossing	$ 8,100.00	EA	2	$ 16,200.00
Erosion Control	$ 70,100.00	LS	1	$ 70,100.00

Table 5.2.21. Capital Costs Water Treatment Improvements Town of River Bend				
Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the				
Alternative:	**Nanofiltration Water Treatment Plant**			
Project Administration ($):	$2,902,500			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
Site Clearing Allowance	$ 58,100.00	LS	1	$ 58,100.00
Select Borrow Material	$ 470,000.00	LS	1	$ 470,000.00
CABC	$ 54,600.00	LS	1	$ 54,600.00
Grading	$ 20,000.00	LS	1	$ 20,000.00
Electrical Service Entrance Allowance	$ 50,000.00	LS	1	$ 50,000.00
Testing Allowance (Chemical; All Three Wells)	$ 13,000.00	EA	2	$ 26,000.00
Well Head and Raw Water Main Construction				
Mobilization and Bonding	$ 77,500.00	LS	1	$ 77,500.00
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$ 750,800.00
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$ 11,600.00
WTP Tie-In	$ 11,600.00	EA	1	$ 11,600.00
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$ 63,000.00
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$ 651,750.00
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$ 10,380.00
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$ 4,600.00
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$ 11,600.00
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$ 37,500.00
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$ 37,500.00
Stabilization Stone (Trench)	$ 115.00	CY	100	$ 11,500.00
Erosion Control	$ 12,700.00	LS	1	$ 12,700.00
Asphalt Pavement Replacement	$ 230.00	LF	200	$ 46,000.00
Electrical Service Entrance Allowance	$ 23,100.00	LS	1	$ 23,100.00
Testing Allowance	$ 11,600.00	LS	1	$ 11,600.00
Telemetry Allowance	$ 86,600.00	LS	1	$ 86,600.00
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$ 231,000.00
Water Treatment Plant Construction				
Mobilization and Bonding	$ 300,000.00	LS	1	$ 300,000.00
Site Work	$ 1,170,000.00	LS	1	$ 1,170,000.00

Table 5.2.21. Capital Costs Water Treatment Improvements Town of River Bend				
Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the				
Alternative:	**Nanofiltration Water Treatment Plant**			
Project Administration ($):	$2,902,500			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
Water Treatment Plant Building	$ 2,180,000.00	LS	1	$ 2,180,000.00
WTP Equipment (Membrane Pumps, VFDs, Cartridge Filters, Membrane Skids, Clean-in-Place System, Membrane Face Piping, Valves, Chemical Feed Equipment, etc.)	$ 3,750,000.00	LS	1	$ 3,750,000.00
Aerator	$ 307,000.00	LS	1	$ 307,000.00
Yard Piping	$ 277,000.00	LS	1	$ 277,000.00
Electrical, WTP Generator, and ATS	$ 1,895,000.00	LS	1	$ 1,895,000.00
SCADA & Telemetry	$ 420,000.00	LS	1	$ 420,000.00
Testing Allowance	$ 105,000.00	LS	1	$ 105,000.00
Equipment Allowance	$ 75,000.00	LS	1	$ 75,000.00
Utility Service Entrance Allowance	$ 40,000.00	LS	1	$ 40,000.00
Undercut Excavation & Select Backfill	$ 40,000.00	LS	1	$ 40,000.00
Erosion Control Measures	$ 60,000.00	LS	1	$ 60,000.00
Waste Concentrate Force Main				
Mobilization and Bonding	$ 67,200.00	LS	1	$ 67,200.00
6” PVC/RJPVC Force Main and Valves	$ 128.00	LF	7985	$ 1,022,080.00
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$ 117,600.00
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$ 48,000.00
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$ 140,000.00
10” Fusible PVC Directional Bore	$ 528.00	LF	700	$ 369,600.00
Asphalt Removal and Replacement	$ 230.00	LF	310	$ 71,300.00
Asphalt Drive Removal and Replacement	$ 115.00	LF	520	$ 59,800.00
Concrete Drive Removal and Replacement	$ 175.00	LF	120	$ 21,000.00
Replace RCP Culvert beneath Driveway	$ 1,160.00	EA	21	$ 24,360.00
Automatic Combination ARV/Vacuum Valve and Vault	$ 23,100.00	EA	4	$ 92,400.00
Additional DIP Fittings	$ 25.00	LB	2550	$ 63,750.00

Table 5.2.21. Capital Costs
Water Treatment Improvements
Town of River Bend

Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the

Alternative:	**Nanofiltration Water Treatment Plant**			
Project Administration ($):	$2,902,500			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
Erosion Control Measures	$ 26,000.00	LS	1	$ 26,000.00
Stabilization Stone	$ 120.00	CY	50	$ 6,000.00
Select Backfill	$ 45.00	CY	170	$ 7,650.00
Testing Allowance	$ 17,300.00	LS	1	$ 17,300.00
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$ 11,600.00
Remove Existing 8” Outfall	$ 57,800.00	LS	1	$ 57,800.00
Remove and Replace Existing Multiport Diffuser	$ 86,600.00	LS	1	$ 86,600.00
Miscellaneous Construction				
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	$ 438,000.00	LS	1	$ 438,000.00
Galvanized Water Service Line Replacement	$ 21,000.00	LS	1	$ 21,000.00

[a]Unit costs are in today's dollars, not future dollars.

Total Construction Cost:	**$16,891,350**
Construction Contingency Cost:	**$1,689,135**
Project Administration Cost:	**$2,902,500**
Total Capital Cost:	**$21,482,985**

Construction Contingency: 10.0%

Table 5.2.22. Project Cost Life Cycle Assumptions Water Treatment Improvements Town of River Bend Nanofiltration Water Treatment Plant			
Complete the areas shown in gray.			
Component	**Expected Life Cycle**	**Replacement Expected?†**	**Rationale for Expected Life Cycle**
New Well Field Construction			
Test Well/Production Well Pit Casing	50		Test well & production well pit casing will be steel which have a life cycle of 50+ years
Test Well/Production Well Casings and Reducers	50		Test well and production well casings will be PVC which have a life cycle of 50+ years
Test Well/Production Well Screens and Tailpieces	50		Test well and production well screens will be PVC which have a life cycle of 50+ years
Well Head and Raw Water Main Construction			
Wellhead, Pump, Electrical and Site Improvements	25		Well Pumps and Electrical Equipment have an average life cycle of 25 years on average
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years
Gate Valves	25		Valves generally have a lifespan of 25 years or more
Air Release Valves	25		Valves generally have a lifespan of 25 years or more
Steel Casing (Jack and Bore)	50		Steel casing pipes have a lifespan of 50+ years
Generator	25		Generators generally have a lifespan of 20-30 years.
Water Treatment Plant Construction			
Water Treatment Plant Building	50		The WTP building will have a lifespan of 50+ years
High Service & Transfer Pumps	20	20	Pumps have a lifespan of approximately 20-25 years

Membrane Cartridges	25		Membrane cartridges are the housing unit for the nanofiltration media and have a lifespan of 25+ years.
Membrane Skid	50		The membrane skid house the individual cartridges, piping, etc. The skids have a lifespan of 50+ years
Clean-in-Place System	25		The clean-in-place system is used to remove contaminants and scour the membranes in between treatment cycles. The system will have a lifespan of 25+ years
Membrane Face Piping	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years
Membrane Face Piping Valves	50		Valves associated with the membrane face piping will be more easily accessible for maintenance than valves for water mains. They will also be exercised more often and therefore will last 50+ years.
Chemical Feed Pumps	10	10, 20	Chemical feed pumps generally have a lifespan of 10-15 years.
Sensors and Controls	20	20	Sensors are anticipated to be replaced every 20-25 years.
Aerator	25		The aerator will have a lifespan of between 25-30 years.
Yard Piping	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years
Electrical, WTP Generator and ATS	25		Generators generally have a lifespan of 20-30 years.
SCADA & Telemetry	20	20	SCADA software regularly becomes outdated as new software becomes available. Physical infrastructure for SCADA & Telemetry has a longer lifespan than software typically about 20+ years
Waste Concentrate Force Main			

PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years
Steel Casing (Jack and Bore)	50		Steel casing pipes have a lifespan of 50+ years
Automatic Combination ARV/Vacuum Valve and Vault	25		Valves generally have a lifespan of 25 years or more
Miscellaneous Construction			
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	20	20	The emergency interconnect will have a life cycle of approximately 20 years.
Galvanized Water Service Line Replacement	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years

[†]Period for replacement would be Years 1 through 20 only.

Table 5.2.23. Replacement Costs (Years 1 to 5)
Water Treatment Improvements
Town of River Bend
Nanofiltration Water Treatment Plant

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 1	2	3	4	5
New Well Field Construction								
Test Well 12” Pit Casing	$ 230.00	LF	40	$0.00	$0.00	$0.00	$0.00	$0.00
6” Test Well Casing and Reducer	$ 60.00	LF	250	$0.00	$0.00	$0.00	$0.00	$0.00
4.5” Test Well Screen	$ 230.00	LF	70	$0.00	$0.00	$0.00	$0.00	$0.00
4.5” Test Well Tailpiece/Cellar	$ 80.00	LF	5	$0.00	$0.00	$0.00	$0.00	$0.00
Production Well 24” Pit Casing	$ 575.00	LF	80	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Casing	$ 175.00	LF	500	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Screen	$ 460.00	LF	140	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Tailpiece/Cellar	$ 400.00	LF	10	$0.00	$0.00	$0.00	$0.00	$0.00
Well Head and Raw Water Main Construction								
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
WTP Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$0.00	$0.00	$0.00	$0.00	$0.00
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$0.00	$0.00	$0.00	$0.00	$0.00
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$0.00	$0.00	$0.00	$0.00	$0.00
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$0.00	$0.00	$0.00	$0.00	$0.00
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$0.00	$0.00	$0.00	$0.00	$0.00
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Water Treatment Plant Construction								
Water Treatment Plant Building	$ 2,180,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
High Service Pumps	$ 100,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Transfer Pumps	$ 80,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Cartridges	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Skid	$ 150,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Clean-in-Place System	$ 50,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Face Piping	$ 40,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Face Piping Valves	$ 60,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00

Chemical Feed Pumps	$ 1,500.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Sensors and Controls	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Aerator	$ 25,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Yard Piping	$ 277,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Electrical, WTP Generator and ATS	$ 1,895,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA & Telemetry	$ 400,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Waste Concentrate Force Main								
6” PVC/RJPVC Force Main and Valves	$ 100.00	LF	7985	$0.00	$0.00	$0.00	$0.00	$0.00
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$0.00	$0.00	$0.00	$0.00	$0.00
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$0.00	$0.00	$0.00	$0.00	$0.00
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$0.00	$0.00	$0.00	$0.00	$0.00
10” Fusible PVC Directional Bore	$ 230.00	LF	700	$0.00	$0.00	$0.00	$0.00	$0.00
Automatic Combination ARV/Vacuum Valve ar	$ 23,100.00	EA	4	$0.00	$0.00	$0.00	$0.00	$0.00
Additional DIP Fittings	$ 25.00	LB	2550	$0.00	$0.00	$0.00	$0.00	$0.00
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Remove and Replace Existing Multiport Diffuse	$ 86,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Miscellaneous Construction								
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	$ 438,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Galvanized Water Service Line Replacement	$ 21,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 1 to 5):				**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.24. Replacement Costs (Years 6 to 10)
Water Treatment Improvements
Town of River Bend
Nanofiltration Water Treatment Plant

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 6	7	8	9	10
New Well Field Construction								
Test Well 12” Pit Casing	$ 230.00	LF	40	$0.00	$0.00	$0.00	$0.00	$0.00
6” Test Well Casing and Reducer	$ 60.00	LF	250	$0.00	$0.00	$0.00	$0.00	$0.00
4.5” Test Well Screen	$ 230.00	LF	70	$0.00	$0.00	$0.00	$0.00	$0.00
4.5” Test Well Tailpiece/Cellar	$ 80.00	LF	5	$0.00	$0.00	$0.00	$0.00	$0.00
Production Well 24” Pit Casing	$ 575.00	LF	80	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Casing	$ 175.00	LF	500	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Screen	$ 460.00	LF	140	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Tailpiece/Cellar	$ 400.00	LF	10	$0.00	$0.00	$0.00	$0.00	$0.00
Well Head and Raw Water Main Construction								
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
WTP Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$0.00	$0.00	$0.00	$0.00	$0.00
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$0.00	$0.00	$0.00	$0.00	$0.00
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$0.00	$0.00	$0.00	$0.00	$0.00
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$0.00	$0.00	$0.00	$0.00	$0.00
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$0.00	$0.00	$0.00	$0.00	$0.00
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Water Treatment Plant Construction								
Water Treatment Plant Building	$ 2,180,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
High Service Pumps	$ 100,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Transfer Pumps	$ 80,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Cartridges	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Skid	$ 150,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Clean-in-Place System	$ 50,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Face Piping	$ 40,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Face Piping Valves	$ 60,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00

Chemical Feed Pumps	$ 1,500.00	EA	2	$0.00	$0.00	$0.00	$0.00	$2,498
Sensors and Controls	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Aerator	$ 25,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Yard Piping	$ 277,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Electrical, WTP Generator and ATS	$ 1,895,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA & Telemetry	$ 400,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Waste Concentrate Force Main								
6” PVC/RJPVC Force Main and Valves	$ 100.00	LF	7985	$0.00	$0.00	$0.00	$0.00	$0.00
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$0.00	$0.00	$0.00	$0.00	$0.00
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$0.00	$0.00	$0.00	$0.00	$0.00
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$0.00	$0.00	$0.00	$0.00	$0.00
10” Fusible PVC Directional Bore	$ 230.00	LF	700	$0.00	$0.00	$0.00	$0.00	$0.00
Automatic Combination ARV/Vacuum Valve ar	$ 23,100.00	EA	4	$0.00	$0.00	$0.00	$0.00	$0.00
Additional DIP Fittings	$ 25.00	LB	2550	$0.00	$0.00	$0.00	$0.00	$0.00
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Remove and Replace Existing Multiport Diffuse	$ 86,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Miscellaneous Construction								
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	$ 438,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Galvanized Water Service Line Replacement	$ 21,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 6 to 10):				**$0**	**$0**	**$0**	**$0**	**$2,498**

Table 5.2.25. Replacement Costs (Years 11 to 15)
Water Treatment Improvements
Town of River Bend
Nanofiltration Water Treatment Plant

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 11	12	13	14	15
New Well Field Construction								
Test Well 12” Pit Casing	$ 230.00	LF	40	$0.00	$0.00	$0.00	$0.00	$0.00
6” Test Well Casing and Reducer	$ 60.00	LF	250	$0.00	$0.00	$0.00	$0.00	$0.00
4.5” Test Well Screen	$ 230.00	LF	70	$0.00	$0.00	$0.00	$0.00	$0.00
4.5” Test Well Tailpiece/Cellar	$ 80.00	LF	5	$0.00	$0.00	$0.00	$0.00	$0.00
Production Well 24” Pit Casing	$ 575.00	LF	80	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Casing	$ 175.00	LF	500	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Screen	$ 460.00	LF	140	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Tailpiece/Cellar	$ 400.00	LF	10	$0.00	$0.00	$0.00	$0.00	$0.00
Well Head and Raw Water Main Construction								
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
WTP Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$0.00	$0.00	$0.00	$0.00	$0.00
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$0.00	$0.00	$0.00	$0.00	$0.00
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$0.00	$0.00	$0.00	$0.00	$0.00
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$0.00	$0.00	$0.00	$0.00	$0.00
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$0.00	$0.00	$0.00	$0.00	$0.00
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Water Treatment Plant Construction								
Water Treatment Plant Building	$ 2,180,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
High Service Pumps	$ 100,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Transfer Pumps	$ 80,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Cartridges	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Skid	$ 150,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Clean-in-Place System	$ 50,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Face Piping	$ 40,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Face Piping Valves	$ 60,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00

Chemical Feed Pumps	$ 1,500.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Sensors and Controls	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Aerator	$ 25,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Yard Piping	$ 277,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Electrical, WTP Generator and ATS	$ 1,895,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA & Telemetry	$ 400,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Waste Concentrate Force Main								
6” PVC/RJPVC Force Main and Valves	$ 100.00	LF	7985	$0.00	$0.00	$0.00	$0.00	$0.00
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$0.00	$0.00	$0.00	$0.00	$0.00
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$0.00	$0.00	$0.00	$0.00	$0.00
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$0.00	$0.00	$0.00	$0.00	$0.00
10” Fusible PVC Directional Bore	$ 230.00	LF	700	$0.00	$0.00	$0.00	$0.00	$0.00
Automatic Combination ARV/Vacuum Valve an	$ 23,100.00	EA	4	$0.00	$0.00	$0.00	$0.00	$0.00
Additional DIP Fittings	$ 25.00	LB	2550	$0.00	$0.00	$0.00	$0.00	$0.00
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Remove and Replace Existing Multiport Diffuse	$ 86,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Miscellaneous Construction								
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	$ 438,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Galvanized Water Service Line Replacement	$ 21,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 11 to 15):				**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.26. Replacement Costs (Years 16 to 20)
Water Treatment Improvements
Town of River Bend
Nanofiltration Water Treatment Plant

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 16	17	18	19	20
New Well Field Construction								
Test Well 12” Pit Casing	$ 230.00	LF	40	$0.00	$0.00	$0.00	$0.00	$0.00
6” Test Well Casing and Reducer	$ 60.00	LF	250	$0.00	$0.00	$0.00	$0.00	$0.00
4.5” Test Well Screen	$ 230.00	LF	70	$0.00	$0.00	$0.00	$0.00	$0.00
4.5” Test Well Tailpiece/Cellar	$ 80.00	LF	5	$0.00	$0.00	$0.00	$0.00	$0.00
Production Well 24” Pit Casing	$ 575.00	LF	80	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Casing	$ 175.00	LF	500	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Screen	$ 460.00	LF	140	$0.00	$0.00	$0.00	$0.00	$0.00
10” Production Well Tailpiece/Cellar	$ 400.00	LF	10	$0.00	$0.00	$0.00	$0.00	$0.00
Well Head and Raw Water Main Construction								
Wellhead, Pump, Electrical and Site Improvements	$ 375,400.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0
Existing Raw Water Main Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
WTP Tie-In	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
6” PVC/RJDIP Raw Water Main	$ 140.00	LF	450	$0.00	$0.00	$0.00	$0.00	$0.00
10” PVC/RJDIP Raw Water Main	$ 165.00	LF	3950	$0.00	$0.00	$0.00	$0.00	$0.00
6” Gate Valve w/ Box	$ 3,460.00	EA	3	$0.00	$0.00	$0.00	$0.00	$0.00
10” Gate Valve w/ Box	$ 4,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Pressure Air Release Valve and Vault	$ 11,600.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 25.00	LB	1500	$0.00	$0.00	$0.00	$0.00	$0.00
Steel Casing (Jack and Bore)	$ 750.00	LF	50	$0.00	$0.00	$0.00	$0.00	$0.00
150 KVA Emergency Standby Generator	$ 231,000.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Water Treatment Plant Construction								
Water Treatment Plant Building	$ 2,180,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
High Service Pumps	$ 100,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$138,696
Transfer Pumps	$ 80,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$110,957
Membrane Cartridges	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Skid	$ 150,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Clean-in-Place System	$ 50,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Face Piping	$ 40,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Membrane Face Piping Valves	$ 60,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Chemical Feed Pumps	$ 1,500.00	EA	2	$0.00	$0.00	$0.00	$0.00	$2,080

Sensors and Controls	$ 80,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$55,478
Aerator	$ 25,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Yard Piping	$ 277,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Electrical, WTP Generator and ATS	$ 1,895,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA & Telemetry	$ 400,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$277,392.49
Waste Concentrate Force Main								
6” PVC/RJPVC Force Main and Valves	$ 100.00	LF	7985	$0.00	$0.00	$0.00	$0.00	$0.00
6” DIP/RJDIP Force Main and Valves	$ 240.00	LF	490	$0.00	$0.00	$0.00	$0.00	$0.00
12” Steel Casing (Jack and Bore)	$ 480.00	LF	100	$0.00	$0.00	$0.00	$0.00	$0.00
6” Fusible PVC Directional Bore	$ 350.00	LF	400	$0.00	$0.00	$0.00	$0.00	$0.00
10” Fusible PVC Directional Bore	$ 230.00	LF	700	$0.00	$0.00	$0.00	$0.00	$0.00
Automatic Combination ARV/Vacuum Valve and Vault	$ 23,100.00	EA	4	$0.00	$0.00	$0.00	$0.00	$0.00
Additional DIP Fittings	$ 25.00	LB	2550	$0.00	$0.00	$0.00	$0.00	$0.00
Tie-In to WWTP Discharge	$ 11,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Remove and Replace Existing Multiport Diffuser	$ 86,600.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Miscellaneous Construction								
Emergency Interconnect w/ New Bern (6" Compound Meter w/ Vault, Associated Piping, Valves, etc.)	$ 438,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$303,745
Galvanized Water Service Line Replacement	$ 21,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 16 to 20):				**$0**	**$0**	**$0**	**$0**	**$888,349**
Total Present Value of Replacement Costs (Life of Project):								**$890,848**

Table 5.2.27. Present Value of Operations and Maintenance Costs (Years 1-10)
Water Treatment Improvements
Town of River Bend
Nanofiltration Water Treatment Plant

Complete the cells shown in gray below.

Current Inflation Rate Based on Municipal Cost Index: 0.09% EPA Discount Rate: 4.875%

				Present Value of O&M Costs for Year:									
Component	**Unit Cost**	**Unit**	**Quantity**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Administrative & Finance	$507,000	LS	1	$483,851	$461,759	$440,675	$420,554	$401,352	$383,027	$365,538	$348,848	$332,920	$317,719
Testing	$6,440	LS	1	$6,146	$5,865	$5,598	$5,342	$5,098	$4,865	$4,643	$4,431	$4,229	$4,036
Contracted Services	$13,100	LS	1	$12,502	$11,931	$11,386	$10,866	$10,370	$9,897	$9,445	$9,014	$8,602	$8,209
Chemicals	$52,528	LS	1	$50,130	$47,841	$45,656	$43,572	$41,582	$39,684	$37,872	$36,143	$34,492	$32,917
Supplies & Materials	$23,700	LS	1	$22,618	$21,585	$20,600	$19,659	$18,761	$17,905	$17,087	$16,307	$15,563	$14,852
Utilities	$49,500	LS	1	$47,240	$45,083	$43,025	$41,060	$39,185	$37,396	$35,689	$34,059	$32,504	$31,020
Maintenance & Repair - Building	$2,500	LS	1	$2,386	$2,277	$2,173	$2,074	$1,979	$1,889	$1,802	$1,720	$1,642	$1,567
Maintenance & Repair - Equipment	$20,700	LS	1	$19,755	$18,853	$17,992	$17,171	$16,387	$15,638	$14,924	$14,243	$13,593	$12,972
Building & Equipment Rental	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permit Fees	$2,240	LS	1	$2,138	$2,040	$1,947	$1,858	$1,773	$1,692	$1,615	$1,541	$1,471	$1,404
Miscellaneous	$2,956	LS	1	$2,821	$2,692	$2,569	$2,452	$2,340	$2,233	$2,131	$2,034	$1,941	$1,852
Capital Outlay - Equipment	$10,000	LS	1	$9,543	$9,108	$8,692	$8,295	$7,916	$7,555	$7,210	$6,881	$6,566	$6,267
Capital Outlay - Grounds & Buildings	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Outlay - Wells/Pumps	$10,000	LS	1	$9,543	$9,108	$8,692	$8,295	$7,916	$7,555	$7,210	$6,881	$6,566	$6,267
Distribution System Maintenance	$58,000	LS	1	$55,352	$52,824	$50,413	$48,111	$45,914	$43,818	$41,817	$39,908	$38,086	$36,347
Total Present Value of Yearly O&M Expenses (Years 1-10):				**$724,024**	**$690,966**	**$659,417**	**$629,309**	**$600,575**	**$573,153**	**$546,984**	**$522,009**	**$498,174**	**$475,428**

Table 5.2.28. Present Value of Operations and Maintenance Costs (Years 11-20)
Water Treatment Improvements
Town of River Bend
Nanofiltration Water Treatment Plant

Complete the cells shown in gray below.

Current Inflation Rate Based on Municipal Cost Index: 0.09% EPA Discount Rate: 4.875%

				Present Value of O&M Costs for Year:									
Component	**Unit Cost**	**Unit**	**Quantity**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Administrative & Finance	$507,000	LS	1	$303,212	$289,368	$276,156	$263,547	$251,513	$240,030	$229,070	$218,611	$208,629	$199,104
Testing	$6,440	LS	1	$3,851	$3,676	$3,508	$3,348	$3,195	$3,049	$2,910	$2,777	$2,650	$2,529
Contracted Services	$13,100	LS	1	$7,834	$7,477	$7,135	$6,810	$6,499	$6,202	$5,919	$5,649	$5,391	$5,144
Chemicals	$52,528	LS	1	$31,414	$29,980	$28,611	$27,305	$26,058	$24,868	$23,733	$22,649	$21,615	$20,628
Supplies & Materials	$23,700	LS	1	$14,174	$13,527	$12,909	$12,320	$11,757	$11,220	$10,708	$10,219	$9,752	$9,307
Utilities	$49,500	LS	1	$29,604	$28,252	$26,962	$25,731	$24,556	$23,435	$22,365	$21,344	$20,369	$19,439
Maintenance & Repair - Building	$2,500	LS	1	$1,495	$1,427	$1,362	$1,300	$1,240	$1,184	$1,130	$1,078	$1,029	$982
Maintenance & Repair - Equipment	$20,700	LS	1	$12,380	$11,814	$11,275	$10,760	$10,269	$9,800	$9,353	$8,926	$8,518	$8,129
Building & Equipment Rental	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permit Fees	$2,240	LS	1	$403,976	$1,278	$1,220	$1,164	$1,111	$1,060	$1,012	$966	$922	$880
Miscellaneous	$2,956	LS	1	$1,768	$1,687	$1,610	$1,537	$1,466	$1,399	$1,336	$1,275	$1,216	$1,161
Capital Outlay - Equipment	$10,000	LS	1	$5,981	$5,707	$5,447	$5,198	$4,961	$4,734	$4,518	$4,312	$4,115	$3,927
Capital Outlay - Grounds & Buildings	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Outlay - Wells/Pumps	$10,000	LS	1	$5,981	$5,707	$5,447	$5,198	$4,961	$4,734	$4,518	$4,312	$4,115	$3,927
Distribution System Maintenance	$58,000	LS	1	$34,687	$33,103	$31,592	$30,149	$28,773	$27,459	$26,205	$25,009	$23,867	$22,777
Total Present Value of Yearly O&M Expenses (Years 11-20):				**$856,357**	**$433,004**	**$413,234**	**$394,366**	**$376,359**	**$359,175**	**$342,776**	**$327,125**	**$312,189**	**$297,934**
Total Present Value of Annual O&M Costs (Life of Project):													**$10,032,557**

Table 5.2.29. Present Value of Intermittent Operations and Maintenance Costs (Years 1-10)
Water Treatment Improvements
Town of River Bend
Nanofiltration Water Treatment Plant

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 0.04875

Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year: 1	2	3	4	5	6	7	8	9	10
Pretreatment Filter Media	$ 15,000.00	EA	2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$18,800
Membrane Replacement	$ 240,000.00	LS	1	$0	$0	$0	$0	$189,989	$0	$0	$0	$0	$150,400
Total Present Value of Intermittent Operations & Maintenace Costs (Years 1-10):				**$0**	**$0**	**$0**	**$0**	**$189,989**	**$0**	**$0**	**$0**	**$0**	**$169,200**

Table 5.2.30. Present Value of Intermittent Operations and Maintenance Costs (Years 11-20)
Water Treatment Improvements
Town of River Bend
Nanofiltration Water Treatment Plant

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 0.04875

Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year: 11	12	13	14	15	16	17	18	19	20
Pretreatment Filter Media	$ 15,000.00	EA	2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$11,781
Membrane Replacement	##########	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$94,250
Total Present Value of Intermittent Operations & Maintenace Costs (Years 11-20):				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$106,031**
Total Present Value of Intermittent Operations & Maintenance Costs (Life of Project):													**$465,220**

Table 5.2.31. Capital Costs
Water Treatment Improvements
Town of River Bend

Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate th

Alternative:	**Bulk Water Supply w/ Distribution System Upgrades**			
Project Administration ($):	$995,000			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
Mobilization and Bonding	$ 109,000.00	LS	1	$ 109,000.00
Packaged Booster Pump Station	$ 528,000.00	LS	1	$ 528,000.00
Booster Pump Station Generator & Electrical	$ 368,500.00	LS	1	$ 368,500.00
SCADA and Telemetry	$ 82,500.00	LS	1	$ 82,500.00
Site Work	$ 149,050.00	LS	1	$ 149,050.00
6" Compound Meter Station w/ Associated Piping, Valves, etc.	$ 154,000.00	LS	1	$ 154,000.00
10" PVC C900 Water Main	$ 143.00	LF	9245	$ 1,322,035.00
10" RJPVC C900 Water Main	$ 220.00	LF	1030	$ 226,600.00
10" DIP Water Main	$ 198.00	LF	180	$ 35,640.00
10" RJDIP Water Main	$ 308.00	LF	45	$ 13,860.00
10" Gate Valve w/ Box	$ 7,700.00	EA	5	$ 38,500.00
18" Steel Casing (Jack and Bore)	$ 715.00	LF	65	$ 46,475.00
400 LF 10" Fusible PVC Bore Under US 17 BUS	$ 200,200.00	LS	1	$ 200,200.00
Tap and Tie-in to Existing 8" Water Main	$ 11,000.00	EA	2	$ 22,000.00
Tap and Tie-in to Existing 10" Water Main	$ 13,200.00	EA	1	$ 13,200.00
Asphalt Pavement Removal and Replacement	$ 220.00	LF	120	$ 26,400.00
Gravel Drive Removal and Replacement	$ 38.50	LF	325	$ 12,512.50
Asphalt Drive Removal and Replacement	$ 110.00	LF	330	$ 36,300.00
Concrete Drive Removal and Replacement	$ 165.00	LF	360	$ 59,400.00
Concrete Curb & Gutter Removal and Replacement	$ 132.00	LF	50	$ 6,600.00
Decorative Brick Wall Removal and Replacement	$ 4,400.00	EA	4	$ 17,600.00
Replace RCP Under Driveway	$ 1,100.00	EA	46	$ 50,600.00
Manual Air Release Valve and Vault	$ 6,600.00	EA	5	$ 33,000.00
Seeding and Mulching	$ 2,750.00	AC	1.5	$ 4,125.00
Additional Ductile Iron Fittings	$ 22.00	LB	5700	$ 125,400.00

Table 5.2.31. Capital Costs
Water Treatment Improvements
Town of River Bend

Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate th

Alternative:	**Bulk Water Supply w/ Distribution System Upgrades**			
Project Administration ($):	$995,000			
Component	**Unit Cost[a]**	**Unit**	**Quantity**	**Total Cost**
Silt Fence	$ 11.00	LF	1200	$ 13,200.00
Straw Wattles	$ 110.00	EA	55	$ 6,050.00
Excelsior Matting	$ 11.00	SY	50	$ 550.00
Stabilization Stone	$ 110.00	TN	50	$ 5,500.00
Select Backfill	$ 44.00	CY	215	$ 9,460.00
Construction Entrance	$ 5,500.00	EA	1	$ 5,500.00
Testing Allowance	$ 11,000.00	LS	1	$ 11,000.00
Electrical Service Entrance	$ 11,000.00	LS	1	$ 11,000.00

[a]Unit costs are in today's dollars, not future dollars.

Total Construction Cost:	**$3,743,758**
Construction Contingency Cost:	**$374,376**
Project Administration Cost:	**$995,000**
Total Capital Cost:	**$5,113,133**

Construction Contingency: 10%

Table 5.2.32. Project Cost Life Cycle Assumptions
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Complete the areas shown in gray.

Component	Expected Life Cycle	Replacement Expected?†	Rationale for Expected Life Cycle
Packaged Booster Pump Station	20	20	Typical Booster Pump Stations have a lifespan of 15-20 years
Booster Pump Station Generator & Electrical	25		Generators generally have a lifespan of 20-30 years.
SCADA and Telemetry	25		SCADA software regularly becomes outdated as new software becomes available. Physical infrastructure for SCADA & Telemetry has a longer lifespan than software typically about 20+ years
6" Compound Meter Station w/ Associated Piping, Valves, etc.	20	20	The emergency interconnect will have a life cycle of approximately 20 years.
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	50		Both PVC, DIP, and ductile iron fittings have a lifespan of 50+ years
Gate Valves	25		Valves generally have a lifespan of 25 years or more
Steel Casing (Jack and Bore)	50		Steel casing pipes have a lifespan of 50+ years
Air Release Valves	25		Valves generally have a lifespan of 25 years or more

†Period for replacement would be Years 1 through 20 only.

Table 5.2.33. Replacement Costs (Years 1 to 5)
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 1	2	3	4	5
Packaged Booster Pump Station	$ 528,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Booster Pump Station Generator & Electrical	$ 368,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA and Telemetry	$ 82,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
6" Compound Meter Station w/ Associated Piping, Valves, etc.	$ 154,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	$ 143.00	LF	9245	$0.00	$0.00	$0.00	$0.00	$0.00
10" RJPVC C900 Water Main	$ 220.00	LF	1030	$0.00	$0.00	$0.00	$0.00	$0.00
10" DIP Water Main	$ 198.00	LF	180	$0.00	$0.00	$0.00	$0.00	$0.00
10" RJDIP Water Main	$ 308.00	LF	45	$0.00	$0.00	$0.00	$0.00	$0.00
10" Gate Valve w/ Box	$ 7,700.00	EA	5	$0.00	$0.00	$0.00	$0.00	$0.00
18" Steel Casing (Jack and Bore)	$ 715.00	LF	65	$0.00	$0.00	$0.00	$0.00	$0.00
400 LF 10" Fusible PVC Bore Under US 17 BUS	$ 200,200.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Tap and Tie-in to Existing 8" Water Main	$ 11,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Tap and Tie-in to Existing 10" Water Main	$ 13,200.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Manual Air Release Valve and Vault	$ 6,600.00	EA	5	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 22.00	LB	5700	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 1 to 5):				**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.34. Replacement Costs (Years 6 to 10)
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 6	7	8	9	10
Packaged Booster Pump Station	$ 528,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Booster Pump Station Generator & Electrical	$ 368,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA and Telemetry	$ 82,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
6" Compound Meter Station w/ Associated Piping, Valves, etc.	$ 154,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	$ 143.00	LF	9245	$0.00	$0.00	$0.00	$0.00	$0.00
10" RJPVC C900 Water Main	$ 220.00	LF	1030	$0.00	$0.00	$0.00	$0.00	$0.00
10" DIP Water Main	$ 198.00	LF	180	$0.00	$0.00	$0.00	$0.00	$0.00
10" RJDIP Water Main	$ 308.00	LF	45	$0.00	$0.00	$0.00	$0.00	$0.00
10" Gate Valve w/ Box	$ 7,700.00	EA	5	$0.00	$0.00	$0.00	$0.00	$0.00
18" Steel Casing (Jack and Bore)	$ 715.00	LF	65	$0.00	$0.00	$0.00	$0.00	$0.00
400 LF 10" Fusible PVC Bore Under US 17 BUS	$ 200,200.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Tap and Tie-in to Existing 8" Water Main	$ 11,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Tap and Tie-in to Existing 10" Water Main	$ 13,200.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Manual Air Release Valve and Vault	$ 6,600.00	EA	5	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 22.00	LB	5700	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 6 to 10):				**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.35. Replacement Costs (Years 11 to 15)
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 11	12	13	14	15
Packaged Booster Pump Station	$ 528,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Booster Pump Station Generator & Electrical	$ 368,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA and Telemetry	$ 82,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
6" Compound Meter Station w/ Associated Piping, Valves, etc.	$ 154,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	$ 143.00	LF	9245	$0.00	$0.00	$0.00	$0.00	$0.00
10" RJPVC C900 Water Main	$ 220.00	LF	1030	$0.00	$0.00	$0.00	$0.00	$0.00
10" DIP Water Main	$ 198.00	LF	180	$0.00	$0.00	$0.00	$0.00	$0.00
10" RJDIP Water Main	$ 308.00	LF	45	$0.00	$0.00	$0.00	$0.00	$0.00
10" Gate Valve w/ Box	$ 7,700.00	EA	5	$0.00	$0.00	$0.00	$0.00	$0.00
18" Steel Casing (Jack and Bore)	$ 715.00	LF	65	$0.00	$0.00	$0.00	$0.00	$0.00
400 LF 10" Fusible PVC Bore Under US 17 BUS	$ 200,200.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Tap and Tie-in to Existing 8" Water Main	$ 11,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Tap and Tie-in to Existing 10" Water Main	$ 13,200.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Manual Air Release Valve and Vault	$ 6,600.00	EA	5	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 22.00	LB	5700	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 11 to 15):				**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.36. Replacement Costs (Years 16 to 20)
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Current Inflation Rate based on Construction Cost Index: 2.97%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year: 16	17	18	19	20
Packaged Booster Pump Station	$ 528,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$366,158
Booster Pump Station Generator & Electrical	$ 368,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
SCADA and Telemetry	$ 82,500.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
6" Compound Meter Station w/ Associated Piping, Valves, etc.	$ 154,000.00	LS	1	$0.00	$0.00	$0.00	$0.00	$106,796
PVC, DIP, Restrained Joint PVC/DIP, and Associated Ductile Iron Fittings	$ 143.00	LF	9245	$0.00	$0.00	$0.00	$0.00	$0.00
10" RJPVC C900 Water Main	$ 220.00	LF	1030	$0.00	$0.00	$0.00	$0.00	$0.00
10" DIP Water Main	$ 198.00	LF	180	$0.00	$0.00	$0.00	$0.00	$0.00
10" RJDIP Water Main	$ 308.00	LF	45	$0.00	$0.00	$0.00	$0.00	$0.00
10" Gate Valve w/ Box	$ 7,700.00	EA	5	$0.00	$0.00	$0.00	$0.00	$0.00
18" Steel Casing (Jack and Bore)	$ 715.00	LF	65	$0.00	$0.00	$0.00	$0.00	$0.00
400 LF 10" Fusible PVC Bore Under US 17 BUS	$ 200,200.00	LS	1	$0.00	$0.00	$0.00	$0.00	$0.00
Tap and Tie-in to Existing 8" Water Main	$ 11,000.00	EA	2	$0.00	$0.00	$0.00	$0.00	$0.00
Tap and Tie-in to Existing 10" Water Main	$ 13,200.00	EA	1	$0.00	$0.00	$0.00	$0.00	$0.00
Manual Air Release Valve and Vault	$ 6,600.00	EA	5	$0.00	$0.00	$0.00	$0.00	$0.00
Additional Ductile Iron Fittings	$ 22.00	LB	5700	$0.00	$0.00	$0.00	$0.00	$0.00
Total Present Value of Replacement Costs (Years 16 to 20):				**$0**	**$0**	**$0**	**$0**	**$472,954**
Total Present Value of Replacement Costs (Life of Project):								**$472,954**

Table 5.2.37. Present Value of Operations and Maintenance Costs (Years 1-10)
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Complete the cells shown in gray below.

Current Inflation Rate Based on Municipal Cost Index: 0.09% EPA Discount Rate: 4.875%

				Present Value of O&M Costs for Year:									
Component	**Unit Cost**	**Unit**	**Quantity**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Administrative & Finance	$507,000	LS	1	$483,851	$461,759	$440,675	$420,554	$401,352	$383,027	$365,538	$348,848	$332,920	$317,719
Testing	$3,000	LS	1	$2,863	$2,732	$2,608	$2,488	$2,375	$2,266	$2,163	$2,064	$1,970	$1,880
Contracted Services	$2,500	LS	1	$2,386	$2,277	$2,173	$2,074	$1,979	$1,889	$1,802	$1,720	$1,642	$1,567
Chemicals	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Supplies & Materials	$8,000	LS	1	$7,635	$7,286	$6,953	$6,636	$6,333	$6,044	$5,768	$5,505	$5,253	$5,013
Utilities	$2,000	LS	1	$1,909	$1,822	$1,738	$1,659	$1,583	$1,511	$1,442	$1,376	$1,313	$1,253
Maintenance & Repair - Building	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance & Repair - Equipment	$2,000	LS	1	$1,909	$1,822	$1,738	$1,659	$1,583	$1,511	$1,442	$1,376	$1,313	$1,253
Building & Equipment Rental	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permit Fees	$500	LS	1	$477	$455	$435	$415	$396	$378	$360	$344	$328	$313
Miscellaneous	$1,000	LS	1	$954	$911	$869	$829	$792	$755	$721	$688	$657	$627
Capital Outlay - Equipment	$10,000	LS	1	$9,543	$9,108	$8,692	$8,295	$7,916	$7,555	$7,210	$6,881	$6,566	$6,267
Capital Outlay - Grounds & Buildings	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Outlay - Wells/Pumps	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Distribution System Maintenance	$58,000	LS	1	$55,352	$52,824	$50,413	$48,111	$45,914	$43,818	$41,817	$39,908	$38,086	$36,347
Total Present Value of Yearly O&M Expenses (Years 1-10):				**$566,879**	**$540,995**	**$516,294**	**$492,721**	**$470,223**	**$448,753**	**$428,264**	**$408,710**	**$390,048**	**$372,239**

Table 5.2.38. Present Value of Operations and Maintenance Costs (Years 11-20)
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Complete the cells shown in gray below.

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 4.875%

				Present Value of O&M Costs for Year:									
Component	**Unit Cost**	**Unit**	**Quantity**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Administrative & Finance	$507,000	LS	1	$303,212	$289,368	$276,156	$263,547	$251,513	$240,030	$229,070	$218,611	$208,629	$199,104
Testing	$3,000	LS	1	$1,794	$1,712	$1,634	$1,559	$1,488	$1,420	$1,355	$1,294	$1,234	$1,178
Contracted Services	$2,500	LS	1	$1,495	$1,427	$1,362	$1,300	$1,240	$1,184	$1,130	$1,078	$1,029	$982
Chemicals	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Supplies & Materials	$8,000	LS	1	$4,784	$4,566	$4,357	$4,159	$3,969	$3,787	$3,615	$3,449	$3,292	$3,142
Utilities	$2,000	LS	1	$1,196	$1,141	$1,089	$1,040	$992	$947	$904	$862	$823	$785
Maintenance & Repair - Building	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance & Repair - Equipment	$2,000	LS	1	$1,196	$1,141	$1,089	$1,040	$992	$947	$904	$862	$823	$785
Building & Equipment Rental	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Permit Fees	$500	LS	1	$299	$285	$272	$260	$248	$237	$226	$216	$206	$196
Miscellaneous	$1,000	LS	1	$598	$571	$545	$520	$496	$473	$452	$431	$411	$393
Capital Outlay - Equipment	$10,000	LS	1	$5,981	$5,707	$5,447	$5,198	$4,961	$4,734	$4,518	$4,312	$4,115	$3,927
Capital Outlay - Grounds & Buildings	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Capital Outlay - Wells/Pumps	$0	LS	1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Distribution System Maintenance	$58,000	LS	1	$34,687	$33,103	$31,592	$30,149	$28,773	$27,459	$26,205	$25,009	$23,867	$22,777
Total Present Value of Yearly O&M Expenses (Years 11-20):				**$355,243**	**$339,023**	**$323,543**	**$308,771**	**$294,673**	**$281,218**	**$268,378**	**$256,124**	**$244,430**	**$233,269**
												Total Present Value of Annual O&M Costs (Life of Project):	**$7,539,798**

Table 5.2.39. Present Value of Intermittent Operations and Maintenance Costs (Years 1-10)
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year: 1	2	3	4	5	6	7	8	9	10
NA	$ -	NA	0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Present Value of Intermittent Operations & Maintenace Costs (Years 1-10):				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Table 5.2.40. Present Value of Intermittent Operations and Maintenance Costs (Years 11-20)
Water Treatment Improvements
Town of River Bend
Bulk Water Supply w/ Distribution System Upgrades

Current Inflation Rate Based on Municipal Cost Index: 0.09%

EPA Discount Rate: 4.875%

Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year: 11	12	13	14	15	16	17	18	19	20
NA	$ -	NA	0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Present Value of Intermittent Operations & Maintenace Costs (Years 11-20):				**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total Present Value of Intermittent Operations & Maintenance Costs (Life of Project):													**$0**

Table 5.2.41. Total Present Worth for Feasible Alternatives Water Treatment Improvements Town of River Bend						
	Capital Costs	Replacement Costs Present Worth	O&M Costs Present Worth			Total Present Worth
			Annual	Intermittent	Total	
No Action	$0	$1,587,193	$8,930,373	$91,744	$9,022,116	$10,609,310
Filter-Softener Water Treatment Plant (Preferred)	$20,843,600	$793,760	$8,842,126	$111,337	$8,953,464	$30,590,824
Nanofiltration Water Treatment Plant	$21,482,985	$890,848	$10,032,557	$465,220	$10,497,778	$32,871,610
Bulk Water Supply w/ Distribution System Upgrades	$5,113,133	$472,954	$7,539,798	$0	$7,539,798	$13,125,885

Table 5.1.5. Alternatives Analysis Summary

		Alternative Name			
		Alternative No. 1 **No-Action**	**Alternative No. 2** **Preferred Alternative** New Filter Softener WTP, wellfield, and Waste Discharge	**Alternative No. 3** New Nanofiltration WTP, wellfield, and Waste Discharge	**Alternative No. 4** Bulk Water Supply from the City of New Bern
Capital Cost		$0	$20,843,600	$21,482,985	$5,113,133
Present Worth		$10,609,310	$30,590,824	$32,871,610	$13,125,885
Feasibility		☐ Feasible ☒ Infeasible	☒ Feasible ☐ Infeasible	☒ Feasible ☐ Infeasible	☒ Feasible ☐ Infeasible
Impact Analysis	**Capital Costs**	☒ Less than Preferred ☐ Greater than Preferred ☐ Same as Preferred	☐ Less than Preferred ☐ Greater than Preferred ☒ Same as Preferred	☐ Less than Preferred ☒ Greater than Preferred ☐ Same as Preferred	☒ Less than Preferred ☐ Greater than Preferred ☐ Same as Preferred
	Present Worth	☒ Less than Preferred ☐ Greater than Preferred ☐ Same as Preferred	☐ Less than Preferred ☐ Greater than Preferred ☒ Same as Preferred	☐ Less than Preferred ☒ Greater than Preferred ☐ Same as Preferred	☒ Less than Preferred ☐ Greater than Preferred ☐ Same as Preferred
	Environmental	☒ Less than Preferred ☐ Greater than Preferred ☐ Same as Preferred	☐ Less than Preferred ☐ Greater than Preferred ☒ Same as Preferred	☐ Less than Preferred ☒ Greater than Preferred ☐ Same as Preferred	☒ Less than Preferred ☐ Greater than Preferred ☐ Same as Preferred
Rationale for Rejection/Acceptance		Does not address the Town's aging infrastructure, nor the difficulties with consistently meeting Secondary Drinking Water Standards.	Provides the Town with a proven, long-term, sustainable water supply and treatment system.	More expensive than the preferred alternative with less certainty associated with potential costs.	Removes system autonomy, counters the desires of the Town, and creates potential adversity among municipal neighbors.

5.2 Present Worth Analysis

The following section is comprised of tables summarizing the capital costs, operation & maintenance costs, and intermittent costs for the alternatives discussed in Section 4.0. The alternatives are as listed in Table 1 below.

Table 1 – List of Alternatives	
Alternative #	Description
#1	No Action
#2	F/S Water Treatment Plant (Preferred)
#3	Nanofiltration Water Treatment Plant
#4	Bulk Water Supply with Distribution System Upgrades

6.0 Proposed Project Description

Table 4.4.1 Project Description **New Filter-Softener WTP, New Well Field, and Waste Discharge to the Trent River** **Town of River Bend**			
Project Vicinity Map Reference:	Figure 4	Project Location Map Reference:	Figure 5
Capital Cost: $20,843,600			
Detailed description of the project, including sizes and capacities of project components:			

The proposed project includes the design and construction of a new LCHA wellfield to supply a new 0.95 MGD Filter/Softener WTP. A test well and production wells will be drilled into the LCHA. A minimum of two (2) new production wells are preliminarily estimated to supply sufficient raw water to the WTP to meet the finished water requirement plus filter backwash and softener regeneration waste byproduct water.

The proposed WTP will include the following major components:

- Forced draft aeration to begin precipitation of iron and manganese and to strip away any hydrogen sulfide present in the raw water.
- Potassium permanganate chemical feed to precipitate iron and manganese out of the raw water.
- Detention tank to allow for quiescent settling of precipitated iron and manganese prior to filtration.
- Dual filter feed/high service pumps to transmit raw water from the detention tank through the treatment process and into the elevated tank and distribution system.
- Three (3) equally sized greensand filters to remove iron and manganese.
- Two (2) equally sized zeolite ion-exchange softeners to reduce overall hardness to an acceptable level. Treated water of the desired hardness will be obtained by blending softened water with softener bypass water from the filters.
- Bulk salt tank and brine pumps to transmit brine to regenerate the softener resin.
- Chemical addition including polyphosphate for corrosion control, fluoride to prevent dental caries, sodium hypochlorite for primary disinfection followed by ammonia to form chloramine for residual disinfection of the distribution system.
- Two (2) geomembrane lined ponds operated in series for settling of precipitated iron and manganese and homogenization of filter backwash and softener regeneration wastewater.
- One (1) submersible duplex waste supernatant pump station to transmit treated supernatant waste to the proposed discharge location.
- Waste discharge force main and multi-port diffuser to discharge treated waste from the WTP and existing WWTP to the Trent River.

Discuss permit requirements and status of each permit for the proposed project:

Construction of the water treatment plant will involve heavy construction including clearing and grubbing, grading, pile installation, building construction, plumbing, mechanical, electrical, process and control equipment, stormwater, paving, etc. New well sites and transmission improvements will be required, and a treated waste effluent force main will need to be extended to a NPDES permitted discharge location. The following permits are preliminarily anticipated:

- USACE Nationwide 58 Permit
- 401 Water Quality Certification – NCDEQ DEMLR,
- Approval of Plans and Specifications – NCDEQ DWR PWSS,
- Erosion and Sedimentation Control Permit – NCDEQ DEMLR,
- State Stormwater Permit – NCDEQ DEMLR,
- Compliance with Neuse River Riparian Buffer Rules – NCDEQ DWR
- CAMA General Permit – NCDEQ DCM,
- Septic Tank Permit – Craven County Environmental Health Department
- NPDES Discharge Permit – NCDEQ DWR NPDES,
- NCDEQ DWR Authorization to Construct

None of the permits have been obtained at this time.

Discuss any sustainability considerations:

In developing a new water supply for the Town of River Bend, the primary concern is locating a sustainable and abundant supply of good quality ground water that is sufficient for treatment. Based on the preliminary evaluation conducted to complete the Town's Water Supply Study, the Lower Castle Hayne Aquifer/Comfort Member appears to offer a more secure long-term water supply than the current Upper Castle Hayne/River Bend Strata or any of the other groundwater-supply sources considered in the River Bend area. This area is located a sufficient distance from the salt water transition zone so that salt water intrusion is not anticipated to be a concern in the foreseeable future. In addition, the LCHA is less susceptible to surficial contamination due to its increased depth from the ground surface as compared to the UCHA. The greater depth provides the added benefit of greater drawdown capability which increases the potential capacity from a given well. The LCHA is a prolific aquifer in the area of River Bend, and is currently utilized by the neighboring City of New Bern to the north and Jones County to the south. It is not believed that brackish water encroachment will be a concern for the UCHA in the River Bend vicinity for many decades into the future. However, testing of the underlying Beaufort Aquifer will be performed as part of the test well installation.

Discuss all funding sources for the project:

The project is partially funded by two (2) funding sources administered by NCDEQ Division of Water Infrastructure. The first source of funding is a NC Legislative Special Appropriation. The funds earmarked for River Bend from SL 134-2023 total $9,252,105. These funds were

designated for the Town's use to fund water, wastewater, or stormwater infrastructure improvements. The Town has requested that $5,112,650 of these funds be allocated to the Town's ongoing WWTP Enhancements Project leaving $4,139,455 of earmarked funds for the WTP Improvements project. The second source of funds is through Drinking Water SRF program. $10,429,895 is available with 75% principal forgiveness (up to a maximum of $3,500,000) with the remainder being paid at 0% interest.

The following is a summary to depict additional funding that is still required:

Estimated Project Cost	**$20,843,600.00**	
Special Appropriation (SRP-D-134-0033)	$4,139,455.00	(Grant)
SRF-D-2070 (Fall 2024)	$3,500,000.00	(75% Princ. Forgiveness)
SRF-D-2070 (Fall 2024)	$6,929,895.00	(Loan)
SRF-D-2070 (Spring 2025)	$3,137,125.00	(50% Princ. Forgiveness)
SRF-D-2070 (Spring 2025)	$3,137,125.00	(Loan)
Total Funding Secured	**$20,843,600.00**	

7.0 Environmental Information Document

The proposed project exceeds the requirement for Minor Construction Activities (MCA) in the Division's guidance document. Therefore, the following section has been prepared to assist the Division in evaluating, preparing and issuing a *Finding of No Significant Impact (FONSI)*.

Table 1. Topography and Floodplains **Water Treatment Improvements** **Town of River Bend**	
Complete this table in accordance with Section 4.1.	
Floodplain Figure Reference Number (if applicable):	6a
Floodplain Information Appendix Reference (if applicable):	G-1, G-3, G-8
Existing Conditions	

Table 1. Topography and Floodplains **Water Treatment Improvements** **Town of River Bend**			
Physiographic Province:	☒ Coastal Plain	☐ Piedmont	☐ Mountains
Minimum Elevation in Project Area (MSL):		*Maximum Elevation in Project Area (MSL):*	
19		30	
Is the project in the 100-year floodplain? (If so, show in Environmental Features Figure.)			☐ Yes ☒ No
Is the project in the 100-year floodway? (If so, show in Environmental Features Figure.)			☐ Yes ☒ No
Discuss other topographical and geological features.			
The site is approximately 4.5 acres of unattended forest with a mixed stand of Loblolly Pine, American Holly, White Oak, Water Oak, Yellow Poplar, etc. The site slopes generally southeastward into a small wetland forming the headwaters to an unnamed tributary of the Trent River. Near surface soils on the site are comprised predominantly of Goldsboro (GoA) and Onslow (On) soils series which are moderately well drained. The site is located well outside of the 100-year flood zone, and there is minimal risk of flooding.			
Impacts			
Describe construction impacts of project on topography.			
The site will need to be cleared and graded to accommodate construction of the WTP building, the proposed waste settling ponds, utilities and access corridors. Site grading will incorporate vegetated swales to capture and transport stormwater runoff from areas around the WTP building and site in the same general direction as currently exists. Where unavoidable, small areas of wetlands will be filled to accommodate site grading and construction requirements. No permanent changes will occur that affect the 100-year floodplain.			
Describe impacts of project on the 100-year floodplain and floodway if "Yes" is checked above.			
Not Applicable			
Describe SCI of the project.			
Secondary and cumulative impacts from changes in topography and flooding are minimal. The WTP building and access drive will increase the overall impervious area, and the remaining wetlands on the site will receive the drainage from the vegetated swales. Construction is not anticipated to adversely impact downstream storm drainage features.			
Mitigative Measures			

Table 1. Topography and Floodplains **Water Treatment Improvements** **Town of River Bend**	
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☒ Yes ☐ Not Applicable	☒ Yes ☐ Not Applicable
Describe the mitigative measures below and supply references to the appropriate appendix in the ER/EID.	
Mitigative Measure Description	*Reference(s)*
Erosion and sedimentation control measures will be installed per NCDEMLR permit requirements. Site drainage will be designed to comply with low density Stormwater permit requirements to include vegetated swales with culverts only where required to cross access roadways. To the extent possible, filling of wetlands will be avoided. Where unavoidable, a USACE Nationwide Permit 58 will be obtained, and mitigation credits will be purchased to offset the impacts. Design and construction will adhere to the River Bend Flood Damage Prevention Ordinance.	NCDEQ Erosion and Sedimentation Control Planning & Design Manual, NCDEQ Stormwater Design Manual, USACE Pre-Construction Notification, Town of River Bend Flood Damage Prevention Ordinance

Table 2. Soils **Water Treatment Improvements** **Town of River Bend**	
Complete this table in accordance with Section 4.2.	
Soils Figure Reference Number:	6b
Soils Information Appendix Reference (if applicable):	G-2, G-3, G-8
Existing Conditions	
Describe the types of soil. Provide a soils figure in the EID.	
Per the USGS Web Soil Survey, there are two (2) primary soil types within the proposed WTP site. Goldsboro loamy fine (GoA) sand between 0-2% slopes is the most abundant at 86.5% of the total area. The remaining 13.5% consists of Onslow loamy sand (On). Both of these soil types are well-drained and have characteristic seasonal high-water tables.	

Table 2. Soils **Water Treatment Improvements** **Town of River Bend**		
Is soil contamination present?	☐ Yes	☒ No
Does soil type present any constraints to the project?	☒ Yes	☐ No
If yes to either of the above, explain: Construction of the WTP will require suitable subgrade material to ensure structural integrity. Suitable fill may need to be brought in from off-site. Additionally, there is no public sewer within the vicinity of the site. The current design proposes utilizing an onsite septic tank and nitrification field with suitable repair area. The soils present suggest that this is a viable option. This will require approval and permitting through the Craven County Environmental Health Department.		
Impacts		
Will soil be moved offsite?	☐ Yes ☒ No	*Quantity (yd^3):*
Will soil be contaminated?	☐ Yes ☒ No	
Describe construction impacts of project.		
Construction will require clearing and grubbing the existing trees and vegetation. The Contractor will be responsible for disposing of clearing debris off site at a permitted disposal site. Onsite burning is not allowed. Select and/or suitable fill material may need to be imported from off-site borrow pits to ensure suitable foundation conditioning and structural integrity. Timber and/or pre-stressed concrete piles are anticipated to be driven to take up depth beneath the WTP building, filter and softener vessels, bulk salt tank, aerator and raw water detention tank in order provide adequate bearing capacity and minimize potential settlement. Wherever practical, existing soils will be utilized for site grading.		
Describe SCI of the project.		
Secondary impacts are minimal. The proposed WTP will have the same combined capacity of the existing WTPs that will be replaced. The project is not planned to expand service area or encourage future development.		
Mitigative Measures		
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*	

Table 2. Soils **Water Treatment Improvements** **Town of River Bend**	
☒ Yes ☐ Not Applicable	☐ Yes ☒ Not Applicable
Describe the mitigative measures below and supply references to the appropriate appendix in the ER/EID.	
Mitigative Measure Description	*Reference(s)*
Erosion and sedimentation control measures will be installed per NCDEMLR permit requirements. Control measures will be installed to prevent erosion and will adhere to the NC Erosion and Sediment Control Planning and Design Manual. Such measures include: silt fence, straw wattles, sediment basins, rock dams, rip-rap, temporary seeding, and permanent seeding. Site drainage will be designed to comply with low density Stormwater permit requirements to include vegetated swales with culverts only where required to cross access roadways.	NCDEQ Erosion and Sedimentation Control Planning & Design Manual, NCDEQ Stormwater Design Manual

Table 3. Prime and Unique Farmland **Water Treatment Improvements** **Town of River Bend**			
Complete this table in accordance with Section 4.3.			
Prime and Unique Farmland Information Appendix Reference (if applicable):			G-4
Existing Conditions & Impacts			
1) Does the project area contain prime and unique (P&U) farmlands? If yes, show on soils figure the soil types that are prime and unique farmland. (If "No" skip the rest of the table.)	☒ Yes ☐ No	If Yes, Quantity (acres):	4.5
2) Will P&U farmland be directly impacted by the project? (If "No" skip questions 3-4.)	☐ Yes ☒ No	If Yes, Quantity (acres):	
3) *What is the total acreage of P&U farmland in the county?*	Acres Impacted:		

Table 3. Prime and Unique Farmland **Water Treatment Improvements** **Town of River Bend**			
4) What is the percentage of P&U farmland in the county that will be impacted? (Divide answer to Question 2 by answer to Question 3)	Percentage Impacted:		
Will SCI impact prime and unique farmlands?	☐ Yes ☒ No	If Yes, Quantity (acres):	
Describe SCI of the project.			
The site for the proposed WTP contains soils that are considered prime farmlands per the USDA; however, the property is not currently being used for agriculture. At present, it is unattended woods land. Construction of the WTP will not have any secondary impacts. The proposed WTP will have the same combined capacity of the existing WTPs that will be replaced. The project is not planned to expand service area or encourage development that would result in the loss of additional prime and unique farmland.			

Mitigative Measures	
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☐ Yes ☒ Not Applicable	☐ Yes ☒ Not Applicable
Describe the mitigative measures below and supply references to the appropriate appendix in the ER/EID.	
Mitigative Measure Description	*Reference(s)*
Not Applicable	Not Applicable

Table 4. Land Use **Water Treatment Improvements** **Town of River Bend**	
Complete this table in accordance with Section 4.4.	
Land Use Figure Reference Number (if applicable):	5, 6c
Land Use Information Appendix Reference (if applicable):	G-5, G-6

Table 4. Land Use **Water Treatment Improvements** **Town of River Bend**
Existing Conditions
Discuss the current land use for the project site.
The site of the proposed WTP is an unattended mixed stand forest. The site appears to have been logged in the early 1990's, and has since been allowed to naturally revegetate. It has remained undisturbed since that time. There is no indication that the property has been farmed over the past six decades.
Discuss the current land use for the project area.
The site and properties located immediately adjacent and surrounding the proposed WTP site are within the Town limits. Existing and/or proposed development to the northeast, east, and south of the site are residential. All undeveloped areas in this area are currently unattended woods land.
Discuss the zoning for the project site.
The proposed WTP site is currently zoned as R20A, Residential – Agricultural 20,000 square feet per the 2023 zoning map. The WTP is an allowed usage within the current property zoning.
Discuss the zoning for the project area.
The site and properties located immediately adjacent and surrounding the proposed WTP are zoned for Residential and/or Residential-Agricultural development.
Impacts
Discuss the direct impacts to land use on the project site.
The Town of River Bend participates in a Regional CAMA Land Use Plan (LUP) with the City of New Bern and the Town of Trent Woods. The current LUP classifies the undeveloped area surrounding the proposed WTP site as Urban Transition. This classification describes areas on the periphery of developed zones that are poised for future growth. These areas also serve as a buffer to Rural and open spaces. Land in this area is a mix of vacant and developed properties. Construction of the WTP will result in the loss of several acres of woodland. The WTP will contribute to the health and wellbeing of the community as it will provide a long-term source of potable drinking water to replace existing facilities that are aged and lacking in regard to production of water at the desired quality. Current zoning of the site allows for construction of the WTP. Construction activity will result in temporary nuisances such as noise, dust, etc. for nearby residents.

Table 4. Land Use **Water Treatment Improvements** **Town of River Bend**	
Describe SCI of the project.	
The development of the WTP is not expected to significantly contribute to secondary and cumulative impacts as the new WTP will provide the same cumulative capacity as the two existing WTPs that it is intended to replace. The proposed WTP site is located immediately adjacent to the Town's new John R. Kirkland Public Works Facility and existing 300,000-gallon elevated storage tank, all of which fit well within the existing residential environment.	
Mitigative Measures	
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☐ Yes ☒ Not Applicable	☒ Yes ☐ Not Applicable
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.	
Mitigative Measure Description	*Reference(s)*
Site to be developed and constructed to conform with proper zoning requirements including setbacks and buffers.	Town of River Bend Zoning Ordinance.

Table 5. Forest Resources **Water Treatment Improvements** **Town of River Bend**	
Complete this table in accordance with Section 4.5.	
Forest Resources Information Appendix Reference (if applicable):	G-5
Existing Conditions	
Discuss the type of forest resources on the project site and in the project area	
The proposed WTP Site is currently an unattended forest consisting of a mixed stand of Loblolly Pine, American Holly, White Oak, Water Oak, Yellow Poplar, etc. Aerial photographs suggest the site was last logged in the early 1990s. The forest appears not to have been re-planted, rather it appears to have re-vegetated naturally. There is no indication that the property has been farmed over the past six decades. Approximately 80 acres located immediately northeast of the proposed WTP site consisting of similar woodland was harvested within the past two years.	

Table 5. Forest Resources
Water Treatment Improvements
Town of River Bend

Discuss the types of wildlife habitat on the project site and in the project area.

Wildlife species found commonly in the project area include White Tailed Deer, Raccoons, Grey Squirrels, Wild Turkeys, Wood thrushes, American robins, Sparrows, Blue Jays, various species of Snakes, Frogs, Salamanders, etc. Threatened and endangered species reported by U.S. Fish and Wildlife that have ranges that could potentially extend into the River Bend area include the Northern Long-eared Bat, Tricolored Bat, Eastern Black Rail, Red-cockaded Woodpecker, and the Red Knot. US Fish and Wildlife have not identified any critical habitats for threatened or endangered species in the project area. There are significant areas of forested habitat in the vicinity of the proposed WTP site.

Impacts

Will forest resources be impacted?	☒ Yes ☐ No	If Yes, Quantity (acres):	4.5
Will SCI impact forest resources?	☐ Yes ☒ No	If Yes, Approximate Quantity (acres):	NA

Describe SCI of the project.

Not Applicable

Mitigative Measures

Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☒ Yes ☐ Not Applicable	☐ Yes ☒ Not Applicable

Describe the mitigative measures below and supply references to the appropriate appendix in the EID.

Mitigative Measure Description	*Reference(s)*
Appropriate clearing limits, setbacks and buffers will be provided.	Town of River Bend Zoning Ordinance.

Table 6.1 Wetlands and Streams **Water Treatment Improvements** **Town of River Bend**			
Complete this table in accordance with Section 4.6 of the guidance.			
Wetlands and Streams Figure Reference Number:		4, 5, 6d, 6e	
Wetlands and Streams Information Appendix Reference (if applicable):		G-3, G-7, G-8, G-10	
Existing Conditions			
Are wetlands present on the project site and in the project area?		*Are streams present on the project site and in the project area?*	
☒ Yes ☐ No		☒ Yes ☐ No	
If so, discuss the type, quality, function, and relative importance of wetlands and identify any streams.			
Wetland delineations were performed by Davey Resource Group in January 20, 2025 and August 26, 2025. Wetlands have been identified on the proposed WTP site and along the proposed access road to the proposed remote well site although neither of these areas are indicated on the National Wetland Inventory online mapping tool. The wetland areas are located in the headwaters of drainage basins of tributaries of the Trent Rivers (27-101-(31)) which is classified as SB;Sw,NSW. Every effort will be made to minimize disturbance to wetlands; however, a small amount of fill (approximately 0.17 +/- acres) in the upstream ends of the wetland areas will be required in order to accommodate construction of the WTP access and waste settling ponds, as well as the access corridor to the remote well site. This quantity and locations of the wetland disturbance is considered negligible relative to the existing wetland resources of the drainage basin.			
Have delineations occurred?		*If so, supply the date.*	
☒ Yes ☐ No		January 20, 2025, August 26, 2025	
Impacts			
Will wetlands be impacted?	☒ Yes ☐ No	If Yes, Quantity (acres):	0.17
Will streams be impacted?	☐ Yes ☒ No	If Yes, Quantity (linear feet):	Not Applicable
Will SCI impact wetlands?	☐ Yes ☒ No	If Yes, Approximate Quantity (acres):	Not Applicable

Table 6.1 Wetlands and Streams **Water Treatment Improvements** **Town of River Bend**			
Will SCI impact streams?	☐ Yes ☒ No	If Yes, Approximate Quantity (linear feet):	Not Applicable
Describe Direct Impacts of the project (construction and operational impacts). If there will be any stream/wetland crossings, complete Table S.9.a in addition to the description.			
Preliminary site plans call for filling 0.17 +/- AC of the existing wetlands on the WTP site and remote well access corridor. This is to allow for the construction of the proposed access roads and waste settling ponds. The proposed waste supernatant force main will be installed by directional drill beneath two (2) canal crossings enroute to the Trent River discharge near the existing WWTP. These are unnamed tributaries of the Trent River and are not classified by DEQ. This construction will have no impacts to wetlands or Waters of the U.S. The proposed WTP treated waste discharge will be combined with the Town's WWTP discharge into the Trent River. This will be accomplished via directional drilling with a multiport diffuser installed in the river.			
Describe SCI of the project.			
Secondary impacts include an ongoing treated waste discharge into the Trent River which will require a new combined NPDES discharge permit to replace the two (2) existing NPDES permits for the WTPs and WWTP. Both existing WTPs discharge to the Plantation Boating Canal which is tributary to the Trent River. In addition, the current WWTP discharges to the Trent River. Design and permitting of the new combined discharge will be accomplished to ensure proper dilution of the most limiting constituent into a regulatory mixing zone.			
Mitigative Measures			
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*		
☒ Yes ☐ Not Applicable	☒ Yes ☐ Not Applicable		
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.			
Mitigative Measure Description			*Reference(s)*

Table 6.1 Wetlands and Streams **Water Treatment Improvements** **Town of River Bend**	
Minimize the disturbance of wetlands, use directional drilling where practical, adhere to the requirements of a USACE Nationwide Permit 58 for utility installation, purchase wetland credits as required to offset unavoidable impacts, and provide erosion and sedimentation measures to prevent silt entering wetland and streams. Mitigative measures for SCI's include ongoing monitoring/testing of waste effluent to ensure compliance with the NPDES permit.	USACE Nationwide Permit 58, NC Erosion and Sedimentation Control Manual NPDES Discharge Permit

Table 6.2. Stream/Wetland Crossings			
Water Treatment Improvements			
Town of River Bend			
Wetland Crossings (add rows as needed; include all crossings even if impact is zero acres.)			
		Stream and Wetlands Crossing Figure Reference Number:	6d, 6e
		Stream and Wetlands Crossing Information Appendix Reference (if applicable):	G-7
# Keyed to Map	Diameter & Type of Sewer	Installation Method	Acres Impacted
W1	Waste Pond	Permanent fill	0.008
W2	WTP Access Road	Permanent fill	0.01
W3	Well Access Road/Raw Water Main	Permanent fill	0.002
W4	Well Access Road/Raw Water Main	Permanent fill	0.10
W5	Well Access Road/Raw Water Main	Permanent fill	0.02
W6	Well Access Road/Raw Water Main	Permanent fill	0.03
		Total Wetland Impacts (acres):	**0.17**
Stream Crossings (add rows as needed; include all crossings even if impact is zero feet.)			
# Keyed to Map	Diameter & Type of Sewer	Installation Method	Linear Feet Impacted

Table 6.2. Stream/Wetland Crossings			
Water Treatment Improvements			
Town of River Bend			
S1	6 – Filter/Softener Treated Backwash/Regeneration Waste Supernatant	Horizontal Directional Drill	100
S2	6 – Filter/Softener Treated Backwash/Regeneration Waste Supernatant	Horizontal Directional Drill	75
S3	8 – Filter/Softener Treated Backwash/Regeneration Waste Supernatant & WWTP Treated Effluent	Horizontal Directional Drill	375
		Total Stream Impacts (feet):	**550**

Table 7. Water Resources **Water Treatment Improvements** **Town of River Bend**			
Complete this table in accordance with Section 4.7.			
Water Resources Appendix Information Appendix Reference (if applicable):			C, G-3, G-7, G-8, G-10
Existing Conditions			
River basin(s) for project:	Nuese		
List all stream(s) found within the project site and greater project area.			
Name	*Classification*	*Impaired?*	*Reason for Impairment*
Trent River	SB; Sw, NSW	☐ Yes ☒ No	NA
Unnamed Tributaries (Boating Canal)	SB; Sw, NSW (Closest Downstream)	☐ Yes ☒ No	NA
Discuss groundwater quality and quantity.			

Table 7. Water Resources **Water Treatment Improvements** **Town of River Bend**	
The aquifers that exist within the proximity of The Town of River Bend (from deepest to shallowest) include the Lower Cape Fear Aquifer, Upper Cape Fear Aquifer, Black Creek Aquifer, Peedee Aquifer, Beaufort Aquifer, Castle Hayne Aquifer and Surficial Aquifer. All of these aquifers, with the exception of the Castle Hayne Aquifer and Surficial Aquifer are brackish. The Castle Hayne Aquifer also is the most prolific aquifer in the vicinity of the Town of River Bend. The proposed wells will draw from the Lower Castle Hayne Aquifer/Comfort Member. These wells will be subject to the Central Coastal Plain Capacity Use Area (CCPCUA) rules.	
Discuss surface water quality.	
The surface water bodies in the vicinity of the proposed project are all Nutrient Sensitive Waters. Surface water is much more sensitive to risk of contamination than deep groundwater aquifers. In eastern North Carolina, groundwater is sufficiently abundant that it is generally the preferred source for drinking water supply over surface waters.	
LGU water supply(ies):	River Bend existing – Upper Castle Hayne/River Bend Strata River Bend proposed – Lower Castle Hayne/Comfort Member City of New Bern – Lower Castle Hayne/Comfort Member Jones County – Lower Castle Hayne/Comfort Member
Impacts	
Discuss construction impacts related to surface water quality and groundwater quality/quantity.	
The new 0.95 MGD WTP will be equivalent to the cumulative capacity of the two existing WTPs that it will replace. However, a slight increase in groundwater withdrawal and surface water discharge will occur as a function of the softening regeneration step being added to the treatment process (approximately 0.1 MGD proposed vs 0.05 MGD existing). This minor volume of additional water flow is negligent relative to the capacity of the Lower Castle Hayne Aquifer as the water supply and the Trent River as the receiving water. The primary impact during construction is erosion and sedimentation that could contaminate downstream waters if proper control techniques are not utilized. Horizontal directional drilling will be utilized for any stream crossings. Appropriate sedimentation control will be required to prevent discharge of sediment, drilling mud, etc. into adjacent water bodies.	
Discuss operational impacts related to surface water quality and groundwater quality/quantity.	

Table 7. Water Resources **Water Treatment Improvements** **Town of River Bend**	
The WTP site will be designed to comply with the NCDEMLR erosion and sedimentation permit requirements, as well as low density stormwater permit requirements. The waste settling basins will be designed to receive and provide quiescent settling of precipitated iron and manganese prior to decanting and pumping the supernatant to the proposed discharge location. Operators will be required to monitor the effluent waste quality to ensure compliance with the NPDES permit. Operators will also be required to monitor daily withdrawals to ensure compliance with the CCPCUA withdrawal limits.	
Describe SCI of the project.	
Secondary impacts include ongoing treated waste discharge into surface water and increased stormwater runoff due to an increase in impervious area. The treated WTP waste supernatant discharge will be combined with the existing WWTP effluent discharge to the Trent River. The Trent River is a nutrient sensitive, saltwater body. The waste settling basins at the WTP will combine fresh filter backwash with brine softener regenerant to produce a brackish supernatant which combined with the fresh waste discharge from the WWTP aligns well with the receiving water body. The combined flow will further dilute the concentration of nutrients from the WWTP effluent, such as nitrogen and phosphorus, to minimize adverse impacts on surface water quality. The total proposed impervious area on the WTP site, remote well access easement, and remote well site is approximately 62,200 SF. This area is a combination of the asphalt and stone access drives, WTP building, and concrete pads or walkways on the WTP and remote well site. This is equivalent to ~1.42 AC which is approximately 20% of the overall site area. As the built-upon area is less than 24% this is considered a low-density development for stormwater permitting purposes. Vegetated swales will be the primary conveyance method for sheet flow and will drain into existing downstream ditches and culverts.	
Mitigative Measures	
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☒ Yes ☐ Not Applicable	☒ Yes ☐ Not Applicable
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.	
Mitigative Measure Description	*Reference(s)*

Table 7. Water Resources **Water Treatment Improvements** **Town of River Bend**	
Mitigative measures for construction include the use of directional drilling, adherence to the USACE Nationwide Permit 58 for utility installation, and erosion and sedimentation measures to prevent silt entering wetland and streams. Mitigative measures for SCI's include ongoing monitoring/testing of waste effluent to ensure compliance with the NPDES permit, as well as adherence to post-construction stormwater requirements.	USACE Nationwide Permit 58, NCDEMLR Erosion and Sedimentation Control Manual Stormwater Design Manual – Low Density Projects

Table 8. Wild and Scenic Rivers **Water Treatment Improvements** **Town of River Bend**			
Complete this table in accordance with Section 4.8 of the guidance.			
Wild and Scenic Rivers Appendix Information Appendix Reference (if applicable):			NA
Existing Conditions			
Is the project located within one mile of one of the designated Wild & Scene Rivers or a river in the Nationwide Rivers Inventory or its tributaries?			☐ Yes ☒ No
If Yes, check the applicable river(s) / stream(s).			
Chattooga River Horsepasture River Lumber River	☐ ☐ ☐	New River Wilson Creek	☐ ☐
If "Yes" was checked above, is the stream reach in the project area designated as Wild & Scenic?			
Not Applicable			
Impacts			
Discuss any construction impacts related to these stream reaches.			
Not Applicable			
Discuss any operational impacts related to these stream reaches.			
Not Applicable			
Describe the SCI of the project.			
Not Applicable			
Mitigative Measures			
Mitigative Measures for Construction Impacts		*Mitigative Measures for SCI*	

☐ Yes ☒ Not Applicable	☐ Yes ☐ Not Applicable

Describe the mitigative measures below and supply references to the appropriate appendix in the EID.

Mitigative Measure Description	*Reference(s)*
Not Applicable	Not Applicable

Table 9. Coastal Resources Water Treatment Improvements Town of River Bend	
Complete this table in accordance with Section 4.9 of the guidance.	
Coastal Resources Appendix Information and Appendix Reference (if applicable)	G-12
CAMA	
Is the project in a CAMA county listed in the guidance? (If no, skip the rest of the table.)	☒ Yes ☐ No
Does the project involve new construction, land conversion, major rehabilitation, and substantial improvement activities?	☒ Yes ☐ No
If "Yes" to both questions, discuss consistency review with Division of Coastal Management and include any relevant documentation in an appendix.	
The Town of River Bend is within Craven County which is a CAMA county. The bulk of the project, including WTP site, remote well site, access roadways and linework, is not located in an Area of Environmental Concern (AEC). The exception is the installation of the new combined multi-port diffuser discharge into the navigable waters of the Trent River. A CAMA review package was submitted to Rich Mahoney, DCM Field Officer, Morehead City, who confirmed that a CAMA Major permit would be required for this project. Additionally, Rivers reached out to Daniel Govoni and obtained a Federal Consistency Determination concurrence letter which is located in the appropriate appendix.	
Coastal Barriers	
Is the project located within a CBRS community? If "Yes," attach a FIRM map indicating whether construction activity occurs in a CBRS and provide documentation of US Fish and Wildlife Service approval in an Appendix. Include the appropriate Appendix reference at the top of this table.	☐ Yes ☒ No

Table 10. Shellfish, Fish, and Their Habitats **Water Treatment Improvements** **Town of River Bend**			
Complete this table in accordance with Section 4.10 of this guidance.			
Shellfish, Fish, and Their Habitats Information Appendix Reference (if applicable):			G-3, G-9, G-10
Existing Conditions			
Are T&E species present within the project site, the project area, or downstream from the project?			
☒ Yes ☐ No			
If Yes, list all aquatic T&E species located in the waterbodies within the project site, in the project area, and downstream of the project site. Show approximate location(s) on the Environmental Features Figure.			
Aquatic T&E Species Figure Reference Number (if applicable):			NA
Common Name	*Scientific Name*	*Status*	*Approximate Location (e.g., 5 mi. NE of Project)*
American Alligator	*Alligator mississippiensis*	Threatened	Any water body in the vicinity of the project area
Green Sea Turtle	*Chelonia mydas*	Endangered	35 miles to the southeast downstream of the Trent River
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered	Coast of North Carolina
Neuse River Waterdog	*Necturus lewisi*	Threatened	Any water body in the vicinity of the project area
West Indian Manatee	*Trichechus manatus*	Threatened	30 miles to the southeast downstream of the Trent River.
Discuss shellfish and fish habitat. (Not just T&E species.)			

Table 10. Shellfish, Fish, and Their Habitats **Water Treatment Improvements** **Town of River Bend**	
The Trent River in the vicinity of the project area is classified as Inland Fishing Waters and is described in 15A NCAC 03Q .0202. The Trent River habitat supports a wide range of popular game fish including Largemouth Bass, Striped Bass, Catfish, Crappie, Sunfish, Speckled Trout and White Perch. It is a Striped Bass Management Area. There are no shellfish habitat classified within the Trent River in the vicinity of the project area.	
Impacts	
Discuss any impacts to threatened and endangered species.	
Impacts to threatened and endangered species will be minimal. Impacts are primarily temporary in nature and consist of potential erosion which can increase turbidity in downstream waters.	
Discuss construction impacts related to fish, shellfish, and their habitats.	
Potential construction impacts for fish and their habitats are similar to those for endangered species. There are no anticipated impacts to shellfish.	
Discuss operational impacts related to fish, shellfish, and their habitats.	
The waste settling basins will be designed to provide quiescent settling of the filter backwash and softener regeneration waste. This will allow time for precipitated iron and manganese to settle out of the wastewater prior to decanting the supernate for discharge. Operators will be required to monitor the effluent waste quality to ensure compliance with the prospective NPDES permit to prevent degradation of water quality for fish habitats. Dechlorination will be provided to ensue Total Residual Chlorine is maintained within an acceptable limit.	
Describe SCI of the project.	
Secondary impacts include ongoing treated waste effluent disposed into surface water. However, the treated waste effluent from the proposed WTP will be mixed with the treated effluent discharge from the existing WWTP providing further dilution. The multiport diffuser will be designed to dilute residual waste constituents within a regulatory mixing zone to minimize concerns for marine life. The WTP project adds no additional capacity, and is not intended to promote growth that may negatively impact fish, shellfish, nor their habitats.	
Mitigative Measures	
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☒ Yes ☐ Not Applicable	☒ Yes ☐ Not Applicable

Table 10. Shellfish, Fish, and Their Habitats **Water Treatment Improvements** **Town of River Bend**	
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.	
Mitigative Measure Description	*Reference(s)*
Proper erosion and sedimentation control measures. Horizontal directional drilling installation of pipelines beneath stream crossings. Proper monitoring, reporting and adherence to the NPDES permit.	NCDEMLR Erosion and Sedimentation Control Manual. NCDEQ NPDES Permit

Table 11. Wildlife and Natural Vegetation **Water Treatment Improvements** **Town of River Bend**			
Complete this table in accordance with Section 4.11 of the guidance.			
Wildlife and Natural Vegetation Information Appendix Reference (if applicable)			G-5, G-9
Existing Conditions			
Are T&E species present within the project site, or project area?			
☒ Yes ☐ No			
If Yes, list all terrestrial T&E species located in the project site or project area. Show approximate location(s) on the Environmental Features Figure.			
Terrestrial T&E Species Figure Reference Number (if applicable):			NA
Common Name	*Scientific Name*	*Status*	*Approximate Location (e.g., 5 mi. NE of Project)*
Northern Long-eared Bat	*Myotis septentrionalis*	Endangered	Throughout project area
Tricolored Bat	*Perimyotis subflavus*	Proposed Endangered	Throughout project area

Table 11. Wildlife and Natural Vegetation Water Treatment Improvements Town of River Bend			
Eastern Black Rail	*Laterallus jamaicensis ssp. Jamaicensis*	Threatened	Throughout project area
Red-cockaded Woodpecker	*Picoides borealis*	Endangered	Throughout project area
Rufa Red Knot	*Calidris canutus rufa*	Threatened	Most often found in Outer Banks, NC approximately 50 miles east
Monarch Butterfly	*Danaus Plexippus*	Proposed Threatened	Throughout project area
Rough-leaved Loosestrife	*Lysimachia asperulaefolia*	Endangered	Croatan National Forest approximately 10 miles southeast
Discuss the wildlife and vegetation present in the project site and project area. (Not just T&E species.)			
The proposed project site is located within an urban transition zone. The WTP site is located immediately adjacent to the Town's Public Works Facility and in the vicinity of existing residential neighborhoods. Wildlife and vegetation are typical to that of an established eastern North Carolina city. Wildlife found in the project area includes deer, squirrels, birds, raccoons, possums, snakes, etc. The vegetation adjacent to the project area include pines, oaks, maples, greenbrier, wax myrtles, and various grasses.			
Impacts			
Discuss any impacts to threatened and endangered species.			
The primary impact to threatened and endangered species includes loss of natural habitat due to clearing and grubbing the site. This is potentially more impactful for birds and bats which utilize trees for roosting. However, birds and bats prefer mature, old growth roost trees with cavities and exfoliating bark. The project area and adjacent woodlands are new growth forests that do not provide the preferred habitat. Craven County does, however, provide an abundance of nearby habitat for displaced wildlife, including nearby Croatan National Forest.			

Table 11. Wildlife and Natural Vegetation **Water Treatment Improvements** **Town of River Bend**	
Discuss construction impacts related to wildlife and natural vegetation.	
Impacts related to wildlife and natural vegetation are identical to those for threatened and endangered species. Following clearing and grading of the site, temporary and permanent seeding and mulching will be accomplished to provide a permanent stand of native grass and vegetation.	
Describe SCI of the project.	
There are no secondary impacts anticipated to wildlife, vegetation, nor threatened and endangered species. This project is not intended to facilitate growth by adding treatment capacity. The finished water capacity of the proposed treatment plant will be the same as the combined capacity of the Town's existing WTP's.	
Mitigative Measures	
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☒ Yes ☐ Not Applicable	☐ Yes ☒ Not Applicable
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.	
Mitigative Measure Description	*Reference(s)*
Appropriate clearing limits, setbacks and buffers will be provided.	River Bend Zoning Ordinance

Table 12. Public Lands and Scenic, Recreational, and State Natural Areas **Water Treatment Improvements** **Town of River Bend**	
Complete this table in accordance with Section 4.12 of the guidance.	
Public Lands and Scenic, Recreational, and State Natural Area Figure Reference Number (if applicable):	6f
Public Lands and Scenic, Recreational, and State Natural Area Information Appendix Reference (if applicable):	NA
Existing Conditions	

Table 12. Public Lands and Scenic, Recreational, and State Natural Areas
Water Treatment Improvements
Town of River Bend

Are public lands and scenic, recreational, and state natural areas found adjacent to or in the project area?

☒ Yes ☐ No (then no impact)

If yes, list these areas and show on the Environmental Features Figure

Name	*Type*	*Location (e.g., 5 mi. NE of Project)*
River Bend Dog & Skate Park	Recreational	2,680 ft east of project
River Bend Town Park	Recreational	3,000 ft east of project

Impacts

If Yes, discuss construction impacts related to public lands, and scenic, recreational, and state natural areas.

The primary impact during construction is limited access during installation of the treated waste supernatant force main. The route for the proposed force main is along the Plantation Drive right-of-way which extends past each of the aforementioned public parks. There are no permanent impacts to these recreational facilities.

If Yes, discuss operational impacts related to public lands, and scenic, recreational, and state natural areas.

Operational impacts include public notifications for any potential down time or limited access to these facilities.

Describe SCI of the project.

NA

Mitigative Measures

Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☒ Yes ☐ Not Applicable	☐ Yes ☒ Not Applicable

Describe the mitigative measures below and supply references to the appropriate appendix in the EID.

Mitigative Measure Description	*Reference(s)*
Public notification in advance of any potential disruption or limited access.	NA

Table 13. Areas of Archaeological or Historical Value **Water Treatment Improvements** **Town of River Bend**		
Complete this table in accordance with Section 4.13 of this guidance.		
Archaeological or Historical Area Figure Reference Number (if applicable):	6g	
Archaeological or Historical Area Information Appendix Reference (if applicable):	NA	
Existing Conditions		
Are areas of archaeological or historical value in the project site, project vicinity, or project area?		
☐ Yes ☒ No (No Impact)		
If yes, list these and show on the Environmental Features Figure		
Name	*Type*	*Location (e.g., 5 mi. NE of Project)*
NA	NA	NA
Impacts		
If Yes, discuss construction impacts related to areas or archaeological or historical value?		
There are no impacts to area of archaeological or historical value anticipated due to construction of this project.		
If Yes, discuss operational impacts related to areas of archaeological or historical value.		
There are no operational impacts anticipated due to construction of this project.		
Describe SCI of the project.		
There are no secondary impacts anticipated due to construction of this project.		
Mitigative Measures		
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*	
☐ Yes ☒ Not Applicable	☐ Yes ☒ Not Applicable	
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.		
Mitigative Measure Description		*Reference(s)*
Not Applicable		Not Applicable

Table 14. Air Quality **Water Treatment Improvements** **Town of River Bend**	
Complete the table in accordance with Section 4.14 of the guidance.	
Air Quality Information Appendix Reference (if applicable):	G-3
Existing Conditions	
Discuss the general air quality and identify current sources of emissions from the project and surrounding area. Note whether odors have been a problem.	
The Town of River Bend and the surrounding area are not known to have air quality issues. There are no major industrial emission sources in the project area. Odors are not considered a problem.	
Impacts	
Discuss construction impacts related to air quality.	
Soil disturbance during construction may generate dust particles to become temporarily suspended. Dust control measures will be required to ensure that conditions do not adversely degrade. All construction equipment will be governed by EPA standards for air quality and emissions.	
Will open burning occur?	*If Yes, describe what will be burned.*
☐ Yes ☒ No	NA
Discuss operational impacts related to air quality.	
The only operational impact anticipated is due to stripping of hydrogen sulfide from the raw water well supply. A forced draft aerator will be utilized to strip hydrogen sulfide and provide oxidation. The discharge from the aerator will be at a sufficient height above ground to disperse and diffuse residual odors in ambient air conditions to avoid any nuisance.	
Describe SCI of the project.	
There are no negative secondary or cumulative impacts to air quality expected to result from the proposed project. The treatment capacity and its service area are not being increased by this project.	
Mitigative Measures	
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☒ Yes ☐ Not Applicable	☐ Yes ☒ Not Applicable

Table 14. Air Quality **Water Treatment Improvements** **Town of River Bend**	
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.	
Mitigative Measure Description	*Reference(s)*
Dust control measures, i.e. wetting of soil areas, will be required to reduce suspension of dust during construction activities. Construction vehicles, equipment, and generators will have proper emission devices to comply with state emissions control regulations.	NCDEMLR Erosion and Sedimentation Control Manual. NA

Table 15. Noise Levels **Water Treatment Improvements** **Town of River Bend**	
Complete this table in accordance with Section 4.15 of the guidance.	
Noise Level Information Appendix Reference (if applicable):	G-11
Existing Conditions	
Discuss the current noise levels for the project site and project area.	
The project is located within an urban transition zone. The proposed project site is located within the Town of River Bend's corporate limits adjacent to the existing Public Works Facility and surrounding residential neighborhoods. Existing noise levels are typical of residential and light commercial areas.	
Does the LGU have noise ordinances in place?	☒ Yes ☐ No
If yes, describe.	
The Town does not have a dedicated Noise Ordinance; however, excessive noise is regulated under the "General Offenses" ordinance. The rules are typical of those of a community of River Bend's size. The ordinances provide specific language defining what is considered "excessive" noise depending on the time of day.	
Impacts	
Discuss construction impacts related to noise levels. If noise levels will increase, discuss when they will be heard and at what distance.	

Table 15. Noise Levels **Water Treatment Improvements** **Town of River Bend**	
Construction of the WTP will result in noise levels typical of heavy construction machinery. Construction activities will be limited to normal working hours (between 7:30 AM-5:30 PM). Noise projection caused by construction can vary substantially between a few feet to several hundred feet depending on the specific equipment. Equipment will include excavators, saws, hauling trucks, etc.	
Discuss operational impacts related to noise levels.	
There are no negative impacts to noise levels expected to result from the operation of the proposed WTP.	
Describe SCI of the project.	
There are no negative secondary or cumulative impacts to noise levels expected to result from the proposed project. The WTP capacity and service area are not being increased by this project. Generators will be specified to include sound attenuating enclosures to minimize nuisance.	
Mitigative Measures	
Mitigative Measures for Construction Impacts?	*Mitigative Measures for SCI?*
☒ Yes ☐ Not Applicable	☐ Yes ☒ Not Applicable
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.	
Mitigative Measure Description	*Reference(s)*
Construction hours will be specified as Monday through Friday, 7:30 am to 5:30 pm. Exhaust mufflers will be provided as standard for gasoline and diesel-powered equipment heavy equipment.	River Bend General Offenses Ordinance.

Table 16. Introduction of Toxic Substances **Water Treatment Improvements** **Town of River Bend**	
Introduction to Toxic Substances Appendix Reference (if applicable):	Not Applicable
Impacts	
Discuss any toxic substances that may be introduced during project construction and operation in accordance with Section 4.16 of the guidance.	

Table 16. Introduction of Toxic Substances **Water Treatment Improvements** **Town of River Bend**	
Potential sources of toxic substances during construction may include exhaust emissions, oil, fuel and other vehicle fluids. Escape of these substances will be minimized by proper vehicle maintenance and collection and proper disposal of fluid containers. Contractors will be required to ensure that no uncured concrete is allowed to contact surface waters. Various chemicals will be utilized as part of the WTP process. These include potassium permanganate, sodium hypochlorite, polyphosphate, ammonia, and sodium bisulfite. Each of these chemicals will be stored in double-walled chemical storage tanks inside the WTP building. All chemical pumps will be housed inside dedicated chemical feed rooms within the WTP building.	
Mitigative Measures	
Mitigative Measures for Construction Impacts?	
☒ Yes ☐ Not Applicable	
Describe the mitigative measures below and supply references to the appropriate appendix in the EID.	
Mitigative Measure Description	*Reference(s)*
Introduction of toxic substances will be minimized by proper vehicle maintenance and collection and proper disposal of fluid containers. Contractors will be required to ensure that no uncured concrete is allowed to contact surface waters. Chemicals will be stored in double-walled chemical storage tanks inside the WTP building. All chemical pumps will be housed inside dedicated chemical feed rooms within the WTP building.	Plans and Specifications

Table 17. Environmental Justice Analysis
Water Treatment Improvements
Town of River Bend

Complete this table in accordance with Section 4.17 of the guidance.

Was the U.S. Environmental Protection Agency's Environmental EJ Screen Tool used? If No, then complete the Existing Conditions cells below.	☐ Yes ☒ No
Environmental Justice Figure Reference Number(s):	Not Available – EPA EJ Screen Tool has been removed from EPA's website
Environmental Justice Information Appendix Reference (if applicable):	Not Available – EPA EJ Screen Tool has been removed from EPA's website

Existing Conditions

Provide the following information and key the Block Groups to the map in the EID. Include figures.

County	Census Tract	Census Block Group	Total Population	Minority Population	Percent Minority Population	Significant Minority Population?	Low-Income Population	Percent Low-Income Population	Significant Low Income Population?
Craven	960404	Block 2012	2,902	388	10%	No	258	8.9	No

Impacts

Are there any potentially significant environmental justice populations in the project area? ☐ Yes ☒ No

If the answer is yes, then below, list the impacts to the minority and/or low-income populations below and whether the impacts are potentially significant. If potentially significant, contact the Environmental Assessment Coordinator.

Impact	*Potentially Significant?*
NA	☐ Yes ☐ No

Table 18. Mitigative Measures
Water Treatment Improvements
Town of River Bend

Complete this table for all resource categories in accordance with Section 4.18 of the guidance. If there was no impact in a particular resource category, then state, "No Impact."

Resource Category	Potential Direct Impact	Mitigative Measure(s) for Direct Impact	Potential SCI	Mitigative Measures for SCI
Topography & Floodplains	No short term nor permanent impact to contours within the 100-year flood zone.	Erosion and sedimentation control measures per NCDEMLR requirements. Site drainage using vegetated swales and culverts.	Increased impervious area due to WTP building and access drive.	Adherence to the River Bend Flood Damage Prevention Ordinance
Soils	Stripping of vegetation to clear and grub site will expose soil to potential erosion	Installation of appropriate erosion control measures. Adherence to the approved E&SC plan.	No Impact. Project is not intended to encourage future development which would further affect soil quality.	Expeditious seeding of exposed soils following construction activities.
Prime & Unique Farmland	Loss of area classified as prime farmland due to soil types present.	No mitigation methods available. The site is not currently utilized as farmland and sufficient prime farming area is adjacent to the project area.	No Impact. Project is not intended to encourage future development which would further remove potential prime farmland due to development.	Not Applicable.
Land Use	Loss of land that could be used for an alternative purpose.	Adherence to the Regional CAMA Land Use Plan.	No Impact. Project is not intended to encourage future development.	Not Applicable
Forest Resources	Loss of naturally vegetated, unattended forest area.	Utilizing appropriate staking to prevent excessive clearing of unnecessary areas.	No Impact. Project is not intended to encourage future development.	Not Applicable

Table 18. Mitigative Measures
Water Treatment Improvements
Town of River Bend

Complete this table for all resource categories in accordance with Section 4.18 of the guidance. If there was no impact in a particular resource category, then state, "No Impact."

Resource Category	Potential Direct Impact	Mitigative Measure(s) for Direct Impact	Potential SCI	Mitigative Measures for SCI
Wetlands and Streams	Permanent filling of wetlands (<1 AC). Crossing streams using horizontal directional drilling. Waste discharge into surface waters. Potential soil erosion into surface waters.	Only filling wetlands where necessary. Using horizontal directional drilling to minimize stream impacts. Adherence to appropriate USACE permits.	Continued waste discharge into surface waters.	Ongoing monitoring and adherence to the NPDES permit.
Water Resources	Withdrawal from a CCPCUA regulated aquifer. Crossing streams with wastewater. Waste discharge into surface waters. Potential soil erosion into surface waters.	Utilizing horizontal directional drilling to mitigate impacts. Adherence to USACE Nationwide Permit 58. Installation of appropriate E&SC measures. Proper stormwater conveyance (low density).	Continued waste discharge into surface waters.	Ongoing monitoring and adherence to the NPDES permit.
Shellfish, Fish, and their Habitats	Crossing streams via horizontal directional drilling. Potential soil erosion into surface waters.	Utilizing horizontal directional drilling to mitigate impacts. Adherence to USACE Nationwide Permit 58.	Continued waste discharge into surface waters.	Ongoing monitoring and adherence to the NPDES permit.
Wildlife and Natural Vegetation	Loss of potential habitat due to clearing of naturally vegetated trees and grasses.	Utilizing appropriate staking to prevent excessive clearing of unnecessary areas.	No Impact. Project is not intended to encourage future development.	Not Applicable

Table 18. Mitigative Measures
Water Treatment Improvements
Town of River Bend

Complete this table for all resource categories in accordance with Section 4.18 of the guidance. If there was no impact in a particular resource category, then state, "No Impact."

Resource Category	Potential Direct Impact	Mitigative Measure(s) for Direct Impact	Potential SCI	Mitigative Measures for SCI
Public Land and Scenic, Recreational, and State Natural Areas	Temporary down-time or limited access to recreational facilities.	Proper coordination and advance public notice.	No Impact	Not Applicable
Areas of Archaeological or Historical Value	No Impact	Not Applicable	No Impact	Not Applicable
Air Quality	Dust from exposed soil during construction. Hydrogen sulfide smell from aerator.	Wetting of soil to prevent potential of dust. Proper erosion and sedimentation control mitigation measures. Aerator will be installed high enough above grade to ensure quick dispersal.	No Impact. Project is not intended to encourage future development.	Not Applicable
Noise Levels	Heavy machinery during construction.	Working only during normal business hours (7:30 AM-5:30 PM). Exhaust mufflers.	No Impact	Not Applicable
Toxic Substances	Exhausts emissions and oil, fuel, and other vehicle fluids from construction machinery. Uncured concrete reaching surface waters.	Proper equipment maintenance and monitoring. Monitoring during concrete mixing and pouring.	Chemical spills/leaks for chemicals kept at the WTP for operation.	Chemical stored in double-walled containers housed in dedicated chemical feed rooms with floor drains.
Environmental Justice	No Impact	Not Applicable	No Impact	Not Applicable

8.0 Financial Analysis

The project is estimated to cost $20,843,600 and is being funded by three (3) sources. Two of the funding sources are Drinking Water State Revolving Fund Loans with 75% and 50% principal forgiveness (up to $3,500,000 and $3,137,125), respectively. The financial analysis tables that follow utilize the loan terms as outlined in the Letters of Intent to Fund for each loan, respectively. The project is also being funded via earmark funds from SL 134-2023. As two (2) of the funding sources are loans, the effect on user rates must be analyzed. The following pages contain Tables 8.1.1-8.1.6 which detail the funding sources available, calculate loan payments, and determine the potential rate increase for the Town's customers

Table 8.1. Applicant's/LGUs Financial Condition Water Treatment Improvements Filter-Softener Water Treatment Plant (Preferred)		
Utility Bill as Percent of Median Household Income		
Use the pulldown menu to select the type of rate structure used for water and sewer. If using a rate structure other than uniform, then there is no need to complete the base charge (charge and volume) or volumetric charge.		
	Sewer Rate Structure	**Water Rate Structure**
Rate Structure:	Uniform	Other
Base Charge:	$24.18	$15.24
Thousands of Gallons in Base Charge:	0	0
Volumetric Charge per 1,000 gallons:	$9.30	-
Volumetric Charge 0 - 4,000 gallons:	-	$4.22
Volumetric Charge 4,001 - 20,000 gallons:	-	$4.50
Volumetric Charge 20,001+ gallons:	-	$4.55
Monthly Bill for 5,000 gallons:	$70.68	$36.62
Combined Monthly Water and Sewer Bill for 5,000 gallons:	**$107.30**	
Median Houshold Income:	$68,314	
Monthly Median Household Income for LGU:	$5,693	
Bill as % of Median Household Income:	1.24%	0.64%
Overall Bill as % of Median Household Income:	**1.88%**	
Additional Information if needed (see Subchater 8.1 of Part B of the guidance).		

Table 8.2. Funding Distribution
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Enter data into the gray areas. Where applicable, use the pulldown menus as shown by the arrows.

	Funding Source[a]	Amount	Funding Type	Specified Interest Rate from LOIF[b] (if applicable)	Repayment Period (if applicable)
Main Division Funding:	DWSRF	$6,929,895	Loan	0.0%	20
Funding 1:	DWSRF-PF	$3,500,000	Principal Forgiveness		
Funding 2:	DWSRF	$3,137,125	Loan	0.0%	20
Funding 3:	DWSRF-PF	$3,137,125	Principal Forgiveness		
Funding 4:	Other	$4,139,455	Grant		
Funding 5:					
Closing/Administrative Fee(s):		$396,175	If Other, list:	Earmarked funds from S.L. 2023-134	
Total Funded Amount (minus applicable closing/administrative fee[s]):		**$20,843,600**			
Total Project Cost (with closing/administrative fee[s]):		**$21,239,775**			

[a]For SRP grants, grant administrative fee is 1.5% of Total grant award.
For SRP and SRF loans, loan administrative fee is 2.0% of Total loan award.

[b]LOIF is Letter of Intent to Fund issued by the Division.

Table 8.3. Year 1 Interest and Repayment Water Treatment Improvements Town of River Bend Filter-Softener Water Treatment Plant (Preferred)					
	Funding Source	**Total Funding Amount**	**Year 1 Principal Payment**	**Year 1 Interest Payment**	**Year 1 Total Payment (Principal + Interest)**
Main DWI Funding :	DWSRF	$6,929,895	$346,495	$0	$346,495
Funding 1:	DWSRF-PF	$3,500,000			$0
Funding 2:	DWSRF	$3,137,125	$156,856	$0	$156,856
Funding 3:	DWSRF-PF	$3,137,125			$0
Funding 4:	Other	$4,139,455			$0
Funding 5:					
				Total Payment @ Specified Interest Rate(s)[a]:	**$503,351**

[a]The interest rates are shown on Table 7.2.

Table 8.4. User Fee Increase Due to Project

Water Treatment Improvements

Town of River Bend

Filter-Softener Water Treatment Plant (Preferred)

Select Customer Type for Financing Project[c]		Average Water Usage Per Month (gallons)	Number of Connections	Total Monthly Water Usage by Customer Type (gallons)	Total Monthly Water Usage for Customer Base (gallons):		4,892,716
☑ Residential		2,770	1,494	4,138,380	# of 5,000 Gallon Units to Finance Project:		979
☑ Non-Residential		47,146	16	754,336	Year 1 O&M Expenses Due to Project:		$62,600
	Funding Source	**Year 1 Annual Repayment**	**Year 1 Annual O&M Costs**	**Total Year 1 Annual Costs @ Specified Interest Rate**	**Year 1 Monthly Costs @ Specified Interest Rate**	**Monthly Cost/ 5,000 Gallons Due to Project @ Specified Interest Rate (All Users)**	**Monthly Cost/5,000 Gallons Due to Project @ Specified Interest Rate (Residential Users Only)**
DWI Main Funding Source:	DWSRF	$346,495	$62,600	$409,095	$34,091	$34.84	$41.19
Funding Source 1:	DWSRF-PF	$0		$0	$0	$0.00	$0.00
Funding Source 2:	DWSRF	$156,856		$156,856	$13,071	$13.36	$15.79
Funding Source 3:	DWSRF-PF	$0		$0	$0	$0.00	$0.00
Funding Source 4:	Other	$0		$0	$0	$0.00	$0.00
Funding Source 5:							
Total Year 1 Annual Cost @ Specified Interest Rate:				**$565,951**			
Total Year 1 Monthly Cost @ Specified Interest Rate:					**$47,163**		
Total Monthly Cost to Treat 5,000 Gallons @ Specified Interest Rate:						**$48.20**	
Total Monthly Cost to Treat 5,000 Gallons @ Specified Interest Rate (Residential Users Only):							**$56.98**

Table 8.5. Impacts to User Rates Water Treatment Improvements Town of River Bend Filter-Softener Water Treatment Plant (Preferred)			
Current Sewer Bill ($/5,000 gallons):	$70.68		
Current Water Bill ($/5,000 gallons):	$36.62		
Current - Combined Water & Sewer Bill ($/5,000 gallons):	$107.30		
	Funding Source	**User Rate Increase Due to Project @ Specified Interest Rate (All Users)**	**User Rate Increase Due to Project @ Specified Rate (Residential Users Only)**
Main IFS Funding Source:	DWSRF	$34.84	$41.19
Funding Source 1:	DWSRF-PF	$0.00	$0.00
Funding Source 2:	DWSRF	$13.36	$15.79
Funding Source 3:	DWSRF-PF	$0.00	$0.00
Funding Source 4:	Other	$0.00	$0.00
Funding Source 5:			
Total User Rate Increase Due to DWI Loan(s) ($/5,000 gal.):		**$34.84**	**$41.19**
Total Increase Due to All Loans(s) ($/5,000 gal.):		**$48.20**	**$56.98**
New Sewer Bill Due to DWI Loan(s) ($/5,000 gal.):		**$105.52**	**$111.87**
New Sewer Bill Due to All Loan(s) ($/5,000 gal.):		**$118.88**	**$127.66**
Percent Change in Sewer Bill Due to DWI Loan(s):		**49.29%**	**58.28%**
Percent Change in Sewer Bill Due to All Loan(s):		**68.19%**	**80.62%**
New Sewer & Water Bills Due to DWI Loan(s) ($/5,000 gal.):		**$142.14**	**$148.49**
New Water & Sewer Bills Due to All Loan(s) ($/5,000 gal.):		**$155.50**	**$164.28**
Percent Change in Sewer & Water Bills Due to DWI Loan(s):		**32.47%**	**32.47%**
Percent Change in Sewer & Water Bills Due to All Loan(s):		**44.92%**	**53.11%**

[a]Change in User Fee to finance DWI Loan.

[b]Change in User Fee to finance ALL funding sources.

Table 8.6. Impact to Bills Due to Project
Water Treatment Improvements
Town of River Bend
Filter-Softener Water Treatment Plant (Preferred)

Sewer Bill as % Monthly MHI:		1.24%	Water Bill as % Monthly MHI:		0.64%
Current Sewer Bill ($/5,000 gal.):		70.68	Current Water Bill ($/5,000 gal.):		$36.62
Current Sewer & Water Bill ($/5,000 gal.):		107.30	Sewer & Water Bill as % Monthly MHI:		1.88%
Monthly MHI for LGU:		$5,693			
		Sewer Bill Due to DWI Loans	**Sewer Bill Due to All Loans**	**Water & Sewer Bills Due to DWI Loans**	**Water & Sewer Bills Due to All Loans**
Specified Interest Rate (All Users)	New	$105.52	$118.88	$142.14	$155.50
	New %MHI Due to Project	1.85%	2.09%	2.50%	2.73%
	Potentially Significant Impact?	No	Yes	No	No
Specified Interest Rate (Residential Users Only)	New	$111.87	$127.66	$148.49	$164.28
	New %MHI Due to Project	1.97%	2.24%	2.61%	2.89%
	Potentially Significant Impact?	No	Yes	No	No

If the user fee increases will be significantly increased, discuss why the LGU has determined to proceed with the project.

The sewer bill as a percentage of the MHI is greater than 2% (due to all loans). Therefore the financial burden is considered to be "potentially significant." The Town's water infrastructure is in need of repair or replacement with many components being greater than 50-years-old. Customers launched complaints about water quality in recent years particularly due to red water from elevated levels of iron. Utilizing better quality raw water from the LCHA and implementing treatment improvements will significantly improve finished water quality. Therefore, the qualitative benefits of the proposed project outweigh the "potential" financial burden.

If a different financial model has been used to determine project financing, then discuss how the Applicant will accommodate the project in terms of financing it.

9.0 Public Outreach

The Environmental Information Document has been prepared to assist the Division in determining a Finding of No Significant Impact. A public meeting will be required as outlined in the Division's guidance document. The Town's citizenry is aware of the proposed project as it has been discussed in public Board meetings. The citizenry has been vocal about water quality in recent years and have launched complaints about red water in areas of the distribution system. It is expected that the Town will react positively to the treatment improvements which the preferred alternative will provide.

The Town is ready and willing to coordinate the public meeting in a timely manner at the Division's direction. The Town can utilize numerous public notification methods including publishing notices in public places, utilizing social media, or posting to the Town's website.

APPENDIX A

CURRENT TREATMENT FACILITIES CONDITION PHOTOGRAPHS

Well House No. 1 (WTP Site) – Exterior

Well No. 1

Well No. 1 Generator

Well House No. 2 (Quarterdeck Townhouses) – Exterior

Well No. 2

Water Treatment Plant (Shoreline/Plantation) - Exterior

WTP – Filters and Face Piping

WTP – Electrical

WTP - Interior

WTP – Chlorine Room

WTP – Bisulfite Feed

WTP - Backwash Waste Holding/Pump Tank

WTP/WWTP Laboratory

Water Treatment Plant (Rhems Fire Station) - Exterior

Well No. 3 and WTP Interior

WTP – Filter Face Piping

WTP – Face Piping/Backwash Waste Sump

WTP - Electrical

WTP – Backwash Waste Holding/Pump Tank

APPENDIX B

LOCAL WATER SUPPLY PLAN
2023/2024

River Bend

2024

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

1. System Information

Contact Information

Complete

Water System Name:	River Bend	PWSID:	04-25-113
Mailing Address:	45 Shoreline Drive River Bend, NC 28562	Ownership:	Municipality
Contact Person:	Brandon Mills	Title:	Public Works Director
Phone:	252-638-3540	Cell/Mobile:	252-617-2893

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Ductile Iron	6-8	2.00 %
Polyvinyl Chloride	2-8	98.00 %

What are the estimated total miles of distribution system lines? 19 Miles
How many feet of distribution lines were replaced during 2024? 0 Feet
How many feet of new water mains were added during 2024? 0 Feet
How many meters were replaced in 2024? 0
How old are the oldest meters in this system? 2 Year(s)
How many meters for outdoor water use, such as irrigation, are not billed for sewer services? 6
What is this system's finished water storage capacity? 0.4000 Million Gallons
Has water pressure been inadequate in any part of the system since last update? *Line breaks that were repaired quickly should not be included.* No

Programs

Does this system have a program to work or flush hydrants? Yes, Semi-Annually
Does this system have a valve exercise program? Yes, Annually
Does this system have a cross-connection program? Yes
Does this system have a program to replace meters? Yes
Does this system have a plumbing retrofit program? No
Does this system have an active water conservation public education program? Yes
Does this system have a leak detection program? No

Water Conservation

What type of rate structure is used? Uniform
How much reclaimed water does this system use? 0.0000 MGD For how many connections? 0
Does this system have an interconnection with another system capable of providing water in an emergency? No

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Trent River (10-3)	100 %	Craven	100 %

What was the year-round population served in 2024? 2,695

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,494	0.1361	0	0.0000
Commercial	15	0.0163	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	1	0.0085	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0960 MGD

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.3387	0.4420	May	0.3958	0.9080	Sep	0.2956	0.4270
Feb	0.3439	0.8760	Jun	0.3823	0.6360	Oct	0.3703	0.8360
Mar	0.3138	0.3790	Jul	0.3101	0.6470	Nov	0.3333	0.4460
Apr	0.3141	0.4070	Aug	0.2655	0.4780	Dec	0.3305	0.6000

Ground Water Sources

Name or Number	Average Daily Withdrawal (MGD)		Max Day Withdrawal (MGD)	12-Hour Supply (MGD)	CUA Reduction	Year Offline	Use Type
	MGD	Days Used					
1	0.1831	359	0.6180	0.3675	CUA0		Regular
2	0.0577	357	0.2220	0.2625	CUA0		Regular
3	0.0974	364	0.3460	0.3675	CUA0		Regular

Ground Water Sources (continued)

Name or Number	Well Depth (Feet)	Casing Depth (Feet)	Screen Depth (Feet)		Well Diameter (Inches)	Pump Intake Depth (Feet)	Metered?
			Top	Bottom			
1	105		77	105	8	85	Yes
2	110		81	110	6	65	Yes
3	103		90	103	8	85	Yes

Are ground water levels monitored? Yes, Monthly

Does this system have a wellhead protection program? Yes

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Ouput Metered?	Source
River Bend WTP	0.3500	Yes	No	Well #3
River Bend WTP	0.6000	Yes	No	Wells 1 and 2

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2024? No

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2024? No

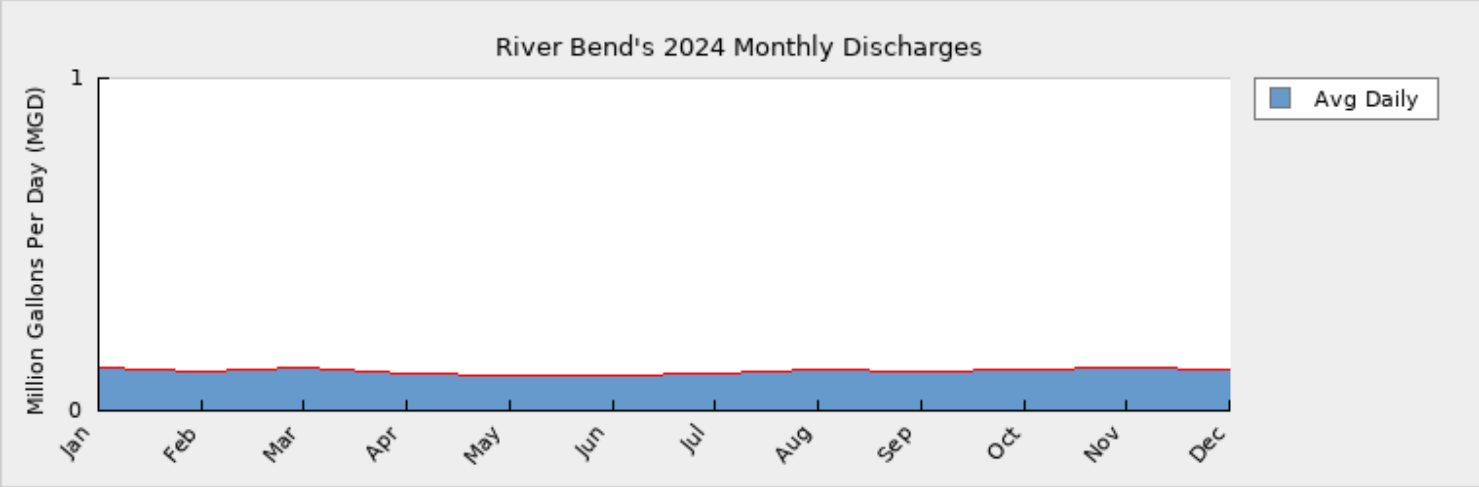
If yes, was any water conservation implemented?

Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? No

4. Wastewater Information

Monthly Discharges

	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	0.1270	May	0.1060	Sep	0.1180
Feb	0.1180	Jun	0.1040	Oct	0.1220
Mar	0.1270	Jul	0.1090	Nov	0.1270
Apr	0.1110	Aug	0.1260	Dec	0.1260



How many sewer connections does this system have? 930

How many water service connections with septic systems does this system have? 497

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

Wastewater Permits

Permit Number	Type	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0030406	WWTP	0.3300	0.3300	0.1020	0.3300	Trent River	Trent River (10-3)
NC0086797	WTP	0.0270	0.0270	0.0170	0.0240	Plantation Canal	Trent River (10-3)

5. Planning

Projections

	2024	2030	2040	2050	2060	2070
Year-Round Population	2,695	2,709	2,736	2,796	2,883	2,994
Seasonal Population	0	0	0	0	0	0
Residential	0.1361	0.1380	0.1390	0.1420	0.1470	0.1520
Commercial	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0085	0.0085	0.0085	0.0085	0.0085	0.0085
System Process	0.0960	0.0960	0.0960	0.0960	0.0960	0.0966
Unaccounted-for	0.0758	0.0764	0.0767	0.0775	0.0790	0.0807

Demand v/s Percent of Supply

	2024	2030	2040	2050	2060	2070
Surface Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ground Water Supply	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Service Area Demand	0.3327	0.3352	0.3365	0.3403	0.3468	0.3541
Sales	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	0.3327	0.3352	0.3365	0.3403	0.3468	0.3541
Demand as Percent of Supply	33%	34%	34%	34%	35%	35%

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

Your long-term water demand is 51 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

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

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

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

Additional Information

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

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

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

River Bend

2023

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1. System Information

Contact Information

Water System Name:	River Bend	PWSID:	04-25-113
Mailing Address:	45 Shoreline Drive River Bend, NC 28562	Ownership:	Municipality
Contact Person:	Brandon Mills	Title:	Public Works Director
Phone:	252-638-3540	Cell/Mobile:	252-617-2893

Complete

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Ductile Iron	6-8	2.00 %
Polyvinyl Chloride	2-8	98.00 %

What are the estimated total miles of distribution system lines? 19 Miles
How many feet of distribution lines were replaced during 2023? 0 Feet
How many feet of new water mains were added during 2023? 0 Feet
How many meters were replaced in 2023? 832
How old are the oldest meters in this system? 1 Year(s)
How many meters for outdoor water use, such as irrigation, are not billed for sewer services? 6
What is this system's finished water storage capacity? 0.4000 Million Gallons
Has water pressure been inadequate in any part of the system since last update? *Line breaks that were repaired quickly should not be included.* No

Programs

Does this system have a program to work or flush hydrants? Yes, Annually
Does this system have a valve exercise program? Yes, Annually
Does this system have a cross-connection program? Yes
Does this system have a program to replace meters? Yes
Does this system have a plumbing retrofit program? No
Does this system have an active water conservation public education program? Yes
Does this system have a leak detection program? No

Water Conservation

What type of rate structure is used? Uniform
How much reclaimed water does this system use? 0.0000 MGD For how many connections? 0
Does this system have an interconnection with another system capable of providing water in an emergency? No

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Trent River (10-3)	100 %	Craven	100 %

What was the year-round population served in 2023? 2,695

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	1,483	0.1426	0	0.0000
Commercial	13	0.0200	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	1	0.0120	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0960 MGD

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	0.2910	0.4190	May	0.3076	0.5170	Sep	0.3234	0.5200
Feb	0.3001	0.5390	Jun	0.3423	0.6760	Oct	0.3109	0.5170
Mar	0.2916	0.3840	Jul	0.3384	0.5610	Nov	0.3107	0.3720
Apr	0.3378	0.8540	Aug	0.3498	0.6820	Dec	0.3080	0.3770

Ground Water Sources

Name or Number	Average Daily Withdrawal (MGD)		Max Day Withdrawal (MGD)	12-Hour Supply (MGD)	CUA Reduction	Year Offline	Use Type
	MGD	Days Used					
1	0.1677	365	0.3940	0.3675	CUA0		Regular
2	0.0638	363	0.1960	0.2625	CUA0		Regular
3	0.0882	362	0.2640	0.3675	CUA0		Regular

Ground Water Sources (continued)

Name or Number	Well Depth (Feet)	Casing Depth (Feet)	Screen Depth (Feet)		Well Diameter (Inches)	Pump Intake Depth (Feet)	Metered?
			Top	Bottom			
1	105		77	105	8	85	Yes
2	110		81	110	6	65	Yes
3	103		90	103	8	85	Yes

Are ground water levels monitored? Yes, Monthly

Does this system have a wellhead protection program? Yes

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Ouput Metered?	Source
River Bend WTP	0.3500	Yes	No	Well #3
River Bend WTP	0.6000	Yes	No	Wells 1 and 2

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2023? No

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2023? No

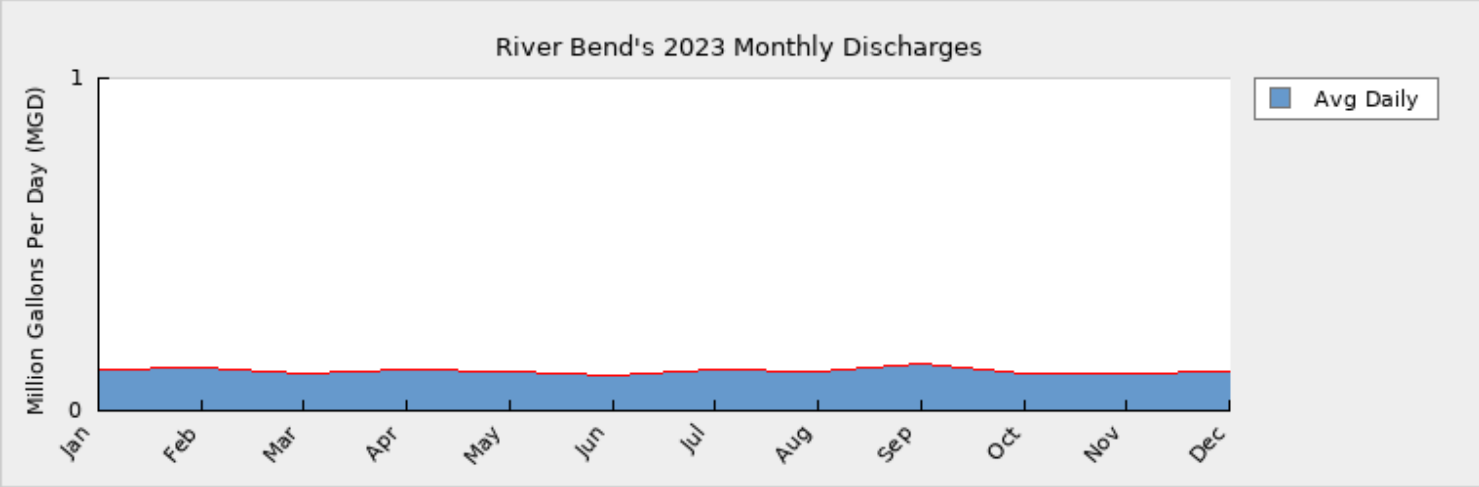
If yes, was any water conservation implemented?

Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? No

4. Wastewater Information

Monthly Discharges

	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	0.1210	May	0.1180	Sep	0.1420
Feb	0.1280	Jun	0.1080	Oct	0.1100
Mar	0.1140	Jul	0.1210	Nov	0.1120
Apr	0.1210	Aug	0.1160	Dec	0.1170



How many sewer connections does this system have? 930

How many water service connections with septic systems does this system have? 497

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

Wastewater Permits

Permit Number	Type	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0030406	WWTP	0.3300	0.3300	0.1020	0.3000	Trent River	Trent River (10-3)
NC0086797	WTP	0.0270	0.0270	0.0170		Plantation Canal	Trent River (10-3)

5. Planning

Projections

	2023	2030	2040	2050	2060	2070
Year-Round Population	2,695	2,709	2,736	2,796	2,883	2,994
Seasonal Population	0	0	0	0	0	0
Residential	0.1426	0.1424	0.1439	0.1470	0.1516	0.1574
Commercial	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120
System Process	0.0960	0.0960	0.0960	0.0960	0.0960	0.0960
Unaccounted-for	0.0480	0.0487	0.0489	0.0495	0.0503	0.0514

Demand v/s Percent of Supply

	2023	2030	2040	2050	2060	2070
Surface Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ground Water Supply	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Service Area Demand	0.3186	0.3191	0.3208	0.3245	0.3299	0.3368
Sales	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	0.3186	0.3191	0.3208	0.3245	0.3299	0.3368
Demand as Percent of Supply	32%	32%	32%	32%	33%	34%

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

Your long-term water demand is 53 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

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

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

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

Additional Information

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

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

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

APPENDIX C

GROUNDWATER MANAGEMENT ASSOCIATES EVALUATION OF GROUNDWATER RESOURCES NARRATIVE

Groundwater Management Associates, Inc.
4300 Sapphire Court, Suite 100
Greenville, North Carolina 27834
Telephone 252-758-3310
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July 22, 2024

Mr. Greg Churchill, P.E.
Rivers & Associates, Inc.
PO Box 929
Greenville, NC 27835

Re: Evaluation of Groundwater Resources near the River Bend Water System, Town of River Bend, Craven County, North Carolina

Mr. Churchill,

Groundwater Management Associates, Inc. (GMA) is pleased to provide this Groundwater Resources Study report for the Town of River Bend (Town). GMA understands that Rivers and Associates (Rivers) will be evaluating water-supply options for the existing public water system. One of the options includes the possibility of constructing new water-supply wells. Rivers contracted with GMA to evaluate the groundwater resources near River Bend and to consider the options available to meet the future water-supply needs for the Town.

Introduction

GMA understands that the Town of River Bend currently operates three wells that supply raw water to two water treatment plants (WTPs) (Figure 1). Each of these three water-supply wells withdraws groundwater from the Upper Castle Hayne Aquifer (UCHA). The current volume of groundwater withdrawal meets the Town's demands. However, two of the three wells are beginning to age, and consideration for constructing new water-supply wells for the public water system has become a priority. Additionally, development within River Bend has encroached on the existing well sites, and it is unlikely that current setback requirements for new wells could be met at the current well locations.

Wells #1 and #2 provide raw water to the water treatment facility located at the northeast corner of the intersection of Shoreline Drive and Plantation Drive (Figure 1). Well #1 has a wellhead enclosed in a wood frame pump house located immediately beside the water treatment building. Well #1 has a 12-hour supply rating of 0.252 MGD (Rivers, 2020). Well #2 is located near the entrance to Quarterdeck Townhomes in a wood frame pump house approximately 700 feet from the WTP. The pump house sits in a grassy area in the middle of a residential parking lot (Figure 1). The 12-hour supply of Well #2 is 0.285 MGD (Rivers, 2020). The total capacity of the WTP that Wells #1 and #2 supply is 0.60 MGD (Rivers, 2020). Backwash effluent from the filters of the WTP is periodically discharged to an NPDES-permitted surface water discharge point located near the wooden seawall at the community boating canal near Plantation Drive bridge (Figure 1).

Well #3 supplies raw water to the WTP located adjacent to the Rhems Fire Department on Shoreline Drive. The Well #3 wellhead is housed inside the wood frame water treatment building. Well #3 has a 12-hour supply rating of 0.252 MGD and the WTP has a total capacity of 0.35 MGD (Rivers, 2020). Backwash water is directed to a floor sump for discharge to a buried steel waste holding

tank. Duplex submersible pumps periodically transfer the backwash supernatant to a NPDES-permitted surface water discharge point located in a ditch that is a tributary to the community boating canal.

Site Inspection

On January 9th, 2024, two GMA hydrogeologists (Cody Shell and James Holley) traveled to River Bend to observe the existing water-supply wells and WTPs. GMA traveled with Greg Churchill of Rivers, and we met with Brandon Mills (Public Works Director) from the Town of River Bend. GMA's initial stop was at water-supply Well #3 and the associated WTP located at the Rhems Fire Department on Shoreline Drive. Information about the well's performance and operation, water treatment for the raw water, and filter backwash effluent discharge was provided to GMA. The largest potential concern identified at Well #3 was the proximity of the wellhead to the fire department building. In early 2024, the Environmental Protection Agency (EPA) finalized a National Primary Drinking Water Regulation (NPDWR) for Per- and Polyfluoroalkyl Substances (PFAS). PFAS has been commonly used in firefighting foams and can migrate into the soil, water, and air. Proximity between the wellhead and the Rhems Fire Department building could potentially lead to a source of contamination in Well #3 if Aqueous Film Forming Foam containing PFAS has been used for firefighting training at the site.

The second stop was at Well #1 and the associated WTP immediately adjacent to the wellhead. The same general information about operation, treatment, and discharge was provided to GMA. No significant concern was identified at this location, although nearby surface waters could potentially cause flooding during large storm events. The Town representative assured GMA that the large diesel generator onsite could maintain a pumping well and water-supply even during severe storm events.

Located near the entrance to Quarterdeck Townhomes is Well #2. This water-supply well is in a grassy area surrounded by a residential parking lot. A new wellhouse had been constructed around the wellhead to establish better security and provide protection from potential damage from vehicles. The largest concern, however, was potential sources of contamination from the nearby vehicles. Wrecks, oil spills, and gasoline contaminants are all potential sources of contamination from the surrounding parking lot that is situated close to the wellhead. Modern setback rules for new wells require a minimum of one hundred feet of control around a wellhead, and the minimum setback would not be met at Well #2's current location due to the proximity of paved areas.

After visiting all the Town's wells and WTPs, GMA briefly visited the discharge location for backwash supernatant at the community boating canal and the wastewater treatment plant before being given a tour of the new public utilities building that was recently constructed. The new public utilities building is located across the street from the newer 300,000-gallon water tower (Figure 1). Adjacent to the Public Utilities building is a plot of land that the Town is currently negotiating to procure, and that property can likely be used as a location for a future water-supply well, if the Town chooses to replace any of the older wells. The proximity to the new water tower would be an ideal location for a new water-supply well. Lastly, GMA visited a city park located near the Town Commons as a potential site for a new well. The location would likely not be the top priority for a new well, as it would eliminate a significant area of the park from future public use and would likely not meet setback criteria due to the proximity to a septic tank and nitrification field. Other potential locations considered for a water-supply well are: a property that River Bend owns on Wakefield Drive, and a planned park area in a new residential development. GMA did not visit either potential location during our site investigation.

Summary of Aquifers Available for Fresh Water Supply

The Town of River Bend lies within the central portion of North Carolina's Coastal Plain, a broad, nearly flat region separating the hilly Piedmont region from the Atlantic Ocean. Coastal Plain topography and subsurface geology have been shaped by numerous large fluctuations in sea level that caused repeated lateral transgressions and regressions of the Atlantic Shoreline over the past ~90 million years. The Coastal Plain is formed by near-shore deposition of sediments that occurred during those fluctuations in sea level, and the land surface of the Coastal Plain reflects ancient coastal environments that previously existed. In general, these deposits occur as sedimentary wedges that thicken seaward. Geologists have described and mapped these depositional units, and they have subdivided the strata into various geological formations and groups (Table 1) based upon their ages and composition (lithology).

Beneath the modern land surface at River Bend is a complex sequence of marine, estuarine, and terrestrial sediments and sedimentary rocks that are the framework of the groundwater system. The groundwater system includes distinctive sequences of permeable sediments and sedimentary rocks (aquifers) separated by strata with low permeability (confining layers) that restrict vertical movement of groundwater between aquifers. The hydrostratigraphic units that comprise the aquifers and confining layers in the Coastal Plain are summarized in Table 1. In the vicinity of the Town of River Bend, no units younger than the River Bend Formation are present, with the exception of a relatively modern, unnamed surficial aquifer.

The Coastal Plain Aquifers that exist beneath the Town of River Bend include from oldest to youngest (deepest to shallowest): 1) the Lower Cape Fear Aquifer (Cretaceous, 90-94 million years ago (Ma)), 2) the Upper Cape Fear Aquifer (Cretaceous, 86-90 Ma), 3) the Black Creek Aquifer (Cretaceous, 72-84 Ma), 4) the Peedee Aquifer (Cretaceous, 66-72 Ma), 5) The Beaufort Aquifer (Paleocene, 56-66 Ma), and 6) the Castle Hayne Aquifer (Eocene and Oligocene, 56 to 23 Ma). Of these available aquifers, State-mandated reductions on the use of the Cretaceous Aquifer System (Specifically, the Black Creek, Upper Cape Fear, and Lower Cape Fear Aquifers) have been imposed with North Carolina's Central Coastal Plain Capacity Use (CCPCUA) rules. Reductions in withdrawals and permitting for use of these aquifers have forced public water systems to rely upon unrestricted aquifers such as the Castle Hayne, Beaufort, and Peedee Aquifers. Additionally, all aquifers with exception of the Castle Hayne Aquifer and Surficial Aquifer are brackish (i.e., have elevated salinity). Usage of groundwater from the brackish aquifers would require additional water treatment and include additional associated costs. Therefore, GMA concludes that the Castle Hayne Aquifer System (CHAS) is the best choice for the Town of River Bend for any future replacement or expansion of their public water system.

The Castle Hayne Aquifer System (CHAS) is a group of permeable sediments and sedimentary rocks with variable ages and lithologies (Winner and Coble, 1996). From oldest to youngest, there are four distinctive lithologic units comprising the CHAS in and near the Town of River Bend: The Comfort Member of the Castle Hayne Formation (Lower Castle Hayne Aquifer), the Spring Garden Member of the Castle Hayne Formation (Middle Castle Hayne Aquifer), the River Bend Formation, and the Belgrade Formation (NCGS 1988). Together, the River Bend and Belgrade Formations comprise the Upper Castle Hayne Aquifer. The CHAS may also include the underlying Paleocene-aged Beaufort Formation, where the Beaufort may lack a confining layer separating it from the Castle Hayne Formation. The three Castle Hayne Aquifer units (Lower, Middle, and Upper) differ distinctively in their lithology, permeability, and water quality.

The lowermost unit of the Castle Hayne Formation (the Comfort Member) is composed of gray to tan, fossiliferous (bryozoan and echinoid) limestone containing primary and secondary porosity. The Comfort Member is the primary source of water for the nearby New Bern Wellfield and several

communities in neighboring Jones County. GMA commonly designates the Comfort Member as the Lower Castle Hayne Aquifer (LCHA) because it is a very distinctive, high-permeability unit that is readily recognized in drill cuttings and on geophysical logs. The LCHA is expected to range from 40 to 120 feet in thickness in the River Bend area, and it is overlain by a semi-confining layer assigned to the lower portion of the Spring Garden Member of the Castle Hayne Formation.

The Spring Garden Member is a tan to gray, molluscan-mold biocalcirudite limestone formed with interbedded calcareous, clayey sands and sandy limestones. The unit becomes more clay-rich with depth. The Spring Garden Member serves as both the semi-confining layer overlying the LCHA and as a permeable aquifer capable of producing significant well yields in the upper sections of the formation. In some areas of the Coastal Plain (e.g., Onslow County) the Spring Garden Member can be designated as the Middle Castle Hayne Aquifer, but in the area of River Bend the overlying River Bend Formation has little to no basal confining layer, making the two formations hydrostratigraphically indistinguishable. In the current study, GMA has designated the Spring Garden Member and the River Bend Formation as the Upper Castle Hayne Aquifer (UCHA). The Belgrade Formation which is generally accepted as part of the UCHA is not present in the River Bend locale.

Existing Wells Serving River Bend

The Upper Castle Hayne Aquifer currently supplies the Town of River Bend with fresh water; however, existing water-supply wells are reaching the end of their lifespan, and well sites are being encroached on by land development, increasing the risks of damage to the wellheads and posing potential sources of contamination. River Bend is assessing the need to replace some or all of the current wells with new water-supply wells.

In March of 2020, Rivers produced a report of the status of the existing water system. The focus of the study was to evaluate the existing treatment systems and to present options for improved treatment in the future. As a part of their study, Rivers sampled the raw water from each of the three existing wells. These samples demonstrated that the Upper Castle Hayne Aquifer produces water with high hardness, elevated manganese, and iron that requires treatment. Tables 2 and 3 presents well construction details and corresponding water quality, respectively, of the existing wells serving River Bend as reported by Rivers in 2020.

The three existing water-supply wells in River Bend are all relatively shallow (less than 110 ft in depth), which limits available drawdown resulting in limited pumping rates. The current production wells have 12-hour supply ratings of 400 GPM or less. Targeting the LCHA could potentially increase any well yields by double or more, making it feasible to replace the current well system (3 wells) with only 2 deeper wells while simultaneously having extra yield for future growth. Nearby well fields in New Bern and Jones County (Table 4) that have built larger wells into the LCHA have yields between 500 and 1,000 GPM. The top of the LCHA is approximately 260 ft below land surface (BLS) in the vicinity of River Bend (Figure 2), and other regional wells are usually screened in varying intervals from 200 to 300 ft BLS (Table 4).

The LCHA also generally has better water quality than the UCHA with less iron and manganese (Table 3 and 4) which may result in lower costs associated with water treatment. For example, the two LCHA wells that supply the nearby Jones County wellfield located on US HWY 17S Business, approximately 3.5 miles southwest of River Bend, produce water with iron and manganese concentrations that are below the maximum contaminant levels (MCLs) for these constituents (Table 4). The LCHA wells that supply the New Bern wellfield located to the northwest of River Bend have comparable or worse water quality than River Bend's UCHA wells (Table 3 and 4). However, the New Bern wells in the LCHA have much better water quality than the UCHA wells in the same

vicinity. If regional trends hold, the LCHA in the vicinity of River Bend should have better water quality than the UCHA with regards to iron and manganese. Test well exploration should be used to verify the quality of raw water from the LCHA.

Conclusions and Recommendations

GMA has evaluated the lithology and hydrostratigraphy of underlying aquifers, including the Castle Hayne Aquifer, in the vicinity of the Town of River Bend. We conclude the Lower Castle Hayne Aquifer has significant, fresh, groundwater resource potential capable of meeting the current and projected future demands of River Bend's residents, and it may have better water quality than the UCHA currently being utilized. Additionally, a pair of wells withdrawing from the LCHA placed a reasonable distance apart and pumped individually for 12-hour cycles might supply the Town's needs while also being capable of handling increased withdrawals and expansion in the future. Another option would be to construct a shallow and deep well at the same site. Combining withdrawals from both wells (shallow and deep) could potentially replace all three of the Town's current wells and improve overall water quality through mixing.

It is GMA's assessment that a new water-supply well would have a more beneficial placement in relation to the upgraded distribution system (newer 300,000-gallon water tower) and would help mitigate risks (security, contamination sources, etc.) associated with current well sites. Additionally, utilizing the deeper LCHA, instead of the UCHA, would likely provide increased yield potential. Based upon available data, new well construction for a high-yield water-supply well into the LCHA would likely consist of a 10 to 12-inch diameter screen and casing, and the well would be approximately 280 to 320 feet in total depth. Verification of the yield potential and water quality of the LCHA at River Bend would require test well exploration before proceeding with design and construction of new production wells.

The water quality of the Lower Castle Hayne Aquifer is likely better than the Upper Castle Hayne Aquifer in the vicinity of River Bend. Raw water from both aquifers is hard, however, and softening would be recommended to meet typical water-quality expectations for potable use. We understand that the Town of River Bend does not currently soften the raw groundwater from the Upper Castle Hayne Aquifer. Instead, softening is accomplished preferentially by some customers on an individual basis through use of residential water softeners. Additionally, water from the Lower Castle Hayne Aquifer may has potential to form disinfection byproducts. Evaluation of the disinfection byproduct formation potential should be included in water quality testing of future test wells to characterize the potential of the LCHA to form excessive disinfection byproducts.

The water from the LCHA is expected to be fresh, and there are no indications of elevated salinity near the Town of River Bend. However, the underlying Beaufort Aquifer likely contains elevated chloride concentrations. The confining layer between the LCHA and the Beaufort Aquifers is often relatively thin, and the Beaufort Aquifer may be somewhat leaky. The NCDWR's Clarks Research Station (located about 4 miles north of River Bend) includes a monitoring well screened within the Beaufort Aquifer that has a reported chloride concentration of about 1000 mg/L. However, the underlying Peedee Aquifer monitoring well at the Clarks Research Station also has a chloride concentration of 1000 mg/L. The NCDWR Clark's Research Station has been the subject of debate for years due to concerns over cross-connecting aquifers via the monitoring well boreholes, and it is likely that the chloride concentrations indicated for the Beaufort Aquifer monitoring well at that station are erroneously elevated due to aquifer interconnection.

If test well exploration of the LCHA is conducted at River Bend, GMA recommends that an exploratory borehole should be extended into the top of the Beaufort Aquifer, and a temporary zone test sample should be collected to verify the salinity of the Beaufort Aquifer. Upon completion of the

zone test, GMA recommends that the driller should permanently abandon the lower borehole with cement before enlarging the upper portion of the borehole to allow construction of a LCHA test well. If elevated salinity is confirmed in the Beaufort Aquifer beneath River Bend, GMA would advise River Bend to monitor chloride concentrations during any future operation of wells in the LCHA to discern if drawdown induced by the wells causes increases in chloride concentrations in the LCHA over time.

At this time, GMA recommends that River Bend should select a potential well site near the new Public Utilities building and a second alternative site. Test well exploration of the sites are recommended to include:

1) Pilot hole drilling to approximately 360 feet depth in at least one of the exploratory wells.
2) Geophysical logging of the pilot holes (Natural Gamma, SP, and Resistivity).
3) Temporary zone testing of the water quality of the Beaufort Aquifer at about 350 feet depth, followed by permanent abandonment of the lower pilot hole with cement grout.
4) Construction of a test well at each location equipped with a 4-inch screen from about 250-320 feet and a 6-inch PVC casing from land surface to about 250 feet.
5) Conducting 6-hour pumping tests at a constant rate of about 200 gpm.
6) Collecting water samples for New Well Series and disinfection byproduct formation potential (THMFP and HAAFP analysis).

The results of the test well program will guide final decisions on future well construction for the Town. The LCHA test well should provide critical data on yield potential of the aquifer and water quality attributes that will guide decisions on future water treatment for the water system.

Report Certification

This report was prepared by Groundwater Management Associates, Inc. (GMA). GMA is a professional corporation licensed to practice geology (#C-121) and engineering (#C-0854) in North Carolina. I, Cody J. Shell, a North Carolina Licensed Geologist for GMA, do certify that the information contained in this report is correct and accurate to the best of my knowledge

If you have any questions, or if we may be of further assistance, please feel free to contact us.

Best regards,

Groundwater Management Associates, Inc.

Cody J. Shell

James K. Holley

Cody J. Shell, P.G.
Project Hydrogeologist

James K. Holley, P.G.
Senior Hydrogeologist

CC: Richard Spruill, Ph.D., P.G.

Enclosures: Figure 1
Figure 2
Table 1, 2, 3, and 4

APPENDIX D

POPULATION DATA
POPULATION OF INCORPORATED PLACES (CENSUS) & NC OSBM PROJECTIONS

37	74720	Winfall town, NC	506	504	503	500	492	493
37	74760	Wingate town, NC	3119	3013	2962	2981	2974	2884
37	75000	Winston-Salem city, NC	168086	168886	168825	168887	168243	168182
37	75060	Winterville town, NC	3539	3548	3513	3480	3486	3492
37	75080	Winton town, NC	771	774	778	781	786	789
37	75280	Woodfin town, NC	3814	3759	3690	3616	3541	3454
37	75340	Woodland town, NC	739	747	754	755	757	752
37	75820	Wrightsville Beach town, NC	3006	3141	3258	3286	3297	3259
37	75960	Yadkinville town, NC	2841	2825	2810	2803	2757	2643
37	76000	Yanceyville town, NC	3011	3002	2836	2366	2364	2018
37	76080	Yaupon Beach town, NC	835	829	823	806	793	780
37	76200	Youngsville town, NC	631	620	608	600	586	573
37	76220	Zebulon town, NC	3397	3467	3489	3511	3537	3561

Block 2 of 2: Population Estimates for the Years 1990-1993

FIPS State/Place Code and Area Name			Estimated Population 7/1/93	7/1/92	7/1/91	7/1/90	4/1/90 Population Estimates Base
37		North Carolina	6947412	6831850	6748135	6656987	6632448
37	00160	Aberdeen town, NC	3123	3080	2995	2899	2883
37	00500	Ahoskie town, NC	4560	4603	4598	4604	4600
37	00640	Alamance village, NC	250	250	247	246	245
37	00680	Albemarle city, NC	15375	15298	15271	15211	15178
37	00840	Alexander Mills town, NC	730	727	727	723	720
37	01000	Alliance town, NC	684	657	671	688	687
37	01380	Andrews town, NC	1520	1465	1454	1436	1433
37	01400	Angier town, NC	2754	2609	2469	2363	2360
37	01420	Ansonville town, NC	630	628	631	632	632
37	01520	Apex town, NC	6876	6356	5939	5528	5476
37	01640	Arapahoe town, NC	461	457	452	451	450
37	01720	Archdale city, NC	7726	7689	7544	7381	7345
37	01900	Arlington town, NC	832	824	818	811	809
37	02080	Asheboro city, NC	18372	18392	18240	18223	18137
37	02140	Asheville city, NC	67032	66586	66331	66428	66184
37	02320	Askewville town, NC	203	204	207	206	206
37	02460	Atkinson town, NC	305	298	291	284	282
37	02500	Atlantic Beach town, NC	1983	1972	1948	1943	1932
37	02580	Aulander town, NC	1218	1216	1224	1226	1225
37	02620	Aurora town, NC	673	671	671	668	667
37	02700	Autryville town, NC	204	201	196	195	195
37	02840	Ayden town, NC	4810	4851	4885	4895	4890
37	02960	Badin town, NC	1155	1163	1165	1167	1164
37	03020	Bailey town, NC	587	577	567	559	555

37	53200	Pollocksville town, NC	295	291	293	297	297
37	53680	Powellsville town, NC	281	279	281	279	279
37	53820	Princeton town, NC	1237	1200	1166	1140	1133
37	53840	Princeville town, NC	2469	2478	2486	2497	2503
37	53900	Proctorville town, NC	174	171	170	168	168
37	54580	Raeford city, NC	4079	3974	3864	3822	3811
37	55000	Raleigh city, NC	236774	231833	226599	222394	220425
37	55040	Ramseur town, NC	1451	1447	1437	1422	1415
37	55080	Randleman city, NC	2923	2913	2894	2866	2852
37	55260	Ranlo town, NC	2350	2350	2352	2353	2349
37	55340	Raynham town, NC	109	106	106	106	106
37	55640	Red Oak town, NC	2273	2225	2181	2136	2122
37	55660	Red Springs town, NC	4010	4013	3999	4034	4025
37	55900	Reidsville city, NC	14375	14400	14460	14467	14438
37	55940	Rennert town, NC	211	208	205	203	203
37	56240	Rhodhiss town, NC	762	755	751	749	747
37	56340	Richfield town, NC	604	597	590	579	578
37	56360	Richlands town, NC	961	983	984	986	986
37	56440	Rich Square town, NC	1079	1074	1087	1093	1093
37	56710	River Bend town, NC	2468	2486	2445	2422	2414
37	56900	Roanoke Rapids city, NC	16821	16624	16543	16421	16389
37	57000	Robbins city, NC	1050	1035	1016	1013	1007
37	57020	Robbinsville town, NC	740	736	728	708	709
37	57100	Robersonville town, NC	1964	1939	1945	1944	1945
37	57260	Rockingham city, NC	9880	9881	9965	9988	9971
37	57340	Rockwell town, NC	1717	1698	1683	1666	1661
37	57500	Rocky Mount city, NC	55879	55421	54886	54524	54339
37	57640	Rolesville town, NC	657	634	613	596	590
37	57700	Ronda town, NC	370	367	365	363	363
37	57740	Roper town, NC	666	671	672	669	669
37	57800	Roseboro town, NC	1464	1452	1442	1444	1442
37	57860	Rose Hill town, NC	1370	1358	1350	1352	1352
37	58020	Rosman town, NC	410	399	392	385	385
37	58140	Rowland town, NC	1159	1150	1141	1141	1138
37	58160	Roxboro city, NC	7645	7626	7627	7609	7584
37	58180	Roxobel town, NC	241	241	244	244	244
37	58360	Rural Hall town, NC	2723	2650	2594	2532	2526
37	58420	Ruth town, NC	401	394	388	381	380
37	58440	Rutherford College town, NC	1219	1208	1197	1189	1186
37	58460	Rutherfordton town, NC	3792	3794	3779	3740	3727
37	58620	St. Helena village, NC	424	415	406	399	396
37	58720	St. Pauls town, NC	2144	2129	2109	2110	2105
37	58840	Salemburg town, NC	471	466	463	464	463
37	58860	Salisbury city, NC	24662	24661	24395	24466	24398
37	58920	Saluda city, NC	555	561	543	543	541
37	59090	Sandy Creek town, NC	273	261	252	244	243
37	59135	Sandyfield town, NC	315	312	310	307	307
37	59280	Sanford city, NC	19945	19433	19119	18963	18874
37	59300	Santeetlah town, NC	53	55	55	55	55

SUMLEV	STATE	COUNTY	PLACE	COUSUB	NAME	STNAME	ESTIMATESBASE2000
40	37	0	0	0	North Carolina	North Carolina	8046346
162	37	0	160	0	Aberdeen town	North Carolina	3741
162	37	0	500	0	Ahoskie town	North Carolina	5280
162	37	0	640	0	Alamance village	North Carolina	354
162	37	0	680	0	Albemarle city	North Carolina	15925
162	37	0	1000	0	Alliance town	North Carolina	800
162	37	0	1380	0	Andrews town	North Carolina	1747
162	37	0	1400	0	Angier town	North Carolina	3463
162	37	0	1420	0	Ansonville town	North Carolina	638
162	37	0	1520	0	Apex town	North Carolina	20781
162	37	0	1640	0	Arapahoe town	North Carolina	453
162	37	0	1720	0	Archdale city	North Carolina	9302
162	37	0	1760	0	Archer Lodge town	North Carolina	2894
162	37	0	2080	0	Asheboro city	North Carolina	21924
162	37	0	2140	0	Asheville city	North Carolina	73989
162	37	0	2320	0	Askewville town	North Carolina	213
162	37	0	2460	0	Atkinson town	North Carolina	280
162	37	0	2500	0	Atlantic Beach town	North Carolina	1835
162	37	0	2580	0	Aulander town	North Carolina	921
162	37	0	2620	0	Aurora town	North Carolina	581
162	37	0	2700	0	Autryville town	North Carolina	204
162	37	0	2840	0	Ayden town	North Carolina	4745
162	37	0	2960	0	Badin town	North Carolina	1802
162	37	0	3020	0	Bailey town	North Carolina	684
162	37	0	3100	0	Bakersville town	North Carolina	415
162	37	0	3150	0	Bald Head Island village	North Carolina	173
162	37	0	3500	0	Banner Elk town	North Carolina	903
162	37	0	3840	0	Bath town	North Carolina	274
162	37	0	3960	0	Bayboro town	North Carolina	1234
162	37	0	4180	0	Bear Grass town	North Carolina	66
162	37	0	4260	0	Beaufort town	North Carolina	3868
162	37	0	4510	0	Beech Mountain town	North Carolina	325
162	37	0	4640	0	Belhaven town	North Carolina	1957
162	37	0	4840	0	Belmont city	North Carolina	8885
162	37	0	4950	0	Belville town	North Carolina	1230
162	37	0	4960	0	Belwood town	North Carolina	980
162	37	0	5040	0	Benson town	North Carolina	2966

SUMLEV	STATE	COUNTY	PLACE	COUSUB	NAME	STNAME	ESTIMATESBASE2000
162	37	0	51820	0	Pilot Mountain town	North Carolina	1430
162	37	0	51840	0	Pinebluff town	North Carolina	1193
162	37	0	51940	0	Pinehurst village	North Carolina	9769
162	37	0	52000	0	Pine Knoll Shores town	North Carolina	1489
162	37	0	52020	0	Pine Level town	North Carolina	1473
162	37	0	52140	0	Pinetops town	North Carolina	1441
162	37	0	52220	0	Pineville town	North Carolina	6037
162	37	0	52400	0	Pink Hill town	North Carolina	622
162	37	0	52660	0	Pittsboro town	North Carolina	2425
162	37	0	52760	0	Pleasant Garden town	North Carolina	4720
162	37	0	53040	0	Plymouth town	North Carolina	4166
162	37	0	53140	0	Polkton town	North Carolina	1986
162	37	0	53160	0	Polkville city	North Carolina	519
162	37	0	53200	0	Pollocksville town	North Carolina	270
162	37	0	53680	0	Powellsville town	North Carolina	259
162	37	0	53820	0	Princeton town	North Carolina	1091
162	37	0	53840	0	Princeville town	North Carolina	1063
162	37	0	53900	0	Proctorville town	North Carolina	131
162	37	0	54580	0	Raeford city	North Carolina	3851
162	37	0	55000	0	Raleigh city	North Carolina	288283
162	37	0	55040	0	Ramseur town	North Carolina	1628
162	37	0	55080	0	Randleman city	North Carolina	3466
162	37	0	55260	0	Ranlo town	North Carolina	2264
162	37	0	55340	0	Raynham town	North Carolina	70
162	37	0	55460	0	Red Cross town	North Carolina	869
162	37	0	55640	0	Red Oak town	North Carolina	2685
162	37	0	55660	0	Red Springs town	North Carolina	3534
162	37	0	55900	0	Reidsville city	North Carolina	14456
162	37	0	55940	0	Rennert town	North Carolina	332
162	37	0	56240	0	Rhodhiss town	North Carolina	619
162	37	0	56340	0	Richfield town	North Carolina	532
162	37	0	56360	0	Richlands town	North Carolina	970
162	37	0	56440	0	Rich Square town	North Carolina	1426
162	37	0	56710	0	River Bend town	North Carolina	2944
162	37	0	56900	0	Roanoke Rapids city	North Carolina	16185
162	37	0	57000	0	Robbins town	North Carolina	1210
162	37	0	57020	0	Robbinsville town	North Carolina	701

Annual Estimates of the Resident Population for Incorporated Places in North Carolina: April 1, 2010 to July 1, 2019

Geographic Area	April 1, 2010		Population Estim				
	Census	Estimates Base	2010	2011	2012	2013	2014
Aberdeen town, North Carolina	6,350	6,369	6,389	6,462	6,643	6,851	7,070
Ahoskie town, North Carolina	5,039	5,062	5,047	4,996	4,965	4,938	4,899
Alamance village, North Carolina	951	956	957	965	968	972	980
Albemarle city, North Carolina	15,903	15,890	15,883	15,868	15,807	15,839	15,806
Alliance town, North Carolina	776	782	781	785	765	761	757
Andrews town, North Carolina	1,781	1,777	1,776	1,759	1,747	1,761	1,747
Angier town, North Carolina	4,350	4,428	4,460	4,554	4,635	4,739	4,857
Ansonville town, North Carolina	631	626	624	617	612	607	602
Apex town, North Carolina	37,476	37,727	37,991	38,999	40,659	42,388	44,064
Arapahoe town, North Carolina	556	557	555	561	552	546	547
Archdale city, North Carolina	11,415	11,435	11,444	11,424	11,451	11,432	11,449
Archer Lodge town, North Carolina	4,292	4,262	4,282	4,357	4,406	4,473	4,557
Asheboro city, North Carolina	25,012	25,408	25,462	25,531	25,672	25,864	25,849
Asheville city, North Carolina	83,393	83,420	83,459	84,457	85,321	86,355	87,837
Askewville town, North Carolina	241	250	250	246	242	239	235
Atkinson town, North Carolina	299	299	300	303	307	312	316
Atlantic Beach town, North Carolina	1,495	1,497	1,502	1,512	1,499	1,505	1,504
Aulander town, North Carolina	895	896	896	882	867	856	842
Aurora town, North Carolina	520	520	520	520	517	516	516
Autryville town, North Carolina	196	200	200	200	200	201	200
Ayden town, North Carolina	4,932	5,000	5,018	5,058	5,102	5,108	5,116
Badin town, North Carolina	1,974	1,974	1,974	1,974	1,957	1,956	1,956
Bailey town, North Carolina	569	569	568	568	566	563	562
Bakersville town, North Carolina	464	467	465	460	458	456	453
Bald Head Island village, North Carolina	158	158	158	159	161	163	165
Banner Elk town, North Carolina	1,028	1,057	1,055	1,121	1,085	1,128	1,160
Bath town, North Carolina	249	249	249	248	247	246	246
Bayboro town, North Carolina	1,263	1,260	1,259	1,265	1,252	1,243	1,247

Annual Estimates of the Resident Population for Incorporated Places in North Carolina: April 1, 2010 to July 1, 2019							
Richlands town, North Carolina	1,520	1,494	1,509	1,519	1,583	1,606	1,626
Rich Square town, North Carolina	958	962	957	951	926	916	899
River Bend town, North Carolina	3,119	3,111	3,121	3,138	3,143	3,119	3,110
Roanoke Rapids city, North Carolina	15,754	15,720	15,666	15,661	15,546	15,357	15,296
Robbins town, North Carolina	1,097	1,111	1,116	1,122	1,130	1,140	1,155
Robbinsville town, North Carolina	620	678	678	673	666	665	657
Robersonville town, North Carolina	1,488	1,488	1,487	1,466	1,445	1,430	1,416
Rockingham city, North Carolina	9,558	9,539	9,529	9,496	9,411	9,331	9,181
Rockwell town, North Carolina	2,108	2,123	2,119	2,111	2,106	2,106	2,107
Rocky Mount city, North Carolina	57,477	57,695	57,680	57,401	56,735	56,300	55,880
Rolesville town, North Carolina	3,786	3,778	3,811	4,043	4,265	4,668	5,781
Ronda town, North Carolina	417	417	417	414	415	413	410
Roper town, North Carolina	611	622	619	607	596	596	586
Roseboro town, North Carolina	1,191	1,191	1,192	1,192	1,195	1,197	1,194
Rose Hill town, North Carolina	1,626	1,620	1,627	1,642	1,645	1,646	1,651
Rosman town, North Carolina	576	577	577	572	574	575	577
Rowland town, North Carolina	1,037	1,037	1,039	1,044	1,044	1,038	1,037
Roxboro city, North Carolina	8,362	8,366	8,352	8,368	8,291	8,299	8,267
Roxobel town, North Carolina	240	240	240	236	233	230	226
Rural Hall town, North Carolina	2,937	2,931	2,940	2,972	3,001	3,030	3,056
Ruth town, North Carolina	440	418	417	415	415	413	410
Rutherford College town, North Carolina	1,341	1,321	1,317	1,317	1,309	1,299	1,298
Rutherfordton town, North Carolina	4,213	4,185	4,183	4,173	4,153	4,108	4,104
St. Helena village, North Carolina	389	396	399	401	403	409	410
St. James town, North Carolina	3,165	3,172	3,196	3,353	3,570	3,890	4,324
St. Pauls town, North Carolina	2,035	2,398	2,402	2,414	2,413	2,403	2,398
Salemburg town, North Carolina	435	422	423	422	423	423	422
Salisbury city, North Carolina	33,662	33,525	33,481	33,364	33,196	33,281	33,492
Saluda city, North Carolina	713	715	713	697	696	702	704
Sandy Creek town, North Carolina	260	259	259	263	267	269	271
Sandyfield town, North Carolina	447	444	443	441	439	437	435

Annual Estimates of the Resident Population for Incorporated Places in North Carolina: April 1, 2020 to July 1, 2024

Geographic Area	April 1, 2020 Estimates Base	Pop	
		2020	2021
Aberdeen town, North Carolina	8,519	8,625	9,109
Ahoskie town, North Carolina	4,893	4,874	4,779
Alamance village, North Carolina	990	990	993
Albemarle city, North Carolina	16,435	16,399	16,445
Alliance town, North Carolina	733	735	731
Andrews town, North Carolina	1,664	1,669	1,668
Angier town, North Carolina	5,346	5,702	6,128
Ansonville town, North Carolina	440	441	441
Apex town, North Carolina	64,324	65,212	68,264
Arapahoe town, North Carolina	415	415	419
Archdale city, North Carolina	11,888	11,906	11,950
Archer Lodge town, North Carolina	4,796	4,832	5,027
Asheboro city, North Carolina	27,195	27,243	27,377
Asheville city, North Carolina	94,725	94,353	94,180
Askewville town, North Carolina	183	182	177
Atkinson town, North Carolina	298	299	311
Atlantic Beach town, North Carolina	1,375	1,377	1,400
Aulander town, North Carolina	757	754	735
Aurora town, North Carolina	454	454	453
Autryville town, North Carolina	169	169	170
Ayden town, North Carolina	5,059	5,065	5,111
Badin town, North Carolina	2,036	2,024	1,776
Bailey town, North Carolina	564	565	567
Bakersville town, North Carolina	451	451	452
Bald Head Island village, North Carolina	263	262	267
Banner Elk town, North Carolina	1,073	1,129	1,169
Bath town, North Carolina	244	244	243
Bayboro town, North Carolina	1,224	1,234	1,229
Bear Grass town, North Carolina	86	86	85

Annual Estimates of the Resident Population for Incorporated Places in North Carolina: April 1, 2020 to July 1, 2024			
Pine Knoll Shores town, North Carolina	1,386	1,385	1,393
Pine Level town, North Carolina	2,050	2,064	2,145
Pinetops town, North Carolina	1,211	1,208	1,196
Pineville town, North Carolina	10,606	10,638	10,700
Pink Hill town, North Carolina	454	453	451
Pittsboro town, North Carolina	4,550	4,571	4,628
Pleasant Garden town, North Carolina	4,996	4,997	4,970
Plymouth town, North Carolina	3,319	3,310	3,278
Polkton town, North Carolina	2,248	2,247	2,486
Polkville city, North Carolina	516	517	520
Pollocksville town, North Carolina	264	263	265
Powellsville town, North Carolina	190	189	184
Princeton town, North Carolina	1,314	1,322	1,376
Princeville town, North Carolina	1,271	1,270	1,265
Proctorville town, North Carolina	119	119	118
Raeford city, North Carolina	4,555	4,556	4,545
Raleigh city, North Carolina	467,911	465,861	471,377
Ramseur town, North Carolina	1,773	1,775	1,772
Randleman city, North Carolina	4,601	4,608	4,628
Ranlo town, North Carolina	4,506	4,520	4,575
Raynham town, North Carolina	61	61	61
Red Cross town, North Carolina	762	760	771
Red Oak town, North Carolina	3,342	3,351	3,364
Red Springs town, North Carolina	3,092	3,085	3,094
Reidsville city, North Carolina	14,588	14,593	14,533
Rennert town, North Carolina	280	279	280
Rhodhiss town, North Carolina	991	990	988
Richfield town, North Carolina	575	574	580
Richlands town, North Carolina	2,289	2,296	2,320
Rich Square town, North Carolina	893	891	871
River Bend town, North Carolina	2,900	2,895	2,872

Population Growth 2020-2030

County population growth 2020-2030

Source: North Carolina Office of State Budget & Management, Vintage 2023 Population Estimates and Vintage 2024 Population Projections.

100 entries per page

Search: craven

County	April 2020 Base Population	July 2030 Population Estimate	Numeric Change 2020-30	Percent Change 2020-30	Births 2020-30	Deaths 2020-30	Natural Increase 2020-30	Migrat 2020
Craven	100,782	103,334	2,552	2.5	12,829	13,588	-759	

Showing 1 to 1 of 1 entry (filtered from 101 total entries)

« ‹ 1 › »

Export Table Data (https://files.nc.gov/osbm/2025-01/County_PopGrowth_2020-30_0.csv?VersionId=xVozfIhMlgKY9Esaag_caDbtsMZ2nJVn)

APPENDIX E

EXISTING WELL AND TREATMENT WORKS DOCUMENTATION

CRAVEN WELL DRILLING SERVICE, INC.

PHONE 637-2045 — 637-3891 V#0529 P. O. BOX 248

BRIDGETON, N. C. 28519 2-6-1985

Carolina Water System #1/22 - 1/28
P.O. Box 103
Atlantic Beach, N.C. 28512

TERMS: NET. NO DISCOUNT
A CHARGE OF 1½% WILL BE ADDED TO ALL ACCOUNTS 30 DAYS PAST DUE.
THIS IS AN ANNUAL RATE OF 18%

River Bend Jet

1-22-	85	Freight bill	27 58
		1-4"X10' Top & bottom section	204 00
		10-4"X5' intermediate sections	1480 00
		1 shoot assy 60± Am	861 00
		1-8" Well D 105' @ 35.00 ft	3675 00
		½ sheet 3/4" ply wood	24 13
		2 men & crane Labor (8 hrs) @60 Hr	480 00
		cement & sand	25 00
1-28-	85	2 men & crane 4¼ hrs	255 00
		2 men only 2½ hrs pouring forms	75 00
		Tax	116 74
		Total Due	$7223 45

Thank You 0590 - 101 - 11

PURCHASE ORDER: $100 to $500.

For use in Rivers Bend-590 Subdivision

Purchase Date 2-6-85
Your P.O. No. 9C059020685
Their Invoice No. _____

MATERIALS AND SUPPLIES

MATERIAL/SUPPLIES PURCHASE

For use in WATER or ~~SEWER~~ System (circle one) Amount of Purchase: $ 7223.45

Supplier Craven Well Drilling Service, Inc.

Description of Items Replacement well for old well No #1

Specific use of Items (Well #1, 2, 3; Lift Station; Water Mains; etc.) New well No #1

CONTRACTOR WORK

Use this Section for: **CONTRACTOR SERVICES**

WATER OR SEWER SYSTEM (circle one)

Name of Contractor Co. _____

Purpose of Work _____

Hours Worked _____

Work Supervised by Op. Manager: None ___ Partial ___ All ___

REPLACED ITEM

IF REPLACEMENT OF EXISTING ITEM - Complete this section for item to be replaced.

Description of Item to be Replaced: New Well Size: _____

Old Serial No. _____ Original Installation Date: _____ (Approximate)

Estimated Original Cost: $ _____

PERSON REQUESTING P.O. A. C. Davis **APPROVAL** A. C. Davis
Area Operating Manager

4/83

MAJOR EXPENDITURE REQUISITION - AMOUNTS OVER $500

(Send to Accounts Payable, Northbrook Office)

MANAGER A. C. Davis SERVICE AREA River Bend-590

DATE 2-26-85 TYPE OF EXPENDITURE: Water ☑ Sewer ☐

EXPENDITURE DESCRIPTION To replace the old well No. #1, with a new 8" well.

CLASSIFICATION OF EXPENDITURE

No Prior Approval Required:

_____ Emergency (no dollar limit)
_____ Maintenance (up to $1000)

TOTAL COST WORK COMPLETED $ 7,223.45

Prior Approval Required:

_____ Maintenance (over $1000)
_____ Equipment needed (over $500)
_____ Construction projects (over $500)

TOTAL COST ANTICIPATED $_____

REASON FOR REQUEST, AND BENEFIT TO BE DERIVED: To replace old well No #1, with a new 8" well, 105' deep.

Name and address of contractor bidding or performing work:

Craven Well Drilling Service, Inc.
P.O. Box 248, Bridgeton, N. C. 28519

IF REPLACEMENT OF EXISTING ITEM:

Description of item to be Replaced _____ Size _____

Old Serial No. _____ Installation Date of Old Item (Approximate) _____

Estimated Original Cost of Old Item $_____

To be Completed by Northbrook Office

Date Logged in _____ Date referred for approval _____

well #2

NORTH CAROLINA

ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES

RALEIGH, NORTH CAROLINA

PERMIT FOR THE CONSTRUCTION OF A WELL OR WELL SYSTEM

In accordance with the provisions of Article 7, Chapter 87, North Carolina General Statutes, and other applicable Laws, Rules and Regulations,

PERMISSION IS HEREBY GRANTED TO
RIVER BEND PLANTATION

FOR THE CONSTRUCTION OF A WELL/~~WELL SYSTEM~~ SR 1222
in Craven County, in accordance with the application dated May 18, and in conformity with specifications and supporting data, all of which are filed with the Department of Natural and Economic Resources and are considered a part of this Permit.

This Permit is for well construction only, and does not waive any provisions or requirements of the Water Use Act of 1967, or any other applicable laws or regulations.

Construction of a well under this Permit shall be in compliance with the North Carolina Well Construction Regulations and Standards, and any other laws and regulations pertaining to well construction.

This Permit shall be subject to other specified conditions, limitations, or exceptions as follows:

1. Prior notice of the pumping test date must be given to Bill Jeter P.O. Box 1082 Washington, N.C. 946-6481 at least 24 hours prior to the start of the test.

Permit issued this the 25th day of May, 19 77.

FOR THE NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

BY Original Signed by W. E. KNIGHT

W. E. KNIGHT, DIRECTOR
DIVISION OF ENVIRONMENTAL MANAGEMENT
By Authority of the Secretary of the Department of natural and Economic Resources

PERMIT NO. 2468

GW-26

Well #2

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT, GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611

WELL RECORD

DRILLING CONTRACTOR Craven Well Drilling Service REG. NO. 79 WELL CONSTRUCTION PERMIT NO. 2468

1. WELL LOCATION: (Show sketch of the location below)
   Nearest Town: New Bern, N.C. County: Craven
   River Bend Plantation Quadrangle No.
   (Road, Community or Subdivision and Lot No.)
2. OWNER: G. Frank Reid Co.
3. ADDRESS: P.O. Box 2067 New Bern
4. TOPOGRAPHY: draw, valley, slope, hilltop, (flat) circle one)
5. USE OF WELL: Aquatic Water System DATE: - -77
6. DOES THIS WELL REPLACE AN EXISTING WELL? no
7. TOTAL DEPTH: 110' RIG TYPE OR METHOD:
8. FORMATION SAMPLES COLLECTED: YES NO
9. CASING:

	Depth		Inside Dia.	Wall thick. or weight/ft.	type
From	0	to 81 ft	6"	Sch 40	12lb

10. GROUT:

	Depth		Material	Method
From	0	to 71 ft	Cement	Pumped

11. SCREEN:

	Depth		Dia.	Type & Opening
From		to ft		

12. GRAVEL:

	Depth		Size	Material
From		to ft		

13. WATER ZONES (depth): 79' — 110'
14. STATIC WATER LEVEL: 3' 9" ~~ft.~~ above / below top of casing
    Casing is 1 ft. above land surface ELEV:
15. YIELD (gpm): 250 METHOD OF TESTING: Pumping
16. PUMPING WATER LEVEL: 18' 3¼" ~~ft.~~
    after 24 hours at 250 gpm.
17. CHLORINATION: Type HTH Amount 1/2 gal
18. WATER QUALITY: TEMPERATURE (°F)
19. PERMANENT PUMP: Date Installed
    Type Capacity (gpm) HP
    Make Intake Depth
    Airline Depth
20. HAS THE OWNER BEEN PROVIDED A COPY OF THIS RECORD AND INFORMED OF THE DEPARTMENTS REQUIREMENTS AND RECOMMENDATIONS?
21. REMARKS

DRILLING LOG

DEPTH FROM	TO	FORMATION DESCRIPTION
0	10	Sand
10	20	Sand & rock
20	30	" " "
30	40	Soft rock
40	50	Sand
50	60	"
60	70	Sand & rock
70	80	" " "
80	90	Rock
90	100	Hard rock
100	110	

If additional space is needed, use back of form

LOCATION SKETCH
(Show distance to numbered roads, or other map reference points)

I do hereby certify that this well was constructed in accordance with N.C. Well Construction Regulations and Standards and that this well record is true and exact.

Frank Reid
SIGNATURE OF CONTRACTOR OF AGENT DATE

Form GW-1 Revised 11/3/77 Submit original to Groundwater Section and copy to well owner.

Well #2 River Bend Plantation Water System - #2 Permit # 2468
Crain Well Drilling Service

Static Water Level: 3' 9"

Noon	12:00	3'	9"
	12:05	11'	8"
	12:10	14'	11"
	12:15	15'	4"
	12:20	11'	
	12:25	16'	2 1/4"
	12:30	16'	4 3/4"
	12:35	11'	6 1/2"
	12:40	11'	2 1/2"
	12:45	11'	5"
	12:50	16'	9 1/4"
	12:55	11'	11 3/4"
	1:00	16'	11 3/4"
	1:10	17'	3/4"
	1:20	17'	2"
	1:30	17'	4"
	1:40	17'	4 3/4"
	1:50	17'	4 1/2"
	2:00	17'	5" 1/4"
	3:00	17	1 1/4"
	4:00	17'	3 3/4"
	5:00	17'	1"
	6:00	17'	11 1/2"
	7:00	17'	11 1/4"
	8:00	18'	1 1/4"
	9:00	18'	1 1/2"
	10:00	18'	2 1/4"
	11:00	18'	1 1/2"
midnight	12:00	18'	2 1/4"
	1:00	18'	2 1/2"
	2:00	18'	2 1/4"
	3:00	18	2"
	4:00	18'	1 3/4"
	5:00	15'	1 1/2"
	6:00	15'	1 1/2"
	7:00	15'	2 1/8"
	8:00	18'	2 1/2"
	9:00	18'	3 3/4"
	10:00	18'	3 1/4"
	11:00	18'	4"
noon	13:00	18'	3 1/4"

Recovery Rate:

12:05	7'	1 1/2"
12:10	7'	1"
12:15	6'	11"
12:20	6'	9 1/2"
12:25	6'	7"
12:30	6'	3 3/4"
12:35	6'	1 3/4"
12:40	5'	11"
12:45	5'	9 1/2"
12:50	5'	8 1/2"
12:55	5'	7 1/2"
1:00	5'	6 1/2"
1:10	5'	4 1/2"
1:20	5'	3"
1:30	5'	2 1/4"
1:40	5'	1"
1:50	4'	10 1/2"
2:00	4'	7 3/4"

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT

WELL RECORD — DIVISION OF ENVIRONMENTAL MANAGEMENT, GROUNDWATER SECTION

P.O. BOX 27687 - RALEIGH, N.C. 27611

DRILLING CONTRACTOR Craven Well Service REG. NO. 79 — WELL CONSTRUCTION PERMIT NO. 2468

RECEIVED MAY 6 1987

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: New Bern, N.C. — County: Craven

River Bend Plantation — Quadrangle No. _____

(Road, Community or Subdivision and Lot No.)

2. OWNER: J. Frank Efird Co.

3. ADDRESS: P.O. Box 10067 New Bern

4. TOPOGRAPHY: draw, valley, slope, hilltop, (flat) circle one)

5. USE OF WELL: Aquatic Water System — DATE: - -77

6. DOES THIS WELL REPLACE AN EXISTING WELL? No

7. TOTAL DEPTH: 110' — RIG TYPE OR METHOD: _____

8. FORMATION SAMPLES COLLECTED: YES ____ NO ____

9. CASING:

	Depth		Inside Dia.	Wall thick. or weight/ft.	type
From	0	to 81 ft	6"	Sch 40	15lb

10. GROUT:

	Depth		Material	Method
From	0	to 71 ft	Cement	Pumped

11. SCREEN:

	Depth		Dia.	Type & Opening
From		to ____ ft		

12. GRAVEL:

	Depth		Size	Material
From		to ____ ft		

13. WATER ZONES (depth): 79' — 110'

14. STATIC WATER LEVEL: 3'9" ~~ft.~~ above / below top of casing

Casing is 1 ft. above land surface ELEV: ____

15. YIELD (gpm): 250 METHOD OF TESTING: Pumping

16. PUMPING WATER LEVEL: 18' 3¼" ~~ft.~~

after 24 hours at 250 ~~gpm.~~

17. CHLORINATION: Type HTH Amount ½ gal

18. WATER QUALITY: _____ TEMPERATURE (°F) ____

19. PERMANENT PUMP: Date Installed _____

Type _____ Capacity _____ (gpm) HP _____

Make _____ Intake Depth _____

Airline Depth _____

20. HAS THE OWNER BEEN PROVIDED A COPY OF THIS RECORD AND INFORMED OF THE DEPARTMENTS REQUIREMENTS AND RECOMMENDATIONS? _____

21. REMARKS _____

I do hereby certify that this well was constructed in accordance with N.C. Well Construction Regulations and Standards and that this well record is true and exact.

Frank Beray
SIGNATURE OF CONTRACTOR OF AGENT — DATE

Form GW-1 Revised 11/3/77 — Submit original to Groundwater Section and copy to well owner.

DRILLING LOG

DEPTH FROM	TO	FORMATION DESCRIPTION
0	10	Sand
10	20	Sand & rock
20	30	" " "
30	40	Soft rock
40	50	Sand
50	60	"
60	70	Sand & rock
70	80	" " "
80	90	rock
90	100	hard rock
100	110	

If additional space is needed, use back of form

LOCATION SKETCH
(Show distance to numbered roads, or other map reference points)

for Jan Lawrence

North Carolina Department of Natural Resources & Community Development

James B. Hunt, Jr., Governor — Joseph W. Grimsley, Secretary

DIVISION OF ENVIRONMENTAL MANAGEMENT

May 27, 1983

FILE COPY

RECEIVED
MAR - 4 1996
TOWN OF RIVER BEND

Craven Well Drilling Company
PO Box 242
Bridgeton, NC 28519

Subject: Well Construction Permit No. 24-0243-WC-0063

Dear Mr. Benton:

In accordance with your application received May 23, 1983, we are forwarding herewith Well Construction Permit No. 24-0243-WC-0063 dated May 27, 1983, issued to Carolina Water System, Inc., for the construction of a 432,000 gallons per day water supply well.

This Permit will be effective from the date of its issuance until November 27, 1983, and shall be subject to the conditions and limitations as specified therein.

Sincerely,

Jim Mulligan

Jim Mulligan
Regional Supervisor

Enclosure

cc: Lee Laymon
Coastal Management Commission
Files

* THIS IS MORE INFO ON well #3

Post-it Fax Note | Date 29 Jan | # of pages
To Vernon Harris
Fax#
From Mark Barnes
Phone# River Bend

P. O. Box 27687 Raleigh, N. C. 27611-7687

X

NORTH CAROLINA

ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

PERMIT FOR THE CONSTRUCTION OF A WELL OR WELL SYSTEM

In accordance with the provisions of Article 7, Chapter 87, North Carolina General Statutes, and other applicable Laws, Rules and Regulations,

PERMISSION IS HEREBY GRANTED TO

CAROLINA WATER SYSTEM, INC.

FOR THE CONSTRUCTION OF A WELL/WELL SYSTEM located in the town of River Bend in Craven County in accordance with the application dated May 23, 1983 and in conformity with specifications and supporting data, all of which are filed with the Department of Natural Resources and Community Development and are considered a part of this Permit.

This Permit is for well construction only, and does not waive any provisions or requirements of the Water Use Act of 1967, or any other applicable laws or regulations.

Construction of a well under this Permit shall be in compliance with the North Carolina Well Construction Regulations and Standards, and any other laws and regulations pertaining to well construction.

This Permit will be effective from the date of its issuance until November 27,1983 and shall be subject to other specified conditions, limitations, or exceptions as follows:

1. The permanent 8" well casing shall have wall thickness of .322 and a plain end weight of 28.55 pounds per foot.

2. Prior notice of the pumping test must be given to Jim Mulligan or Willie Hardison, PO Box 1507, Washington, NC 27889, telephone (919) 946-6481, at least 24 hours prior to the start of the test.

Permit issued this the 27th day of May, 1983.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

Jim Mulligan

Jim Mulligan, Regional Supervisor
Division of Environmental Management
By Authority of the
Environmental Management Commission

PERMIT NO. 24-0243-WC-0063

NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION
DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES

APPLICATION FOR PERMIT TO CONSTRUCT A WELL

MAY 25 1983
D.E.M.

To: NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION 5-20-, 1983

Gentlemen:

In accordance with the provisions of Article 7, Chapter 87, General Statutes of North Carolina, and regulations pursuant thereto, application is hereby made by Carolina Water System, Inc. (name of well owner) for a permit to construct a well as described below and in the accompanying data submitted as a part of this application.

(a) Name of Property owner Carolina Water System, Inc.

(b) Location of Property Town of River Bend (Road, Community, Subdivision, Lot No.) Craven (Town) (County)

(c) Purpose of well Domestic Water System

(d) Will proposed well replace an existing well No

(e) Total capacity of existing system: 760,000 gallons per day

Well No.	Yield	Well No.	Yield

(f) Proposed well:

Construction type Open end (open end, screened, gravel packed, etc.)

Estimated depth 120 Estimated Yield 300 Gal Per Min.

Estimated date of construction: Begin June 1 Complete June 20-83

(g) Drilling Contractor: Craven Well Drilling Service, Inc.

(h) Location of Well: Provide a detailed map showing the location of the proposed well and any wells in the existing system to at least two (2) nearby reference points such as roads, intersections, and streams. Identify roads with State Highway road identification numbers. Show all existing water supply wells within a radius of 1,000 feet of the proposed well.

(i) Well Construction Diagram: Provide a diagram showing proposed construction specification. (See Form GW-22A)

The Applicant hereby agrees the proposed well will be constructed in accordance with approved specifications and conditions of the Well Construction Permit.

Raymond E. Benton
Signature of Well Owner or Agent

Agent for Carolina Water System, Inc.
Title

(Mailing Address of Well Owner (Required)
Craven Well Drilling Service, Inc.
P.O. Box 245
Bridgeton, N.C. 28519
Mailing Address of Agent

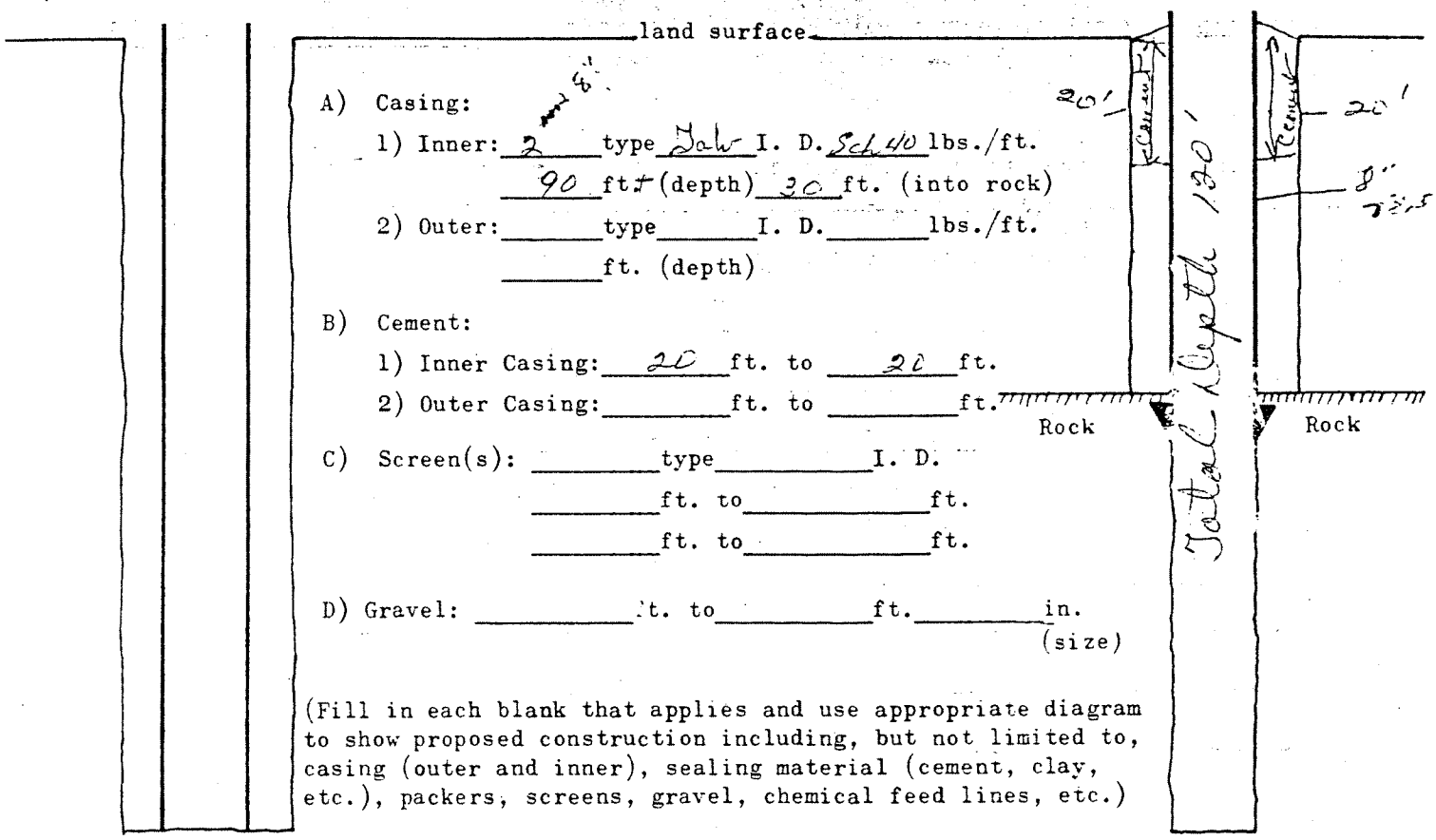
PERMIT NO. ____ issued ____ 19____

GW-22

DIAGRAM OF PROPOSED CONSTRUCTION SPECIFICATIONS

Straight-Screened or Gravel-Packed Well
(Constructed in unconsolidated formations)

Open-End Well
(Constructed in consolidated formations)



A) Casing:
1) Inner: 2 type Jaw I. D. Sch 40 lbs./ft.
90 ft. (depth) 30 ft. (into rock)
2) Outer: _____ type _____ I. D. _____ lbs./ft.
_____ ft. (depth)

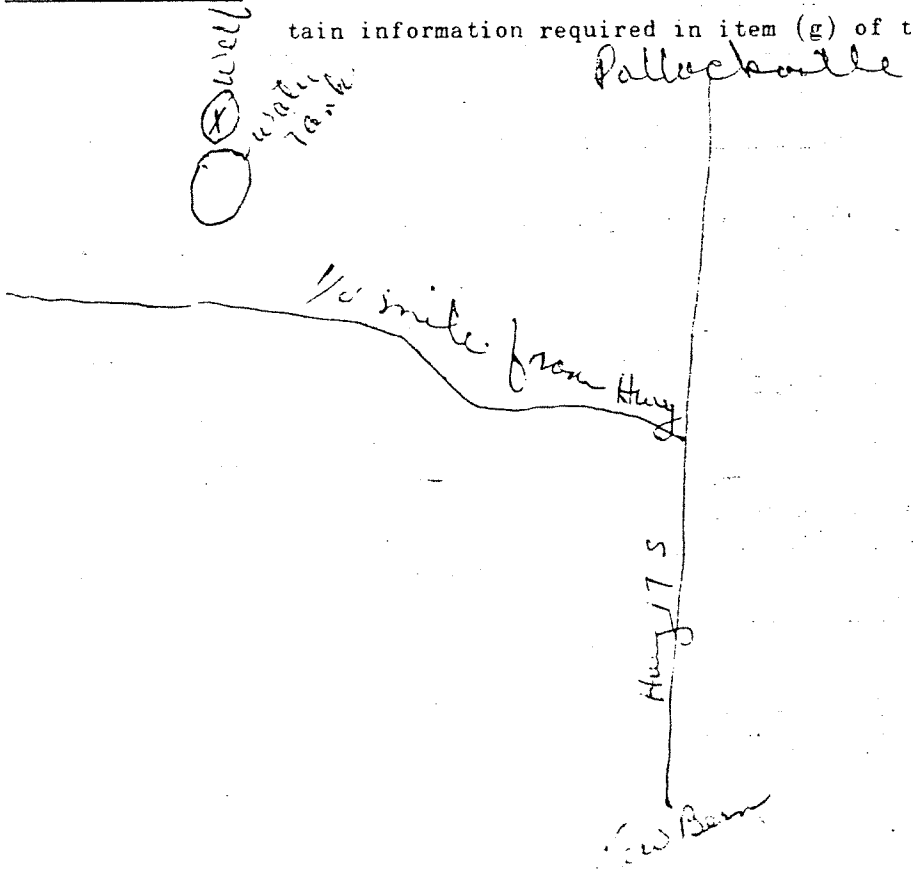
B) Cement:
1) Inner Casing: 20 ft. to 20 ft.
2) Outer Casing: _____ ft. to _____ ft.

C) Screen(s): _____ type _____ I. D.
_____ ft. to _____ ft.
_____ ft. to _____ ft.

D) Gravel: _____ ft. to _____ ft. _____ in. (size)

(Fill in each blank that applies and use appropriate diagram to show proposed construction including, but not limited to, casing (outer and inner), sealing material (cement, clay, etc.), packers, screens, gravel, chemical feed lines, etc.)

Location Diagram: (Previously prepared maps may be submitted provided they contain information required in item (g) of the application).



NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
ENVIRONMENTAL MANAGEMENT COMMISSION
GROUNDWATER SECTION
P. O. BOX 27687 - Raleigh, N. C. 27611

PUMPING TEST RECORD

Test Conducted by: Craven Well Drilling Service Inc. Well Construction Permit No. 24-0243-4C-0006

1. WELL LOCATION: Nearest Town: River Bend County: Craven
   Back of Water Tank Tower Quadrangel No.
   (Road No., Community, or Subdivision and Lot No.)
2. OWNER: Carolina Water System (Name) P.O. Box 103 Atlantic Beach, N.C. 28511 (Address)
3. USE OF WELL: ( ) Domestic (X) Public ( ) Industrial ( ) Irrigation ( ) (Other)
4. WELL DEPTH: 103 ft. Casing Diameter 8 in. Casing type: Bell
5. DRILLING CONTRACTOR: Craven Well Drilling Service Inc. Was casing grouted? Yes
6. STATIC WATER LEVEL: 7' 5" ~~ft.~~ above/below top of casing. Casing is 2 ft. above land surface.
   Date Measured:
7. WELL YIELD: 350 gpm. Specific Capacity: gpm/ft.-dd.
8. PUMPING WATER LEVEL 22' 3" ~~ft.~~ after 24 hours at 350 gpm.
9. CHLORINATION: Type HTH Amount 2 lbs
10. TIME AND DATE: PUMP STARTED: 6-9-83 1:00 P.M. PUMP STOPPED: 6-10-83 1:00 P.M.
11. WATER LEVEL MEASURING DEVICE: Electric Tape FLOW MEASURING DEVICE: Orifice
12. TEST PUMP: Type Turbine Make Berkeley Horse Power
    Capacity gpm at T D H. Intake Depth ft

Time	Water Level	Pumping Rate			Remarks
1:00	11' 2"	350 GPM			
1:05	18' 4"				
1:10	20' 3"				
1:15	22' 7¼"				
1:20	22' 10"				
1:25	22' 3¼"				
1:30	22' 8"				
1:35	22' 2½"				
1:40	21' 8"				
1:45	21' 3¼"				
1:50	20' 9½"				
1:55	20' 8¾"				

GW-40 Submit one copy to Groundwater Section and one to owner.

Pumping Test Record Permit # 24-0303-WC-0065

Continued

Time	Water Level	Pumping Rate			Remarks
P.M. 2:00	20' 9 1/4"	350 G.P.M.			
2:05	20' 10"				
2:10	20' 10 3/4"				
2:15	20' 11 1/4"				
2:20	20' 11"				
2:25	20' 10 1/2"				
2:30	20' 10 1/2"				
2:35	20' 10 3/4"				
2:40	20' 11"				
2:45	20' 11 1/2"				
2:50	20' 11 1/4"				
2:55	20' 11 3/4"				
3:00	20' 11 1/2"				
4:00	21' 1 1/4"				
5:00	21' 8 1/2"				
6:00	21' 8 1/2"				
7:00	21' 11 1/4"				
8:00	22' 1/2"				
9:00	22' 1 1/4"				
10:00	22'				
11:00	22' 1 1/4"				
Midnite 12:00	22' 1 3/4"				
A.M. 1:00	22' 2"				
2:00	22' 1 1/2"				
3:00	22' 2"				
4:00	22' 2 1/2"				

GW 40 **Submit one copy to** Environmental Management and one to owner.

Pumping Test Record Permit # 2J-0243-WC-0063

Continued

Time	Water Level	Pumping Rate			Recovery ~~Remarks~~ Rate
A.M. 5:00	22' 2¾"	350 GPM			
6:00	22' 3"				
7:00	22' 3¼"				
8:00	22' 3¾"				
9:00	22' 3½"				
10:00	22' 3¾"				
11:00	22' 3½"				
Noon 12:00	22' 3½"				
P.M. 1:00	22' 3"				
Recovery Rate					
P.M. 1:05	16' 8"				
1:10	13'				
1:15	11' 1¼"				
1:20	10' 6"				
1:25	10' 1½"				
1:30	9' 11½"				
1:35	9'				
1:40	8' 9½"				
1:45	8' 1¼"				
1:50	7' 10½"				
1:55	7' 5"				
2:00	7' 5"				

GW 40 **Submit one copy to** Environmental Management and one to owner.

ENGINEER'S CERTIFICATION

PROJECT WATER SYSTEM IMPROVEMENTS - TOWN OF RIVERBEND

PERMIT NO. SN 88-5411

I, Linwood E. Stroud, as a duly Registered Professional Engineer in the State of North Carolina, hereby certify that construction of these permitted facilities has been completed substantially in accordance with the approved plans and specifications. Certain items of equipment are different than shown on the approved plans but meet the intent of the plans and specifications. These are as follows:

1) The pump installed at Well No. 1 is Goulds model 8DHL0-11. This pump is delivering 570 gpm at system pressure which exceeds the specifications.

2) The emergency power source at Well No. 1 pump is Ford gas powered engine, model CSG-649 (300 C.I.D.), 124 HP which exceeds the specifications and is more than adequate. Fifty gallon propane will provide about 12 hours fuel supply. The emergency power source for the chemical feed pumps and air compressor is provided by a Dayton 5500 watt gasoline powered generator. Operational test showed that the generator is sufficient to operate the feed pumps and compressor. This meets the intent of the plans and specifications.

3) The pump installed at Well No. 3 is Goulds model 8DHLO-11; same as Well No. 1. This pump is capable of pumping over 500 gpm but restriction plate limits the flow to 400 gpm against system pressure. This meets the intent of the plans and specifications.

4) Emergency power at Well No. 3 is supplied by a 50 KW diesel fueled generator, Atlantic Power Systems model 6329D. A 50 gallon fuel tank is provided which will operate the generator for about 15 hours. An operational test demonstrated the power source is adequate. This meets the intent of the plans and specifications.

Signature Linwood E. Stroud Registration NO. PE5279 Date 7-14-89

NORTH CAROLINA PROFESSIONAL # PE5279 ENGINEER LINWOOD E. STROUD

ENGINEER'S CERTIFICATION

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Signature Linwood E. Stroud Registration NO. PE5279 Date 7-14-95

NORTH CAROLINA PROFESSIONAL # PE5279 ENGINEER LINWOOD E. STROUD

STROUD ENGINEERING COMPANY
CONSULTING ENGINEERS
107B COMMERCE STREET
GREENVILLE, NORTH CAROLINA 27858
(919) 756-9352

December 5, 1988

Mr. J. C. Lin, P.E.
North Carolina Department of Human Resources
Division of Health Services
Post Office Box 2091
Raleigh, North Carolina 27602-2091

RE: Water System Improvements - Riverbend Plantation
Craven County - I.D. Number 04-25-113

Dear Mr. Lin:

The following information is furnished in response to your letter dated November 24, 1987.

1. Pump performance curves are enclosed.

2. The emergency power source for well pumps No. 1 and No. 3 is not a gasoline driven generator but is a gas engine with a coupling direct to the pump motor which can be engaged by a clutch. The proposed 20 KW gasoline driven generator sets were designed to provide emergency power to essential equipment associated with water treatment at each location including chlorinator, compressor and chemical feed pumps. Further refinement of our calculation indicate that the size of each generator can be reduced to 15KW. A copy of these calculations is enclosed.

3. As an alarm, we have specified an auto-dial system which will automatically dial a series of numbers in the event of a power failure. The system will dial up to six numbers in sequence until the emergency call is acknowledged. (for more information, see specifications)

The Sequence of calls will be as follows:

First - Carolina Water Service Answering Service
(919) 636-5301

Second - Mark Burris, Opererator
(919) 638-8759

Third - Joe Lawrence, Manager
(919) 726-8706

Fourth - Town of Riverbend Police Department
(919) 638-1108

4. Backwash water from filters at well No. 1 will be discharged to an existing pond at the same location where the backwash from the existing filters are discharged. The discharge point is approximately 100 feet from well No. 1.

5. I have contacted Mr. Stan Holloway of the North Carolina Pressure Vessel Division and made arrangements for him to inspect the filter which we propose to relocate from the Town of Warrenton. I will furnish a copy of his report to you as soon as available.

6. Backwash calculations for the 120-inch filter are enclosed.

7. The longest power outage on record in which the entire Town of Riverbend was without power lasted 2-3 minutes. Isolated areas have been out up to 3 hours. The gasoline tank on each of the well pump engines is 7 1/2 gallons which is about a 3 hour supply. The gasoline tank on each of the generator sets is 18 gallons which is about 6 hours supply at full load.

Sincerely,

Linwood E. Stroud

Linwood E. Stroud, P.E. 5279

LES/bsf

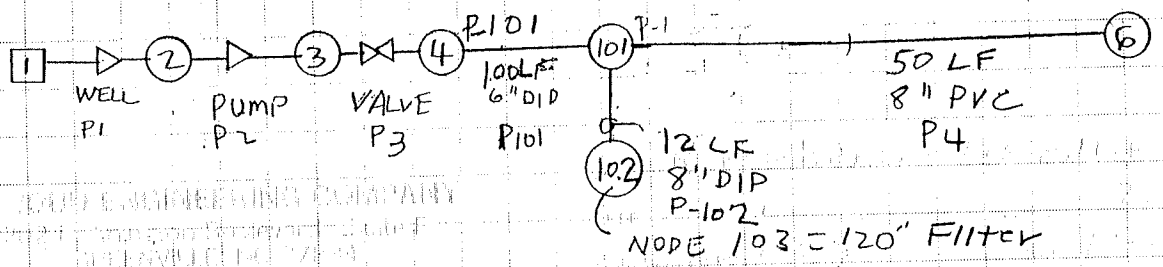
CC: Joe Lawrence
Carl Daniel
Jim DelPapa

STROUD ENGINEERING COMPANY
202 E. Arlington Boulevard - Suite F
GREENVILLE, NC 27834
(919) 756-9352

JOB Riverbend - 120 Filter Backwash
SHEET NO. 1 OF 2
CALCULATED BY LES DATE 12-29-87
CHECKED BY DATE
SCALE

Backwash Calculations for 120" Filter

Schematic for Hardee-Cross Analysis



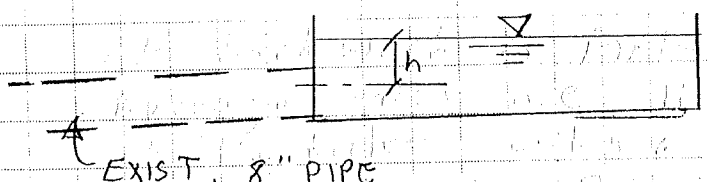
Backwash Water Req. = 15 gpm/SF X $\pi 5^2$ SF = 1177.5 gpm

IF backwash is initiated during a period of Average water use, 1177.5 gpm is available at the filter with a minimum pressure in the system of 27.1 psi. (see Hardy Cross Analysis attached)

Design of gravity pipe from backwash pit

$$\frac{1177.5 \text{ gal/min}}{7.48 \text{ gal/ft}^3 \times 60 \text{ sec/min}} = 2.62 \text{ CFS}$$

Capacity of exist. 8" Pipe outlet



$$Q = C_D A \sqrt{2gh}$$

$$2.62 = 0.58 \times \pi\left(\frac{4}{12}\right)^2 \sqrt{64.4}\sqrt{h}$$

$$\sqrt{h} = 2.62 / 0.58 \times \pi \left(\frac{4}{12}\right)^2 \sqrt{64.4}$$

$$\sqrt{h} = 1.61 \Rightarrow h = 2.60 \text{ Ft.}$$

STROUD ENGINEERING COMPANY
202 E. Arlington Boulevard - Suite F
GREENVILLE, NC 27834
(919) 756-9352

JOB Riverbend
SHEET NO. 2 OF 2
CALCULATED BY JLS DATE 12-29-87
CHECKED BY DATE
SCALE

∴ Need to add a second 8" drain parallel to exist.

$$\sqrt{h} = 1.31/0.58\,\pi\,(4/12)^2\,\sqrt{64.4}$$

$$h = 0.65\ FT \quad O.K.$$

Johnny T. Johnson & Associates, Inc.
INTERSTATE CENTER / 16 BERRY HILL ROAD
P. O. BOX 21066 / COLUMBIA, SOUTH CAROLINA 29221
TELEPHONE (803) 772-5740

January 24, 1984

Mr. J. C. Lin, P.E.
Engineering Planning Branch
Division of Health Services
P. O. Box 2091
Raleigh, N. C. 27602-2091

Re: Water System Improvements
As-Builts
River Bend Plantation
Craven County
R-128

Dear Mr. Lin:

Reference is made to your letter dated January 13, 1984. The following clarifications are numbered to correspond with the comments in your letter:

1. Well number one is to be abandoned and disconnected from the water system.

2. I apologize for the lack of information on the filters. The filters are to use a birm media. With the birm there is no chemical feed equipment. I am enclosing some information on the birm media for your information.

3. The pump which has been installed is a vertical turbine type pump. The motor is mounted on a concrete base which is approximately 24" above the slab of the pump house. There is a screened vent on the casing.

4. There is a gate valve on the blowoff line. It was not shown on the drawings. There are also valves before each filter which will close off the discharge line.

5. The booster pump is for the chlorine injection and the air compressor is to make sure the water has sufficient dissolved oxygen for the birm. It has been our experience in the past that this helps assure the proper operation of the birm media.

6. I would like to request that the bypass line be allowed to remain. The situation could arise where the filters were out of service for an extended period of time and it would be better to have water with a high iron content than no water at all. Since iron is not a health problem, I would like to request that this bypass line by allowed to remain.

7. The filters were obtained from another system and there is no model number or manufacturer's number available. From the enclosed brochure, the manufacturer recommends not exceeding 5 GPM/ft^2. Once again, I would like to request a variance from your letter. Since there are no health problems associated with the excess iron and since current operating data shows good results, I see no reason to limit the filters to 4 GPM/ft^2.

8. The pump installed is a Gould's model #ORL-73-308. The pump is set 65' deep. There is no pump curve but the pumping rate is 240 GPM under the existing conditions.

9. (See item 8)

10. The filters are backwashed with finished water. There is a 100,000 gallon elevated storage tank on the system which provides adequate water for backwashing. The backwash process is a manual operation and is currently provided every 2 days for 30 minutes.

11. The drawing has been modified to show this arrangement.

12. Since the plans submitted to your office are as-built plans, no specifications have been prepared. The type of pump is a Gould pump. The chlorinator is a Wallace A. Tiernan. The manufacturer of the filters is unknown but the dimensions are as given on the drawings. The filter media is birm and the supplier for the birm is the Clack Corp. There are no chemical feeders except for the chlorinators.

13. The exhaust fan in the chlorine room is approximately 6" above the floor.

I hope the above information answers your questions. I believe there is some misunderstanding on the submittal. The new well and filters are as-builts. When the existing well went bad, Carolina Water worked with your district engineer to rapidly install a new well to replace the old well. Once the water samples and analyses were known, they were allowed to place this system in operation. I prepared the original submittal under the supervision of Mr. William T. Knowles. I have since obtained registration in North Carolina and the remainder of the project will be under my supervision and request that all future correspondence be addressed to me. Should you have any questions or desire any additional information, please do not hesitate to contact me.

Sincerely,

JOHNNY T. JOHNSON & ASSOCIATES, INC.

HHB

Heyward H. Bouknight, P.E.

HHB:mll

cc: William T. Knowles
Jimmy Parnell
A. C. Davis
Joe Lawrence ✓

Water System

Asset Management Plan

10-Year Capital Improvement Plan

Adopted by the River Bend Town Council April 18,2024

Municipal Engineering, Inc.
68 Shipwash Drive, Garner, NC 27529 – Phone: 919-772-5393
PO Box 349, Boone, NC 28607 – Phone: 828-262-1767
License No. F-0812 and C-586

Table 4-1. Water Distribution System Inventory

Pipe Assets by Size			Pipe Assets by Material*			Pipe Assets by Age			Pipe Assets by Condition		
Dia. (in)	Feet	Miles	Material	Feet	Miles	Age	Feet	Miles	Condition	Feet	Miles
6	105,276.37	19.94	PVC	110,485.26	20.92	<40 – 50 yrs.	112,740.06	21.35	Good - Fair	112,740.06	21.35
8	6,796.28	1.29	DIP	2,254.80	0.43						
Unk.	667.41	0.12									
TOTAL	**112,740.06**	**21.35**	**TOTAL**	**112,740.06**	**21.35**	**TOTAL**	**112,740.06**	**21.35**	**TOTAL**	**112,740.06**	**21.35**

**From 2022 Local Water Supply Plan*

Table 4-2 – Well Inventory

Name/Number	Year Constructed or Renovated	Well Yield (GPM)	Well Depth (feet)	Casing Depth (feet)	Screen Depth (ft)		Well Diameter (inches)	Pump Intake Depth (ft)	Metered?
					Top	Bottom			
1	1985 (Replaced)	350	105		77	105	8	85	Yes
2	1977	250	110	81	81	110	6	65	Yes
3	1983	350	103	90	90	103	8	85	Yes

Table 4-3 – Water Filter/Treatment Plant Inventory

Name/Number	Permitted Capacity (MGD)	Year Constructed	Raw Water Metered	Finished Water Metered	Source
River Bend WTP	0.3500	1981	Yes	No	Well 3
River Bend WTP	0.6000	1981	Yes	No	Well 1 & 2

Table 4-4 - Finished Water Storage Inventory

Location	Construction Date	Tank Manufacturer	Type	Material	Bottom Elevation	Overflow Elevation	Capacity (Gal)	Notes
1405 Plantation Drive	1999	Caldwell	Leg	Steel		117.5’	300,000	
Shoreline Drive	1981		Leg	Steel	96’	127’	100,000	
						TOTAL	**400,000**	

APPENDIX F

TOWN OF RIVER BEND WATER SUPPLY STUDY EXECUTIVE SUMMARY

Water Supply Study

for

Town of River Bend, North Carolina

September 2024

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TOWN OF RIVER BEND
WATER SUPPLY STUDY

EXECUTIVE SUMMARY

On January 12, 2024, Rivers & Associates, Inc. (Rivers) was authorized by the Town of River Bend to conduct a Water Supply Study to evaluate potential water supply and treatment alternatives in order to provide a secure and cost-effective future water supply.

Background: The Town of River Bend was originally developed as a retirement community known as River Bend Plantation. Construction of the development began in the late 1960's, and continued to expand in subsequent years. The residents of River Bend Plantation elected to incorporate in the late 1970's, and the Town was chartered in 1981. The water and sanitary sewer utilities were originally sold by the developer to Carolina Water Service which operated them until 1995. At that time, the Town purchased the water and sanitary sewer systems, and has operated them as public utilities ever since.

The Town has provided routine maintenance and has performed periodic upgrades, such as installation of the 300,000-gallon elevated storage tank at the southern terminus of Plantation Drive. However, the bulk of the water supply and treatment system has outlived its useful service life as most of the facilities and equipment are 36 – 52 years old. The condition of the facilities requires that they be rehabilitated or replaced.

Purpose: This Water Supply Study is intended to evaluate potential water supply and treatment options to determine and recommend the most secure and cost-effective alternative to serve the Town for the future.

Future Capacity: Historical population and water demand data were evaluated to identify trends in the River Bend and Craven County area in order to develop 20-year population and demand projections. The results supported only modest growth of approximately 3% per decade. As such, the current 0.95 MGD cumulative capacity of the existing two (2) water treatment plants (WTPs) appears sufficient to meet the 20-year maximum day demand. Given this, 0.95 MGD capacity was utilized as the basis for evaluating and estimating costs for the various alternatives considered.

Preliminary Hydrogeological Findings: Rivers contracted with Groundwater Management Associates, Inc. (GMA) to conduct a preliminary hydrogeologic evaluation as a planning-level summary of available groundwater resources in the River Bend area. As a result of their efforts, two (2) freshwater aquifers are believed to be suitable for future use to meet the projected raw water-supply requirements for the Town of River Bend: (1) the Upper Castle Hayne Aquifer (UCHA)/River Bend Strata, and (2) the underlying Lower Castle Hayne Aquifer (LCHA)/Comfort Member.

Upper Castle Hayne Aquifer/River Bend Strata - The Town's existing three (3) production wells tap into the UCHA/River Bend Strata. These wells are relatively shallow at 110 feet deep, and have limited yields due to minimal drawdown capability. Individual yields of these shallow wells average less than 250 gallons per minute (gpm). In addition, the water-quality

tends to be high in iron, manganese and hardness. The Town of River Bend is the only municipal water system in the local area that utilizes the River Bend strata. Due to its shallow depth, this aquifer is much more susceptible to contamination than the LCHA. Treatment is required in order to produce a potable quality drinking water. Although the Upper Castle Hayne/River Bend Strata could be utilized as a future water supply for the Town of River, a better alternative is believed to exist.

Lower Castle Hayne Aquifer/Comfort Member - The LCHA/Comfort Member produces greater yields averaging on the order of 500 – 1,000 gpm due to the greater depth and available drawdown. Historically, aquifer testing has shown that groundwater sampled from the Lower Castle Hayne Aquifer exhibits superior water quality to that contained in the shallower Upper Castle Hayne Aquifer at a similar geographic location. As such, the water-quality of Lower Castle Hayne water is anticipated to be superior to that of the River Bend Strata expressed in the form of lower iron and reduced hardness. However, the aquifer can exhibit significant variability across the area. Treatment is required in order to produce potable quality drinking water. Both the City of New Bern and Jones County utilize the LCHA/Comfort Member to supply their individual Filter Softener WTPs.

If the Town pursues development of a new Water Treatment Plant, GMA and Rivers recommend the Town pursue the Lower Castle Hayne/Comfort Member as the water supply source based on our evaluation of available groundwater resources in the River Bend area. Two (2) 380 gpm production wells are recommended to supply a 0.95 MGD WTP. These recommendations are based on anticipated water-quality and water quantity estimates that must be validated through test well evaluation.

Four (4) potential locations were preliminarily considered for siting the two (2) production wells. The two locations that appear most suitable are (1) the new WTP site and (2) the Town Commons. Both sites will require a site investigation and approval by NCDEQ Public Water Supply Section (PWSS) staff prior to drilling of a test well and/or a production well.

In-Town WTP Alternatives: Two (2) In-Town WTP alternatives were evaluated to provide treatment of fresh groundwater: (1) Filter Softener WTP and (2) Nanofiltration WTP.

Filter Softener WTP - This alternative makes use of greensand filters and ion exchange softeners. During treatment, as water passes through a greensand filter, soluble iron and manganese are pulled from solution and later react to form insoluble iron and manganese. Regular backwashing, as recommended by the manufacturer, is required to remove the insoluble forms of iron and manganese. In addition, the greensand filter must be regenerated continuously with potassium permanganate. Most greensand filters are rated to be effective treating water with iron concentrations up to 10 mg/l. If the pH of the water is lower than 6.8, greensand will not filter out the iron and manganese adequately, and the pH must be raised prior to filtration. Regular backwashing is essential to remove particles collected in the filter and to ensure effective filter performance. Backwash flow rates are typically three to four times the normal usage rate.

Ion exchange softening is used to reduce the hardness associated with raw water such as that from the Castle Hayne aquifer. During water treatment, the ion exchange resin removes hardness ions, i.e. calcium and magnesium from the water, and replaces them with non-hardness ions, typically sodium. A brine solution is utilized to periodically regenerate the resin to flush out excess hardness ions. This results in a brackish waste discharge from the WTP. Some raw waters that have lower amounts of iron and manganese can be treated by ion exchange softening only, because dissolved iron and manganese can be exchanged for sodium on the anionic exchange resin or zeolite. The process of iron and manganese removal is the same as the ion exchange process that removes hardness.

In the case of the Castle Hayne Aquifer, ion exchange softening would not be typically used without first reducing iron and manganese via filtration due to the concentrations normally present in the raw water. The use of ion exchange softening would eliminate the need for each customer to provide and maintain a residential water softener.

A greensand filter system followed by cationic softening would make for a high-quality water that is capable of consistently meeting secondary limits. A similar water treatment process is utilized by the City of New Bern and Jones County.

Nanofiltration WTP – This process makes use of partially permeable membranes to separate contaminants at a molecular level from a fresh water supply. Nanofiltration membranes are capable of removing organics, soluble iron, manganese, hardness and other contaminants, and produce a very high-quality drinking water.

For a nanofiltration WTP, it is necessary to keep chemical contaminants in a soluble form to prevent membrane fouling and to accommodate separation of the contaminant concentrate from the permeate. As such, submersible well pumps are typically utilized to minimize oxidation and precipitation of iron and manganese. A new water treatment plant building would house the nanofiltration pumps, cartridge filters, membrane skids, clean-in-pace system, chemical feed systems, and electrical gear. However, if iron concentration is too high, iron pre-filters may be required in lieu of cartridge filters. The use of iron pre-filters is similar to the filtration process described previously, and can contribute significantly to the cost of a nanofiltration WTP.

The capital costs associated with construction of a Filter Softener WTP are approximately 25% lower than that of a comparably sized Nanofiltration WTP. However, Nanofiltration costs can increase significantly if iron pre-filters are required.

In-Town WTP Waste Treatment/Discharge Alternatives: The filter backwash and softener regeneration waste from the F/S WTP requires further treatment since precipitated iron and manganese are present. Dual geomembrane-lined settling ponds are recommended for quiescent settling of the precipitates prior to pumping the supernatant to the selected discharge location. The waste concentrate from a Nanofiltration WTP, rather, is in soluble form. It can be pumped directly from the WTP to the selected discharge location. Three (3) alternatives were evaluated for

treatment and disposal of the waste from each of the WTP alternatives: (1) the existing sanitary sewer collection system, (2) Plantation Canal, and (3) combined WTP/WWTP multiport diffuser in the Trent River.

Sanitary Sewer Collection System - Discharge to the existing sanitary sewer collection system is the least costly solution; however, it should be considered a short-term solution. Under this arrangement, the WTP's brackish waste will mix and dilute with the sanitary sewer waste through the collection system and treatment plant prior to discharge through the existing Trent River diffuser. The WTP waste, however, could potentially consume a significant percentage of the WWTP permitted capacity. In addition, it would introduce a brackish waste stream into the WWTP which increases corrosivity and expedites degradation to the existing tankage and equipment. Each of these reasons argues against discharging to River Bend's existing sanitary sewer collection system as a long-term solution.

Under initial conditions, the sanitary sewer collection system could potentially be employed as a short-term viable solution; however, it is not considered a viable long-term solution due to its impact on WWTP capacity, operations and maintenance requirements.

Plantation Canal - The two (2) currently permitted discharge locations from the existing WTPs drain into and through the larger Plantation Canal that serves the River Bend Marina, local boaters and fishermen. Plantation Canal is significantly larger than the existing receiving waters of the two (2) existing WTPs, and is approximately 100 feet to over 200 feet wide along the main channel run which is approximately 1.4 miles long prior to its discharge into the Trent River. Given that Plantation Canal is a much larger waterbody than the current permitted tributary discharge locations, it would seem to be preferable to that which currently exists. The upstream portion of Plantation Canal is likely freshwater that transitions to brackish or saltwater further downstream. There is potential that Plantation Canal could be considered an acceptable location for discharge from a new WTP; however, discharge of a brackish waste stream to a freshwater receiving stream will likely be discouraged. This would have to be addressed directly with the NPDES Unit, and is beyond the scope of this study. If it was acceptable, it would be preferable to discharge into the broader section of Plantation Canal rather than the narrower upper section or tributaries.

Combined WTP/WWTP Discharge into the Trent River – This alternative involves combining the treated effluent discharge from the WTP with the treated effluent discharge from the Town's existing Wastewater Treatment Plant (WWTP). Effluent discharge from the River Bend WWTP is through an 8" diameter gravity outfall under the influence of driving head from the WWTP. Should the WTP treated waste be combined with the WWTP treated waste, a new 10" outfall would be required to accommodate the total flow. Typically, the NPDES Unit encourages discharge to the largest reasonable downstream receiving water in order to maximize dilution within a small regulatory mixing zone. For River Bend, this receiving water is considered to be the Trent River.

From a technical, environmental and permitting standpoint this option would appear to be the most favorable long-term discharge solution.

Selection of an In-Town WTP Supply Alternative: Two (2) combinations of alternatives were evaluated using a Net Present Value of Costs Analysis (NPVCA). This approach evaluates the major capital costs, annual recurring costs and salvage values associated with each option and converts them to an equivalent net present cost to determine which is the least expensive option on a level basis. The two (2) combinations of alternatives evaluated include:

Filter Softener WTP – This alternative includes (1) one new test well and two new production wells in the Lower Castle Hayne Aquifer/Comfort Member plus raw water mains to transmit flow from the well sites to the WTP site, (2) a 0.95 MGD Filter Softener WTP located on the site recently purchased by the Town located adjacent to the Public Works Facility and 300,000-gallon elevated storage tank, and (3) dual settling basins with supernatant pump station and force main to discharge into a common WTP/WWTP outfall and multiport diffuser into the Trent River.

Nanofiltration WTP – This alternative includes (1) one new test well and two new production wells in the Lower Castle Hayne Aquifer/Comfort Member plus raw water mains to transmit flow from the well sites to the WTP site, (2) a 0.95 MGD Nanofiltration WTP (no iron pre-filters) located on the site recently purchased by the Town located adjacent to the Public Works Facility and 300,000-gallon elevated storage tank, and (3) waste concentrate force main to discharge into a common WTP/WWTP outfall and multiport diffuser into the Trent River.

The estimated capital cost and annual recurring costs for the Filter Softener WTP alternative are less expensive than the Nanofiltration WTP alternative while the salvage value is greater for the Nanofiltration alternative. Given this, the Net Present Value of Costs is approximately $2,100,000 basis. The following is a summary of the estimated costs for both alternatives:

	Filter Softener WTP Alternative	**Nanofiltration WTP Alternative**
Capital Cost	$18,228,000	$19,798,000
Annual Costs	$696,600	$758,664
Salvage Value	($1,040,774)	($1,252,044)
NPVC	$25,511,863	$27,612,281

The Filter Softener WTP Alternative is the least expensive of the two (2) viable In-Town WTP alternatives.

Non-monetary factors were also considered in formulating a recommendation. A decision matrix was utilized consisting of the following parameters for each alternative included:

- sustainability (future availability and quality) of the raw water supply,
- treatability to primary and secondary drinking water standards,

- residual waste treatment and disposal requirements/NPDES discharge permitting capability
- disinfection byproducts requirements
- land requirements
- vulnerability due to test well/pilot plant/dilution study results
- environmental and permitting concerns
- ease of operations

Each of the parameters was assigned a rating from 1 – 9, which represents least to most favorable. A value of 5 is neutral while values of 1 and 9 represent highly unfavorable and highly favorable scores, respectively. The ratings assigned for each factor are subjective based on experience in the industry and discussions with Publicly Operated Treatment Works (POTW) Owners, Operators and Public Water Supply Section (PWSS) staff. For most parameters, one alternative scored more favorable depending on the specific factor considered. Sometimes the ratings for each alternative were identical.

Based on the total scores for each alternative in the decision matrix, the Filter/Softener WTP alternative received the highest and most favorable score. In addition, it is the more affordable alternative based on the Net Present Value of Costs Analysis. Therefore, if River Bend chooses to move forward with design, permitting and construction of a new in-town WTP, the recommended long-term water supply alternative is to design and construct a single new Filter/Softener WTP. This alternative includes construction of a new Lower Castle Hayne Aquifer wellfield with raw water transmission mains to supply the new WTP site. Filter backwash and softener regeneration waste would be treated in dual geomembrane-lined settling basins with a supernatant pump station and force main to discharge into a combined WTP/WWTP multiport diffuser in the Trent River.

If the Town is unable to secure sufficient funding for all portions of this alternative, the Town could realize some savings by rehabilitating the existing Upper Castle Hayne Aquifer wells and installing raw water mains to the new WTP site. Similarly, as a short-term solution, the Town could discharge the treated backwash and softener regeneration waste to the existing sanitary sewer collection system to combine with the existing treated WWTP discharge to the Trent River.

Bulk Water Supply and Transmission Alternatives - Other water supply alternatives could also be available to the Town of River Bend beyond the in-town WTP options evaluated above. This includes purchasing potable drinking water in bulk from a neighboring system. Several public water systems are located in near proximity to the Town of River Bend. These include the City of New Bern, Jones County Regional Water System and Craven County Water Department. Only the City of New Bern has demonstrated available capacity and willingness to serve as a bulk water supplier to the Town.

A User Rate Impact Analysis was utilized to compare user charge requirements for the recommended In-Town WTP alternative against the City of New Bern bulk water supply alternative. The evaluation was conducted on an “equivalent user” basis to convert commercial

and institutional users to equivalent residential users. The Town's 1,497 actual residential, commercial and institutional customers equate to approximately 1,816 equivalent residential users for purpose of this analysis. Average monthly consumption based on the 1,816 equivalent users is 2,920 gallons.

If the Town purchases water in bulk from a neighboring water system, a portion of the Town's recurring costs associated with water supply and treatment will no longer be required. However, the Town will still need to continue operating its water distribution system. Approximately 91% of the revenue generated by the current water rates is estimated to still be required. Based on the size of the current customer base, current average water sales and current average collections rate, the average monthly water bill per customer is estimated to be $25.08. In addition to the costs required to continue operating the Town's distribution system, the Town's user rates will be increased by the cost to purchase water in bulk, as well as any capital improvements required to fund transmission improvements between the City of New Bern and the Town of River Bend.

The City of New Bern's distribution system includes an 8" water main that extends along US Hwy 17 BUS past the River Bend corporate limits, as well as another 8" water main that extends somewhat parallel along Rocky Run Road.

The City of New Bern is currently working toward design and installation of transmission and elevated water tank improvements to serve the western side of their service area. This western loop and elevated tank will connect from the US Hwy 70/NC Hwy 43 Interchange to the Trent Creek Road/ Bus Hwy 17 intersection. Installation of these water system improvements is expected to be complete within the next two years. Those improvements will improve the capability for New Bern to supply a community like River Bend.

Emergency Interconnect - Based on preliminary hydraulic evaluation, the existing 8" water mains, including the New Bern western elevated storage tank and transmission improvements, appear capable of supplying the current average day demand with reduced pressures, but insufficient to supply the current maximum day demand and fire flow. As such, interconnection with the City of New Bern's water system could be an asset to the Town of River Bend for purposes of an emergency interconnection, but not as a long-term water supply source unless additional transmission improvements are made.

The total estimated project cost for an emergency interconnect is $499,000.00

Bulk Water Supply Interconnect - The City of New Bern has the available capacity to serve the Town of River Bend, and the City has preliminarily indicated a willingness to serve as a bulk supplier to the Town. The City has informally suggested that a reasonable preliminary estimate of the charges to sell water to the Town would be no greater than 150% of the current "In-City" water rates. For the purposes of this evaluation, 150% was utilized for preliminary estimates. On this basis, the estimated average monthly water bill per equivalent user at current average day consumption equals $18.67. This estimated cost

excludes debt service for any required transmission and interconnection capital improvements and other required distribution system operation, maintenance and debt costs.

In order for the City to serve as a reliable source of water supply to River Bend, transmission and interconnection requirements are required to supply a future maximum day demand in River Bend equal to 0.95 MGD. Preliminary hydraulic modelling indicates a booster pump station and 10" transmission main would likely be required between the City's new western elevated storage tank to the River Bend elevated tank. Unless the Town of River Bend is willing to pay for these improvements to the New Bern and River Bend water systems through fund balance or grant funds, additional debt service would be generated to repay a new loan to cover the costs of these capital improvements. The cost for this additional debt service would also increase the user rates for River Bend customers.

The estimated project cost for required transmission improvements to interconnect the Town of River Bend's water system to the City of New Bern as a permanent bulk water supplier is estimated at $5,113,000. If the Town of River Bend utilizes the N.C. Special Appropriation funds to pay the capital improvements costs for the transmission and interconnection to both the New Bern or River Bend systems, then there would be no new debt service to be repaid. Under those circumstances, the estimated monthly utility charge is approximately $43.76.

If, however, the N.C. Special Appropriation cannot be used to pay for the transmission and interconnection costs for New Bern and River Bend, then the Town may need to borrow some or all of the money and repay it over a period of time. Assuming the worst case, that $5,113,000 is borrowed to finance the cost of the capital improvements through a 20-year Division of Water Infrastructure low interest loan at 3.25% half-market-rate interest, the first year's annual debt service is approximately $421,823 which equates to approximately $19.36 per month per customer. As such, the total estimated monthly cost to purchase drinking water from the City of New Bern under this circumstance is approximately $63.11/month/equivalent user.

Both advantages and disadvantages exist for the Town of River Bend to purchase water in bulk from the City of New Bern. Several are listed in this report for the Town's consideration in making a decision between the in-Town WTP solution and the Bulk Water Supply solution.

Recommendation - The Town of River Bend has successfully operated their own in-town water and sanitary sewer systems for almost three decades. The expertise and willingness to continue doing certainly appear to exist. The biggest hurdle confronting the Town is the ability to generate sufficient revenue to address significant capital costs and potential associated debt service with a small customer base.

The Town has previously secured a significant grant to help offset a portion of the potential debt service and the resulting impact to water rates. The ability to pursue design, permitting,

construction and operation of a new in-town WTP will be based on the Town's capability to secure additional grant funding.

The estimated cost for the recommended long-term water supply alternative is $18,228,000. The Town currently has Special Legislative Grant appropriation of $9,252,105. As such, the current shortfall is estimated to be $8,975,895. Ideally, if the Town could secure an additional $8,975,895 in grant, the Town could pursue design, permitting and construction of the long-term recommended water supply improvements.

On the basis of the preliminary estimates and computations included herein, the Town should borrow no more than $3,544,000 based on securing a low interest NCDEQ DWI loan with a 20-year term at 3.25% interest rate. The first-year principal and interest would equal $293,205 which translates to $13.45/month/equivalent customer. Approximately $30.31/month/equivalent user is estimated for operation and maintenance of the water system with a new F/S WTP in place. These two incremental costs added together equal the estimated cost of $43.76/month/equivalent customer such that the average user charge for the long-term water supply alternative does not exceed that required to purchase bulk water from the City of New Bern.

Potential Rate Impact - The Town's current water rates equate to $36.62/month for a 5,000 gal/month customer. This is below the State median of $40.01. However, when viewed in combination with sewer rates, the Town monthly rate of $107.30 far exceeds the State median of $89.71.

The Town does not average 5,000 gal/month per user based on water sales. In 2023, the average consumption was only 2,920 gal/month per equivalent customer. As such, the average water bill was $27.56/month/equivalent customer. Required revenues must be generated based on the actual quantity of water sold.

The impact to water rates for constructing a new F/S WTP is a function of the grant funds available to offset potential debt service plus the inherent cost to operate and maintain the new WTP and the remainder of the water system.

- If the Town is able to secure 100% grant funding, then monthly water rates are estimated to increase from $27.56 to $30.31/month/equivalent customer in order to cover the additional operating costs associated with the new F/S WTP.
- If the Town is unable to secure any additional grant funding, the monthly water rates are estimated to increase to $64.29/month/equivalent customer which far exceeds the cost to purchase bulk water from the City of New Bern.
- If the Town limits their debt service to not exceed that required to purchase bulk water from New Bern, water rates could increase to $43.76/month/equivalent user.

Potential Funding Opportunities - Given that the Town of River Bend has already secured a substantial amount of Special Legislative Grant funding for the project, additional funding efforts

should proceed in parallel with the planning, design and permitting efforts required for the new WTP project.

The Town of River Bend has worked previously with NCDEQ Division of Water Infrastructure (DWI) State Revolving Fund (SRF) program for various grant and loan funded projects. The SRF program provides ½ market interest rate loans with a limited amount of principal forgiveness. The maximum loan amount is $20 million (DW Unit) and $30 million (WW Unit) with a payback term of 20 years. A 2.0% closing fee applies.

The DWI SRF funding process is competitive. The opportunity for the Town to be funded depends on numerous factors, including the availability of funds, the number of applications submitted, and final scoring/ranking of the applications. Given this, it is recommended that the Town proceed with the Drinking Water application at the first available opportunity. In this manner, the Town will have the best opportunity to receive funding for the project.

The SRF Program has two funding cycles per year, typically in March and September. The Town, working with their engineering consultant, should begin preparation of the applications and supporting documents to support a funding request for the proposed alternative. If the Town's application is selected for funding, the Town should expect to be notified and receive a Letter of Intent to Fund (LOIF) letter from DWI approximately five months following application.

Due to significant capital costs, the discussion on financing dictates a need to secure grant funding from as many sources as possible in order to keep the cost of water at as reasonable a level as possible. Drinking Water State Revolving Fund (SRF), USDA-Rural Development and Revenue Bonds appear to be the most promising source of project financing. However, other available sources of revenue could also be pursued.

APPENDIX G

ENVIRONMENTAL IMPACT MITIGATION REFERENCES

APPENDIX G-1 TOWN OF RIVER BEND FLOOD DAMAGE PREVENTION ORDINANCE

APPENDIX G-2 USDA CUSTOM SOILS REPORT

APPENDIX G-3 NCDEQ EROSION AND SEDIMENTATION CONTROL MANUAL – CHAPTER 4

APPENDIX G-4 USDA SOIL DATA ACCESS – PRIME AND OTHER IMPORTANT FARMLANDS – CRAVEN COUNTY, NC

APPENDIX G-5 TOWN OF RIVER BEND ZONING ORDINANCE

APPENDIX G-6 EXCERPT FROM REGIONAL LAND USE PLAN (CAMA)

APPENDIX G-7 USACE PRE-CONSTRUCTION NOTIFICATION & NATIONWIDE PERMIT 58

APPENDIX G-8 NCDEQ STORMWATER DESIGN MANUAL E-1 – LOW DENSITY PROJECTS

APPENDIX G-9 FISH AND WILDLIFE SERVICE – LIST OF THREATENED AND ENDANGERED SPECIES

APPENDIX G-10 NC MARINE FISHERIES RULE AREAS

APPENDIX G-11 TOWN OF RIVER BEND GENERAL OFFENSES ORDINANCE (NOISE)

APPENDIX G-12 CAMA CORRESPONDENCE AND FEDERAL CONSISTENCY LETTER

APPENDIX G-1

TOWN OF RIVER BEND FLOOD DAMAGE PREVENTION ORDINANCE

TITLE XVI: FLOOD DAMAGE PREVENTION

Chapter

16.01. FLOOD DAMAGE PREVENTION

CHAPTER 16.01 FLOOD PLAIN DAMAGE PREVENTION

FLOOD DAMAGE PREVENTION

Non-Coastal Regular Phase

Adopted August 21st, 1985

Amended: September 18th, 1985, July 15th, 1987, September 16th, 1987, April 21st, 1993, June 16th, 1993, July 21st, 1993, July 21st, 1999, July 18th, 2001, December 19th, 2002, April 21st, 2004, & June 18th, 2020

Codified February 21st, 2008

Section

General Provisions

§ 16.01.001 STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE AND OBJECTIVES.

(A) STATUTORY AUTHORIZATION.

Municipal: The Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; Article 8 of Chapter 160A; and Article 7, 9, and 11 of Chapter 160D (Effective January 1, 2021) of the North Carolina General Statutes, delegated the responsibility to local governmental units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry.

(B) FINDINGS OF FACT.

(1) The flood prone areas within the jurisdiction of the Town of River Bend are subject to periodic inundation which results in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures of flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

(2) These flood losses are caused by the cumulative effect of obstructions in floodplains causing increases in flood heights and velocities, and by the occupancy in flood prone areas by uses vulnerable to floods or hazardous to other lands which are inadequately elevated, floodproofed, or otherwise unprotected from flood damages.

(C) STATEMENT OF PURPOSE.

It is the purpose of this ordinance to promote public health, safety, and general welfare and to minimize public and private losses due to flood conditions within flood prone areas by provisions designed to:

(1) restrict or prohibit uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion, flood heights or velocities;

(2) require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

(3) control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters;

(4) control filling, grading, dredging, and all other development which may increase erosion or flood damage; and,

(5) prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

(D) OBJECTIVES.

The objectives of this ordinance are:

(1) to protect human life and health;

(2) to minimize expenditure of public money for costly flood control projects;

(3) to minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

(4) to minimize prolonged business losses and interruptions;

(5) to minimize damage to public facilities and utilities (i.e. water and gas mains, electric, telephone, cable and sewer lines, streets, and bridges) that are located in flood prone areas;

(6) to minimize damage to private and public property due to flooding;

(7) to make flood insurance available to the community through the National Flood Insurance Program;

(8) to maintain the natural and beneficial functions of the floodplains;

(9) to help maintain a stable tax base by providing for the sound use and development of flood prone areas in such a manner as to minimize flood blight areas; and,

(10) to ensure that potential homebuyers are notified when enquiring if property is in a Special Flood Hazard Area.

§ 16.01.002 DEFINITIONS.

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

"Accessory Structure (Appurtenant Structure)" means a structure which is located on the same parcel of property as the principal structure and the use of which is incidental to the use of the principal structure. Garages, carports and storage sheds are common urban accessory structures. Pole barns, hay sheds and the like qualify as accessory structures on farms, and may or may not be located on the same parcel as the farm dwelling or shop building.

"Addition (to an existing building)" means an extension or increase in the floor area or height of a building or structure.

"Alteration of a watercourse" means a dam, impoundment, channel relocation, change in channel alignment, channelization, or change in cross-sectional area of the channel or the channel capacity, or any other form of modification which may alter, impede, retard or change the direction and/or velocity of the riverine flow of water during conditions of the base flood.

"Appeal" means a request for a review of the floodplain administrator's interpretation of any provision of this ordinance.

"Area of Shallow Flooding" means a designated AO or AH Zone on a community's Flood Insurance Rate Map (FIRM) with base flood depths determined to be from one (1) to three (3) feet. These areas are located where a clearly defined channel does not exist, where the path of flooding is unpredictable and indeterminate, and where velocity flow may be evident.

"Area of Special Flood Hazard" see "Special Flood Hazard Area (SFHA)"

"Base Flood" means the flood having a one (1) percent chance of being equaled or exceeded in any given year.

"Base Flood Elevation (BFE)" means a determination of the water surface elevations of the base flood as published in the Flood Insurance Study. When the BFE has not been provided in a "Special Flood Hazard Area", it may be obtained from engineering studies available from a Federal, State, or other source using FEMA approved engineering methodologies. This elevation, when combined with the "Freeboard", establishes the "Regulatory Flood Protection Elevation."

"Basement" means any area of the building having its floor subgrade (below ground level) on all sides.
"Breakaway Wall" means a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces without causing damage to the elevated portion of the building or the supporting foundation system.

"Building" see "Structure"

"Chemical Storage Facility" means a building, portion of a building, or exterior area adjacent to a building used for the storage of any chemical or chemically reactive products.

"Coastal Area Management Act (CAMA)" means North Carolina's Coastal Area Management Act, this act, along with the Dredge and Fill Law and the Federal Coastal Zone Management Act, is managed through North Carolina Department of Environmental Quality (NCDEQ) Division of Coastal Management (DCM).

"Coastal A Zone (CAZ)" means an area within a special flood hazard area, landward of a V zone or landward of an open coast without mapped V zones. In a Coastal A Zone, the principal source of flooding must be astronomical tides, storm surges, seiches, or tsunamis, not riverine flooding. During the base flood conditions, the potential for wave heights shall be greater than or equal to 1.5 feet. Coastal A Zones are not normally designated on FIRMs. (see Limit of Moderate Wave Action (LiMWA))

"Coastal Barrier Resources System (CBRS)" consists of undeveloped portions of coastal and adjoining areas established by the Coastal Barrier Resources Act (CoBRA) of 1982, the Coastal Barrier Improvement Act (CBIA) of 1990, and subsequent revisions, and includes areas owned by Federal or State governments or private conservation organizations identified as Otherwise Protected Areas (OPA).

"Coastal High Hazard Area" means a Special Flood Hazard Area extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The area is designated on a FIRM, or other adopted flood map as determined in §16.01.003(B) of this ordinance, as Zone VE.

"Design Flood" See "Regulatory Flood Protection Elevation"

"Development" means any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials.

"Development Activity" means any activity defined as Development which will necessitate a Floodplain Development Permit. This includes buildings, structures, and non-structural items, including (but not limited to) fill, bulkheads, piers, pools, docks, landings, ramps, and erosion control/stabilization measures.

"Digital Flood Insurance Rate Mate (DFIRM)" means the digital official map of a community, issued by the Federal Emergency Management Agency (FEMA), on which both the Special Flood Hazard Areas and the risk premium zones applicable to the community are delineated.

"Disposal" defined as in NCGS 130A-290(a)(6), the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste into or on any land or water so that the solid waste or any constituent part of the solid waste may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

"Elevated Building" means a non-basement building which has its reference level raised above ground level by foundation walls, shear walls, posts, piers, pilings, or columns.

"Encroachment" means the advance or infringement of uses, fill, excavation, buildings, permanent structures or development into a special flood hazard area, which may impede or alter the flow capacity of a floodplain.

"Existing Building" and "Existing Structure" means any building and/or structure for which the "start of construction" commenced before August 19th, 1986, the effective date of the initial FIRM.

"Existing Manufactured Home Park or Manufactured Home Subdivision" means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) was completed before August 21, 1985, the initial effective date of the floodplain management regulations adopted by the community.

"Flood" or "Flooding" means a general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) the overflow of inland or tidal waters; and/or,
(2) the unusual and rapid accumulation of runoff of surface waters from any source.

"Flood Boundary and Floodway Map (FBFM)" means an official map of a community, issued by the Federal Emergency Management Agency, on which the Special Flood Hazard Areas and the floodways are delineated. This official map is a supplement to and shall be used in conjunction with the Flood Insurance Rate Map (FIRM).

"Flood Hazard Boundary Map (FHBM)" means an official map of a community, issued by the Federal Emergency Management Agency, where the boundaries of the Special Flood Hazard Areas have been defined as Zone A.

"Flood Insurance" means the insurance coverage provided under the National Flood Insurance Program.

"Flood Insurance Rate Map (FIRM)" means an official map of a community, issued by the Federal Emergency Management Agency, on which both the Special Flood Hazard Areas and the risk premium zones applicable to the community are delineated. (See also DFIRM).

"Flood Insurance Study (FIS)" means an examination, evaluation, and determination of flood hazard areas, corresponding water surface elevations (if appropriate), flood insurance risk zones, and other flood data in a community issued by FEMA. The Flood Insurance Study report includes Flood Insurance Rate Maps (FIRMs) and Flood Boundary and Floodway Maps (FBFMs), if published.

"Flood Prone Area" see "Floodplain"

"Flood Zone" means a geographical area shown on a Flood Hazard Boundary Map or Flood Insurance Rate Map that reflects the severity or type of flooding in the area.

"Floodplain" means any land area susceptible to being inundated by water from any source.

"Floodplain Administrator" is the individual appointed to administer and enforce the floodplain management regulations.

"Floodplain Development Permit" means any type of permit that is required in conformance with the provisions of this ordinance, prior to the commencement of any development activity.

"Floodplain Management" means the operation of an overall program of corrective and preventive measures for reducing flood damage and preserving and enhancing, where possible, natural resources in the floodplain, including but not limited to emergency preparedness plans, flood control works, floodplain management regulations, and open space plans.

"Floodplain Regulations" means this ordinance and other zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances, and other applications of police power. This term describes federal, state or local regulations in any combination thereof, which provide standards for preventing and reducing flood loss and damage.

"Floodproofing" means any combination of structural and nonstructural additions, changes, or adjustments to structures, which reduce or eliminate risk of flood damage to real estate or improved real property, water and sanitation facilities, or structures with their contents.

"Flood-resistant Material" means any building product (material, component, or system) capable of withstanding direct and prolonged contact (minimum 72 hours) with floodwaters without sustaining damage that requires more than low-cost cosmetic repair. Any material that is water-soluble or is not resistant to alkali or acid in water, including normal adhesives for above-grade use, is not flood-resistant. Pressure-treated lumber or naturally decay-resistant lumbers are acceptable flooring materials. Sheet-type flooring coverings that restrict evaporation from below and materials that are

impervious, but dimensionally unstable are not acceptable. Materials that absorb or retain water excessively after submergence are not flood-resistant. Please refer to Technical Bulletin 2, Flood Damage-Resistant Materials Requirements, available from the FEMA. Class 4 and 5 materials, referenced therein, are acceptable flood-resistant materials.

"Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one (1) foot.

"Floodway Encroachment Analysis" means an engineering analysis of the impact that a proposed encroachment into a floodway or non-encroachment area is expected to have on the floodway boundaries and flood levels during the occurrence of the base flood discharge. The evaluation shall be prepared by a qualified North Carolina licensed engineer using standard engineering methods and hydraulic models meeting the minimum requirement of the National Flood Insurance Program.

"Floor" see "Lowest Floor"

"Freeboard" means the additional amount of height added to the Base Flood Elevation (BFE) to account for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, blockage of bridge or culvert openings, storm surge or precipitation exceeding the base flood, and the hydrological effect of urbanization of the watershed. The BFE plus the freeboard establishes the "Regulatory Flood Protection Elevation".

"Functionally Dependent Facility" means a facility which cannot be used for its intended purpose unless it is located in close proximity to water, such as a docking or port facility necessary for the loading and unloading of cargo or passengers, shipbuilding, or ship repair. The term does not include long-term storage, manufacture, sales, or service facilities.

"Hazardous Waste Management Facility" means a facility for the collection, storage, processing, treatment, recycling, recovery, or disposal of hazardous waste as defined in NCGS Article 9 of Chapter 130A.

"Highest Adjacent Grade (HAG)" means the highest natural elevation of the ground surface, prior to construction immediately next to the proposed walls of the structure.

"Historic Structure" means any structure that is:

(a) listed individually in the National Register of Historic Places (a listing maintained by the US Department of Interior) or preliminarily determined by the Secretary of Interior as meeting the requirements for individual listing on the National Register;
(b) certified or preliminarily determined by the Secretary of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
(c) individually listed on a State inventory of historic places;
(d) individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified by and approved state program as determined by the Secretary of Interior, or directly by the Secretary of Interior in states without approved programs.

"Letter of Map Change (LOMC)" means an official determination issued by FEMA that amends or revises an effective Flood Insurance Rate Map or Flood Insurance Study. Letters of Map Change include:

(a) Letter of Map Amendment (LOMA): An official amendment, by letter, to an effective National Flood Insurance Program map. A LOMA is based on technical data showing that a property had been inadvertently mapped as being in the floodplain, but is actually on natural high ground above the base flood elevation. A LOMA amends the current effective Flood Insurance Rate Map and establishes that a specific property, portion of a property, or structure is not located in a special flood hazard area.
(b) Letter of Map Revision (LOMR): A revision based on technical data that may show changes to flood zones, flood elevations, special flood hazard area boundaries and floodway delineations, and other planimetric features.
(c) Letter of Map Revision Based on Fill (LOMR-F): A determination that a structure or parcel of land has been elevated by fill above the BFE and is, therefore, no longer located within the special flood hazard area. In order to qualify for this determination, the fill must have been permitted and placed in accordance with the community's floodplain management regulations.
(d) Conditional Letter of Map Revision (CLOMR): A formal review and comment as to whether a proposed project complies with the minimum NFIP requirements for such projects with respect to delineation of special flood hazard areas. A CLOMR does not revise the effective Flood Insurance Rate Map or Flood Insurance Study; upon submission and approval of certified as-built documentation, a Letter of Map Revision may be issued by FEMA to revise the effective FIRM.

"Light Duty Truck" means any motor vehicle rated at 8,500 pounds Gross Vehicular Weight Rating or less which has a vehicular curb weight of 6,000 pounds or less and which has a basic vehicle frontal area of 45 square feet or less as defined in 40 CFR 86.082-2 and is:

(a) Designed primarily for purposes of transportation of property or is a derivation of such a vehicle, or
(b) Designed primarily for transportation of persons and has a capacity of more than 12 persons; or
(c) Available with special features enabling off-street or off-highway operation and use.

"Limit of Moderate Wave Action (LiMWA)" means the boundary line given by FEMA on coastal map studies marking the extents of Coastal A Zones (CAZ).

"Lowest Adjacent Grade (LAG)" means the lowest elevation of the ground, sidewalk, or patio slab immediately next to the building, or deck support, after completion of the building.

"Lowest Floor" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access, or limited storage in an area other than a basement area is not considered a building's lowest floor, provided that such an enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.
"Manufactured Home" means a structure, transportable in one or more sections, which is built on a permanent chassis and designed to be used with or without a permanent foundation when

connected to the required utilities. The term "manufactured home" does not include a "recreational vehicle."

"Manufactured Home Park or Subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

"Map Repository" means the location of the official flood hazard data to be applied for floodplain management. It is a central location in which flood data is stored and managed; in North Carolina, FEMA has recognized that the application of digital flood hazard data products carries the same authority as hard copy products. Therefore, the NCEM's Floodplain Mapping Program websites house current and historical flood hazard data. For effective flood hazard data, the NC FRIS website (http://fris.nc.gov/fris) is the map repository, and for historical flood hazard data the FloodNC website (http://floodnc.gov/ncflood) is the map repository.

"Market Value" means the building value, excluding the land (as agreed to between a willing buyer and seller), as established by what the local real estate market will bear. Market value can be established by independent certified appraisal, replacement cost depreciated by age of building (Actual Cash Value) or adjusted assessed values.

"New Construction" means structures for which the "start of construction" commenced on or after the effective date of the original version (dated 8-21-85) of this ordinance and includes any subsequent improvements to such structures.

"Nonconforming Building or Development" means any legally existing building or development which fails to comply with the current provisions of this ordinance.

"Non-Encroachment Area" means the channel of a river or other watercourse including the area above a bridge or culvert when applicable, and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one (1) foot as designated in the Flood Insurance Study report.

"Obstruction" includes, but is not limited to, any dam, wall, wharf, embankment, levee, dike, pile, abutment, protection, excavation, channelization, bridge, conduit, culvert, building, wire, fence, rock, gravel, refuse, fill, structure, vegetation or other material in, along, across or projecting into any watercourse which may alter, impede, retard or change the direction and/or velocity of the flow of water, or due to its location, its propensity to snare or collect debris carried by the flow of water, or its likelihood of being carried downstream.

"Otherwise Protected Area (OPA)" see "Coastal Barrier Resources System (CBRS)."

"Post-FIRM" means construction or other development which started on or after the effective date of the initial Flood Insurance Rate Map for the area, August 19, 1986.

"Pre-FIRM" means construction or other development which started before the effective date of the initial Flood Insurance Rate Map for the area, August 19, 1986.

"Primary Frontal Dune (PFD)" means a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The

inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

"Principally Above Ground" means that at least 51% of the actual cash value of the structure is above ground.

"Public Safety" and/or "Nuisance" means anything which is injurious to the safety or health of an entire community or neighborhood, or any considerable number of persons, or unlawfully obstructs the free passage or use, in the customary manner, of any navigable lake, or river, bay, stream, canal, or basin.

"Recreational Vehicle (RV)" means a vehicle, which is:

(a) built on a single chassis;
(b) 400 square feet or less when measured at the largest horizontal projection;
(c) designed to be self-propelled or permanently towable by a light duty truck; and,
(d) designed primarily not for use as a permanent dwelling, but as temporary living quarters for recreational, camping, travel, or seasonal use.

"Reference Level" is the top of the lowest floor for structures within Special Flood Hazard Areas designated as Zones A, AE, AH, AO, A99. The reference level is the bottom of the lowest horizontal structural member of the lowest floor for structures within Special Flood Hazard Areas designated as Zone VE.

"Regulatory Flood Protection Elevation" means the elevation to which all structures and other development located within the Special Flood Hazard Areas must be elevated or floodproofed, if non-residential. Within areas where Base Flood Elevations (BFEs) have been determined, this elevation shall be the BFE plus two (2) feet of freeboard. In areas where no BFE has been established, all structures and other development must be elevated or floodproofed, if non-residential, to two (2) feet above the highest adjacent grade.

"Remedy a Violation" means to bring the structure or other development into compliance with State or Community floodplain management regulations, or, if this is not possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced include protecting the structure or other affected development from flood damages, implementing the enforcement provisions of the ordinance or otherwise deterring future similar violations, or reducing Federal financial exposure with regard to the structure or other development.

"Repetitive Loss" means flood-related damages sustained by a structure on two (2) separate occasions during any 10-year period for which the cost of repairs at the time of each such flood event, on the average, equals or exceeds twenty-five percent (25%) of the market value of the structure before the damage occurred.

"Riverine" means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

"Salvage Yard" means property used for the storage, collection, and/or recycling of any type of equipment whatsoever, whether industrial or noncommercial, and including but not limited to vehicles, appliances and related machinery.

"Sand Dunes" means naturally occurring accumulations of sand in ridges or mounds landward of the beach.

"Shear Wall" means walls used for structural support but not structurally joined or enclosed at the end (except by breakaway walls). Shear walls are parallel or nearly parallel to the flow of the water.

"Solid Waste Disposal Facility" means any facility involved in the disposal of solid waste, as defined in NCGS 130A-290(a)(35).

"Solid Waste Disposal Site" means, as defined in NCGS 130A-290(a)(36), any place at which solid wastes are disposed of by incineration, sanitary landfill, or any other method.

"Special Flood Hazard Area (SFHA)" means the land in the floodplain subject to a one percent (1%) or greater chance of being flooded in any given year, as determined in §16.01.003(B) of this ordinance.

"Start of Construction" includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure (including a manufactured home) on a site, such as the pouring of slabs or footings, installation of piles, construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of the building, whether or not that alteration affects the external dimensions of the building.

"Structure" means a walled and roofed building, a manufactured home, or a gas, liquid, or liquefied gas storage tank that is principally above ground.

"Substantial Damage" means damage of any origin sustained by a structure during any one year period whereby the cost of restoring the structure to it's before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. See definition of "substantial improvement".

"Substantial Improvement" means any combination of repairs, reconstruction, rehabilitation, addition, or other improvement of a structure, taking place within any two (2) year period whereby the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either:

(a) any correction of existing violations of State or Community health, sanitary, or safety code specifications which have been identified by the community code enforcement official and which are the minimum necessary to assure safe living conditions; or,

(b) any alteration of a historic structure, provided that the alteration will not preclude the structure's continued designation as a historic structure.

"Technical Bulletin" and Technical Fact Sheet" means a FEMA publication that provides guidance concerning the building performance standards of the NFIP, which are contained in Title 44 of the U.S. Code of Federal Regulations at Section 60.3. The bulletins and fact sheets are intended for use primarily by State and local officials responsible for interpreting and enforcing NFIP regulations and by members of the development community, such as design professionals and builders. New bulletins, as well as updates of existing bulletins, are issued periodically as needed. The bulletins do not create regulations; rather they provide specific guidance for complying with the minimum requirements of existing NFIP regulations.

"Temperature Controlled" means having the temperature regulated by a heating and/or cooling system, built-in or appliance.

"Variance" is a grant of relief from the requirements of this ordinance.

"Violation" means the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in §16.01.004 and §16.01.005 is presumed to be in violation until such time as that documentation is provided.

"Water Surface Elevation (WSE)" means the height, in relation to mean sea level, of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

"Watercourse" means a lake, river, creek, stream, wash, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

§ 16.01.003 GENERAL PROVISIONS.

(A) LANDS TO WHICH THIS ORDINANCE APPLIES.

This ordinance shall apply to all Special Flood Hazard Areas within the jurisdiction, including Extra-Territorial Jurisdictions (ETJs) as allowed by law, of the Town of River Bend.

(B) BASIS FOR ESTABLISHING THE SPECIAL FLOOD HAZARD AREAS.

The Special Flood Hazard Areas are those identified under the Cooperating Technical State (CTS) agreement between the State of North Carolina and FEMA in its FIS dated June 19, 2020 for Craven County and associated DFIRM panels, including any digital data developed as part of the FIS, which are adopted by reference and declared a part of this ordinance, and all revisions thereto after January 1, 2021. Future revisions to the FIS and DFIRM panels that do not change flood hazard data within the jurisdictional authority of the Town of River Bend are also adopted by reference and declared a part of this ordinance. Subsequent Letter of Map Revisions (LOMRs) and/or Physical Map Revisions (PMRs) shall be adopted within 3 months.

(C) ESTABLISHMENT OF FLOODPLAIN DEVELOPMENT PERMIT.

A Floodplain Development Permit shall be required in conformance with the provisions of this ordinance prior to the commencement of any development activities within Special Flood Hazard Areas as determined in §16.01.003(B).

(D) COMPLIANCE.

No structure or land shall hereafter be located, extended, converted, altered, or developed in any way without full compliance with the terms of this ordinance and other applicable regulations.

(E) ABROGATION AND GREATER RESTRICTIONS.

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

(F) INTERPRETATION.

In the interpretation and application of this ordinance, all provisions shall be:

(a) considered as minimum requirements;
(b) liberally construed in favor of the governing body; and,
(c) deemed neither to limit nor repeal any other powers granted under State statutes

(G) WARNING AND DISCLAIMER OF LIABILITY.

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering consideration. Larger floods can and will occur on rare occasions. Actual flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the Special Flood Hazard Areas or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of the Town of River Bend or by any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

(H) PENALTIES FOR VIOLATION.

Penalty, See § 1.01.999 General Penalty

§16.01.004 ADMINISTRATION.

(A) DESIGNATION OF FLOODPLAIN ADMINISTRATOR.

The Zoning Administrator, or his/her designee, hereinafter referred to as the “Floodplain Administrator”, is hereby appointed to administer and implement the provisions of this ordinance.

(B) FLOODPLAIN DEVELOPMENT PERMIT AND CERTIFICATION REQUIREMENTS.

(1) Plans and Application Requirements. Application for a Floodplain Development Permit shall be made to the floodplain administrator on forms furnished by him or her prior to any development activities proposed to be located within Special Flood Hazard Areas. The following items/information shall be presented to the floodplain administrator to apply for a floodplain development permit.

(a) A plot plan drawn to scale which shall include, but shall not be limited to, the following specific details of the proposed floodplain development:

(i) the nature, location, dimensions, and elevations of the area of development/disturbance; existing and proposed structures, the location of utility systems, proposed grading/pavement areas, fill materials, storage areas, drainage facilities, and other proposed development;
(ii) the boundary of the Special Flood Hazard Area as delineated on the FIRM or other flood map as determined in §16.01.003(B) or a statement that the entire lot is within the Special Flood Hazard Area;
(iii) flood zone(s) designation of the proposed development area as determined on the FIRM or other flood map as determined in §16.01.003(B);
(iv) the boundary of the floodway(s) or non-encroachment area(s) as determined in §16.01.003(B);
(v) the Base Flood Elevation (BFE) where provided as set forth in §16.01.003(B); §16.01.004(C)(11-12); or §16.01.005(D) and (B)(5);
(vi) the old and new location of any watercourse that will be altered or relocated as a result of proposed development;
(vii) the boundary and designation date of the Coastal Barrier Resource System (CBRS) area or Otherwise Protected Areas (OPA), if applicable; and
(viii) preparation of the plot plan by or under the direct supervision of a registered land surveyor or professional engineer and certified by same.

(b) Proposed elevation, and method thereof, of all development within a Special Flood Hazard Area including but not limited to:

(i) Elevation in relation to NAVD 1988 of the proposed reference level (including basement) of all structures;

(ii) Elevation in relation to NAVD 1988 to which any non-residential structure in Zones A, AE, AH, AO, A99 will be floodproofed; and
(iii) Elevation in relation to NAVD 1988 to which any proposed utility systems will be elevated or floodproofed;

(c) If floodproofing, a Floodproofing Certificate (FEMA Form 086-0-34) with supporting data, an operational plan, and an inspection and maintenance plan that include, but are not limited to, installation, exercise, and maintenance of floodproofing measures.

(d) A Foundation Plan drawn to scale which shall include details of the proposed foundation system to ensure all provisions of this ordinance are met. These details include but are not limited to:

(i) Proposed method of elevation, if applicable (i.e., fill, solid foundation perimeter wall, solid backfilled foundation, open foundation on columns/piers);
(ii) Should solid foundation perimeter walls be used in floodplains, details of sufficient openings to facilitate the unimpeded movements of floodwaters in accordance with §16.01.005(B)(4);
(iii) The following, in Coastal High Hazard Areas, in accordance with the provisions of §16.01.005(B)(4)(e) and §16.01.005(G) and (H):

(1) V-Zone Certification with accompanying plans and specifications verifying the engineered structure and any breakaway wall designs; In addition, prior to the Certificate of Compliance/Occupancy issuance, a registered professional engineer or architect shall certify the finished construction is compliant with the design, specifications and plans for VE Zone construction.;

(2) Plans for open wood latticework or insect screening, if applicable; and

(3) Plans for non-structural fill, if applicable. If non-structural fill is proposed, it must be demonstrated through coastal engineering analysis that the proposed fill would not result in any increase in the BFE or otherwise cause adverse impacts by wave ramping and deflection on to the subject structure or adjacent properties.

(e) Usage details of any enclosed space below the regulatory flood protection elevation.

(f) Plans and/or details for the protection of public utilities and facilities such as sewer, gas, electrical, and water systems to be located and constructed to minimize flood damage;

(g) Copy of all other Local, State and Federal permits required prior to floodplain development permit issuance (i.e. Wetlands, Erosion and Sedimentation Control, Riparian Buffers, Mining, etc.)

(h) If floodplain development permit is issued for placement of Recreational Vehicles and/or Temporary Structures, documentation to ensure §16.01.005(B)(6-7) of this code are met.

(i) If a watercourse is proposed to be altered and/or relocated, a description of the extent of watercourse alteration or relocation; an engineering report on the effects of the proposed project on the flood-carrying capacity of the watercourse and the effects to properties located both upstream and downstream; and a map (if not shown on plot plan) showing the location of the proposed watercourse alteration or relocation.

(2) Permit Requirements. The Floodplain Development Permit shall include, but not be limited to:

(a) A complete description of all the development to be permitted under the floodplain development permit (e.g. house, garage, pool, septic, bulkhead, cabana, pier, bridge, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials, etc.).
(b) The Special Flood Hazard Area determination for the proposed development in accordance with available data specified in §16.01.003(B).
(c) The Regulatory Flood Protection Elevation required for the reference level and all attendant utilities.
(d) The Regulatory Flood Protection Elevation required for the protection of all public utilities.
(e) All certification submittal requirements with timelines.
(f) A statement that no fill material or other development shall encroach into the floodway or non-encroachment area of any watercourse unless the requirements of §16.01.005(F) have been met.
(g) The flood openings requirements, if in Zones A, AE, AH, AO, A99.
(h) Limitations of below BFE enclosure uses. (i.e., parking, building access and limited storage only).
(i) A statement, if in Zone VE, that there shall be no alteration of sand dunes which would increase potential flood damage.
(j) A statement, if in Zone VE, that there shall be no fill used for structural support.
(k) A statement, that all materials below BFE/RFPE must be flood resistant materials.

(3) Certification Requirements.

(a) Elevation Certificates

(i) An Elevation Certificate (FEMA Form 086-0-33) is required prior to the actual start of any new construction. It shall be the duty of the permit holder to submit to the Floodplain Administrator a certification of the elevation of the reference level, in relation to NAVD 1988. The Floodplain Administrator shall review the certificate data submitted. Deficiencies detected by such review shall be corrected by the permit holder prior to the beginning of construction. Failure to submit the certification or failure to make required corrections shall be cause to deny a floodplain development permit.

(ii) A final Finished Construction Elevation Certificate (FEMA Form 086-0-33) is required after construction is completed and prior to Certificate of Compliance/Occupancy issuance. It shall be the duty of the permit holder to submit to the Floodplain Administrator a certification of final as-built construction of the elevation of the reference level and all attendant utilities. The Floodplain Administrator shall review the certificate data submitted. Deficiencies detected by such review shall be corrected by the permit holder immediately and prior to Certificate of Compliance/Occupancy issuance. In some instances, another certification may be required to certify corrected as-built construction. Failure to submit the certification or failure to make required corrections shall be cause to withhold the issuance of a Certificate of Compliance/Occupancy. The Finished Construction Elevation Certificate certifier shall provide at least 2 photographs

showing the front and rear of the building taken within 90 days from the date of certification. The photographs must be taken with views confirming the building description and diagram number provided in Section A. To the extent possible, these photographs should show the entire building including foundation. If the building has split-level or multi-level areas, provide at least 2 additional photographs showing side views of the building. In addition, when applicable, provide a photograph of the foundation showing a representative example of the flood openings or vents. All photographs must be in color and measure at least 3" × 3". Digital photographs are acceptable.

(b) Floodproofing Certificate

(i) A final Finished Construction Floodproofing Certificate (FEMA Form 086-0-34), with supporting data, an operational plan, and an inspection and maintenance plan are required prior to the issuance of a Certificate of Compliance/Occupancy. It shall be the duty of the permit holder to submit to the Floodplain Administrator a certification of the floodproofed design elevation of the reference level and all attendant utilities, in relation to NAVD 1988. Floodproofing certificate shall be prepared by or under the direct supervision of a professional engineer or architect and certified by same. The Floodplain Administrator shall review the certificate data, the operational plan, and the inspection and maintenance plan. Deficiencies detected by such review shall be corrected by the applicant prior to Certificate of Occupancy. Failure to submit the certification or failure to make required corrections shall be cause to deny a Floodplain Development Permit. Failure to construct in accordance with the certified design shall be cause to deny a Certificate of Compliance/Occupancy.

(c) If a manufactured home is placed within Zones A, AE, AH, AO, A99 and the elevation of the chassis is more than 36 inches in height above grade, an engineered foundation certification is required in accordance with the provisions of §16.01.005(B)(3)(b).

(d) If a watercourse is to be altered or relocated, a description of the extent of watercourse alteration or relocation; an engineering report on the effects of the proposed project on the flood-carrying capacity of the watercourse and the effects to properties located both upstream and downstream; and a map showing the location of the proposed watercourse alteration or relocation shall all be submitted by the permit applicant prior to issuance of a floodplain development permit.

(e) Certification Exemptions. The following structures, if located within A, AO, AE or A1-30 zones, are exempt from the elevation/floodproofing certification requirements specified in items (a) and (b) above:

(i) Recreational Vehicles meeting requirements of §16.01.005(B)(6)(a);

(ii) Temporary Structures meeting requirements of §16.01.005(B)(7); and

(iii) Accessory Structures of 150 square feet or less or $5,000 or less and meeting requirements of §16.01.003(B)(8).

(4) Determinations for existing buildings and structures.

For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, change of occupancy, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the Floodplain Administrator, in coordination with the Building Official, shall:

(a) Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work; in the case of repair, the market value of the building or structure shall be the market value before the damage occurred and before any repairs are made;

(b) Compare the cost to perform the improvement, the cost to repair a damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;

(c) Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; and

(d) Notify the applicant if it is determined that the work constitutes substantial improvement or repair of substantial damage and that compliance with the flood resistant construction requirements of the NC Building Code and this ordinance is required.

(C) DUTIES AND RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR.

Duties of the floodplain administrator shall include, but not be limited to:

(1) Review all floodplain development applications and issue permits for all proposed development with in flood prone areas to assure that the requirements of this ordinance have been satisfied.
(2) Review all proposed development within Special Flood Hazard Areas to assure that all necessary local, state and federal permits have been received, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

(3) Notify adjacent communities and the North Carolina Department of Crime Control and Public Safety, Division of Emergency Management, State Coordinator for the National Flood Insurance Program prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Emergency Management Agency.

(4) Assure that maintenance is provided within the altered or relocated portion of said watercourse so that the flood-carrying capacity is not diminished.

(5) Prevent encroachments within floodways and non-encroachment areas unless the certification and flood hazard reduction provisions of §16.01.005(E) are met.

(6) Obtain actual elevation (in relation to NAVD 1988) of the reference level (including basement) of all attendant utilities of all new or substantially improved structures, in accordance with §16.01.004(B)(3).

(7) Obtain the actual elevation (in relation to NAVD 1988) to which the new or substantially improved structures and all utilities have been floodproofed, in accordance with §16.01.004(B)(3).

(8) Obtain actual elevation (in relation to NAVD 1988) of all public utilities, in accordance with §16.01.004(B)(3).

(9) When floodproofing is utilized for a particular structure, obtain certifications from a registered professional engineer or architect in accordance with §16.01.004(B)(3) and §16.01.005(B)(2).

(10) Where interpretation is needed as to the exact location of boundaries of the Special Flood Hazard Areas (for example, where there appears to be a conflict between a mapped boundary and actual field conditions), make the necessary interpretation. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in this article.

(11) When Base Flood Elevation (BFE) data has not been provided in accordance with §16.01.003(B), obtain, review, and reasonably utilize any Base Flood Elevation (BFE) data, along with floodway data and/or non-encroachment area data available from a Federal, State, or other source, including data developed pursuant to §16.01.005(C)(4), in order to administer the provisions of this ordinance.

(12) When Base Flood Elevation (BFE) data is provided but no floodway nor non-encroachment area data has been provided in accordance with §16.01.003(B), obtain, review, and reasonably utilize any floodway data, and/or non-encroachment area data available from a Federal, State, or other source in order to administer the provisions of this ordinance.

(13) When the exact location of boundaries of the Special Flood Hazard Areas conflict with the current, natural topography information at the site, the property owner may apply and be approved for a Letter of Map Amendment (LOMA) by FEMA. A copy of the Letter of Map Amendment issued from FEMA will be maintained by the floodplain administrator in the floodplain development permit file.

(14) Permanently maintain all records that pertain to the administration of this ordinance and make these records available for public inspection.

(15) Make on-site inspections of work in progress. As the work pursuant to a floodplain development permit progresses, the floodplain administrator shall make as many inspections of the work as may be necessary to ensure that the work is being done according to the provisions of the local ordinance and the terms of the permit. In exercising this power, the floodplain administrator has a right, upon presentation of proper credentials, to enter on any premises within the jurisdiction of the community at any reasonable hour for the purposes of inspection or other enforcement action.

(16) Issue stop-work orders as required. Whenever a building or part thereof is being constructed, reconstructed, altered, or repaired in violation of this ordinance, the floodplain administrator may order the work to be immediately stopped. The stop-work order shall be in writing and directed to the person doing the work. The stop-work order shall state the specific work to be stopped, the specific reason(s) for the stoppage, and the condition(s) under which the work may be resumed. Violation of a stop-work order will subject the offender to penalties as described in § 1.01.999 General penalty.

(17) Revocation of floodplain development permits as required. The floodplain administrator may revoke and require the return of the floodplain development permit by notifying the permit holder in writing stating the reason(s) for the revocation. Permits shall be revoked for any substantial departure from the approved application, plans, or specifications; for refusal or failure to comply with the requirements of State or local laws; or for false statements or misrepresentations made in securing the permit. Any floodplain development permit mistakenly issued in violation of an applicable State or local law may also be revoked.

(18) Make periodic inspections throughout all special flood hazard areas within the jurisdiction of the community. The floodplain administrator and each member of his or her inspections department shall have a right, upon presentation of proper credentials, to enter on any premises within the territorial jurisdiction of the department at any reasonable hour for the purposes of inspection or other enforcement action.

(19) Follow through with corrective procedures of §16.01.004(D).

(20) Review, provide input, and make recommendations for variance requests.

(21) Maintain a current map repository to include, but not limited to, historical and effective FIS Report, historical and effective FIRM and other official flood maps and studies adopted in accordance with the provisions of §16.01.003(B) of this ordinance, including any revisions thereto including Letters of Map Change, issued by FEMA. Notify State and FEMA of mapping needs.

(22) Coordinate revisions to FIS reports and FIRMs, including Letters of Map Revision Based on Fill (LOMR-Fs) and Letters of Map Revision (LOMRs).

(D) CORRECTIVE PROCEDURES.

(1) Violations to be Corrected: When the floodplain administrator finds violations of applicable State and local laws, it shall be his or her duty to notify the owner or occupant of the building of the violation. The owner or occupant shall immediately remedy each of the violations of law pertaining to their property.

(2) Actions in Event of Failure to Take Corrective Action: If the owner of a building or property shall fail to take prompt corrective action, the floodplain administrator shall give the owner written notice, by certified or registered mail to the owner's last known address or by personal service, stating:

(a) that the building or property is in violation of the Flood Damage Prevention Ordinance;
(b) that a hearing will be held before the floodplain administrator at a designated place and time, not later than ten (10) days after the date of the notice, at which time the owner shall be entitled to be heard in person or by counsel and to present arguments and evidence pertaining to the matter; and,
(c) that following the hearing, the floodplain administrator may issue such order to alter, vacate, or demolish the building; or to remove fill as appears appropriate.

(3) Order to Take Corrective Action: If, upon a hearing held pursuant to the notice prescribed above, the floodplain administrator shall find that the building or development is in violation of the Flood Damage Prevention Ordinance, he or she shall make an order in writing to the owner, requiring the owner to remedy the violation within a specified time period, not less than sixty (60) days, nor more than one hundred eighty (180) days. Where the floodplain administrator finds that there is imminent danger to life or other property, he may order that corrective action be taken in such lesser period as may be feasible.

(4) Appeal: Any owner who has received an order to take corrective action may appeal the order to the local elected governing body by giving notice of appeal in writing to the floodplain administrator and the clerk within ten (10) days following issuance of the final order. In the absence of an appeal, the order of the floodplain administrator shall be final. The local governing body shall hear an appeal within a reasonable time and may affirm, modify and affirm, or revoke the order.

(5) Failure to Comply with Order: If the owner of a building or property fails to comply with an order to take corrective action for which no appeal has been made or fails to comply with an order of the governing body following an appeal, the owner shall be subject to penalties as described in § 1.01.999 General penalty.

(E) VARIANCE PROCEDURES.

(1) The Board of Adjustment as established by the Town of River Bend, hereinafter referred to as the “appeal board”, shall hear and decide requests for variances from the requirements of this ordinance.

(2) Any person aggrieved by the decision of the appeal board may appeal such decision to the Court, as provided in Chapter 7A of the North Carolina General Statutes.

(3) Variances may be issued for:

(a) The repair or rehabilitation of historic structures upon the determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.
(b) Functionally dependent facilities if determined to meet the definition as stated in §16.01.002 of this ordinance, provided provisions of §16.01.004(E)(9)(b), (c), and (e) have been satisfied, and such facilities are protected by methods that minimize flood damages during the base flood and create no additional threats to public safety; or
(c) Any other type of development provided is meets the requirements of this Section.

(4) In passing upon variances, the appeal board shall consider all technical evaluations, all relevant factors, all standards specified in other sections of this ordinance, and:

(a) the danger that materials may be swept onto other lands to the injury of others;
(b) the danger to life and property due to flooding or erosion damage;
(c) the susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
(d) the importance of the services provided by the proposed facility to the community;
(e) the necessity to the facility of a waterfront location, where applicable;
(f) the availability of alternative locations, not subject to flooding or erosion damage, for the proposed use;
(g) the compatibility of the proposed use with existing and anticipated development;
(h) the relationship of the proposed use to the comprehensive plan and floodplain management program for that area;
(i) the safety of access to the property in times of flood for ordinary and emergency vehicles;
(j) the expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,
(k) the costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, and streets and bridges.

(5) A written report addressing each of the above factors shall be submitted with the application for a variance.

(6) Upon consideration of the factors listed above and the purposes of this ordinance, the appeal board may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.

(7) Variances shall not be issued within any designated floodway or non-encroachment area if any increase in flood levels during the base flood discharge would result.

(8) Conditions for Variances:

(a) Variances may not be issued when the variance will make the structure in violation of other Federal, State, or local laws, regulations, or ordinances.
(b) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
(c) Variances shall only be issued upon:

(i) a showing of good and sufficient cause;
(ii) a determination that failure to grant the variance would result in exceptional hardship; and
(iii) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense, create nuisance, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.

(d) Any applicant to whom a variance is granted shall be given written notice specifying the difference between the Base Flood Elevation (BFE) and the elevation to which the structure is to be built and a written statement that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced reference level elevation. Such notification shall be maintained with a record of all variance actions.
(e) The floodplain administrator shall maintain the records of all appeal actions and report any variances to the Federal Emergency Management Agency and the State of North Carolina upon request.
(f) Variances shall only be issued prior to development permit approval.

(9) A variance may be issued for solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities that are located in Special Flood Hazard Areas provided that all of the following conditions are met. A Floodplain Development permit may be issued for such development only if a variance is granted.

(a) The use serves a critical need in the community.
(b) No feasible location exists for the use outside the Special Flood Hazard Area.
(c) The reference level of any structure is elevated or floodproofed to at least the regulatory flood protection level.
(d) The use complies with all other applicable federal, state and local laws.
(e) The Town of River Bend has notified the Secretary of the North Carolina Department of Crime Control and Public Safety of its intention to grant a variance at least thirty (30) days prior to granting the variance.

§16.01.005 PROVISIONS FOR FLOOD HAZARD REDUCTION.

(A) GENERAL STANDARDS.

In all Special Flood Hazard Areas the following provisions are required:

(1) All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.

(2) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage in accordance with the FEMA Technical Bulletin 2, Flood Damage-Resistant Materials Requirements.

(3) All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages.

(4) Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding. These include but are not limited to HVAC equipment, water softener units, bath/kitchen fixtures, ductwork, electric meter panels/boxes, utility/cable boxes, appliances (i.e., washers, dryers, refrigerator, etc.), hot water heaters, electric outlets/switches.

(a) Replacements part of a substantial improvement, electrical, heating, ventilation,

plumbing, air conditioning equipment, and other service equipment shall also meet the above provisions.

(b) Replacements that are for maintenance and not part of a substantial improvement, may be installed at the original location provided the addition and/or improvements only comply with the standards for new construction consistent with the code and requirements for the original structure.

(5) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.

(6) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters.

(7) On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding.

(8) Any alteration, repair, reconstruction, or improvements to a structure which is in compliance with the provisions of this ordinance, shall meet the requirements of “new construction” as contained in this ordinance.

(9) Non-conforming structures or other development may not be enlarged, replaced, or rebuilt unless such enlargement or reconstruction is accomplished in conformance with the provisions of this ordinance. Provided, however, nothing in this ordinance shall prevent the repair, reconstruction, or replacement of a building or structure existing on the effective date of this ordinance and located totally or partially within the floodway, non-encroachment area, or stream setback, provided that the bulk of the building or structure below the regulatory flood protection elevation in the floodway, non-encroachment area, or stream setback is not increased and provided that such repair, reconstruction, or replacement meets all of the other requirements of this ordinance.

(10) New solid waste disposal facilities, hazardous waste management facilities, salvage yards, and chemical storage facilities shall not be permitted in Special Flood Hazard Areas. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in a Special Flood Hazard Area only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified according to §16.01.004(B)(3) of this code.

(11) All subdivision proposals and other development proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

(12) All subdivision proposals and other development proposals shall have adequate drainage provided to reduce exposure to flood hazards.

(13) All subdivision proposals and other development proposals shall have received all necessary permits from those governmental agencies for which approval is required by federal or

state law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

(14) When a structure is partially located in a Special Flood Hazard Area, the entire structure shall meet the requirements for new construction and substantial improvements.

(15) When a structure is located in multiple flood hazard zones or in a flood hazard risk zone with multiple base flood elevations, the provisions for the more restrictive flood hazard risk zone and the highest BFE shall apply.

(B) SPECIFIC STANDARDS.

In all Special Flood Hazard Areas where Base Flood Elevation (BFE) data has been provided, as set forth in §16.01.003(B), or §16.01.004(C)(11 & 12), the following provisions are required:

(1) Residential Construction. New construction or substantial improvement of any residential structure (including manufactured homes) shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation.

(2) Non-Residential Construction. New construction or substantial improvement of any commercial, industrial, or other non-residential structure shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation. Structures located in A, AE, AH, AO, and A99 Zones may be floodproofed to the regulatory flood protection elevation in lieu of elevation provided that all areas of the structure below the required flood protection elevation are watertight with walls substantially impermeable to the passage of water, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the official as set forth in §16.01.004(B)(3).

(3) Manufactured Homes.
(a) New or replacement manufactured homes shall be elevated so that the reference level of the manufactured home is no lower than the regulatory flood protection elevation.
(b) Manufactured homes shall be securely anchored to an adequately anchored foundation to resist flotation, collapse, and lateral movement in accordance with the State of North Carolina Regulations for Manufactured/Mobile Homes, 1995 Edition, and any revision thereto adopted by the Commissioner of Insurance pursuant to NCGS ξ143-143.15 or a certified engineered foundation. Additionally, when the elevation would be met by an elevation of the chassis thirty-six (36) inches or less above the grade at the site, the chassis shall be supported by reinforced piers or other foundation elements of at least equivalent strength. When the elevation of the chassis is above thirty-six (36) inches in height, an engineering certification is required.
(c) All foundation enclosures or skirting shall be in accordance with §16.01.005(B)(4).
(d) An evacuation plan must be developed for evacuation of all residents of all new, substantially improved or substantially damaged manufactured home parks or subdivisions located within flood prone areas. This plan shall be filed with and approved by the floodplain administrator and the local Emergency Management coordinator.

(4) Elevated Buildings. Fully enclosed area, of new construction and substantially improved structures, which is below the lowest floor or below the lowest horizontal structural member in VE zones:

(a) Shall not be designed or used for human habitation, but shall only be used for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises. Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment (standard exterior door), or entry to the living area (stairway or elevator). The interior portion of such enclosed area shall not be finished or partitioned into separate rooms, except to enclose storage areas;
(b) Shall be constructed entirely of flood resistant materials at least to the Regulatory Flood Protection Elevation; and
(c) Shall include, in Zones A, AE, AH, AO, A99 flood openings to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. To meet this requirement, the openings must either be certified by a professional engineer or architect or meet or exceed the following minimum design criteria:

(i) A minimum of two flood openings on different sides of each enclosed area subject to flooding;
(ii) The total net area of all flood openings must be at least one (1) square inch for each square foot of enclosed area subject to flooding;
(iii) If a building has more than one enclosed area, each enclosed area must have flood openings to allow floodwaters to automatically enter and exit;
(iv) The bottom of all required flood openings shall be no higher than one (1) foot above the higher of the interior or exterior adjacent grade;
(v) Flood openings may be equipped with screens, louvers, or other coverings or devices, provided they permit the automatic flow of floodwaters in both directions; and
(vi) Enclosures made of flexible skirting are not considered enclosures for regulatory purposes, and, therefore, do not require flood openings. Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires flood openings as outlined above.

(d) Shall, in Coastal High Hazard Areas (Zone VE), meet the requirements of §16.01.005(G).

(5) Additions/Improvements.

(a) Additions and/or improvements to pre-FIRM structures when the addition and/or improvements in combination with any interior modifications to the existing structure are:

(i) Not a substantial improvement, the addition and/or improvements must be designed to minimize flood damages and must not be any more non-conforming than the existing structure.

(ii) A substantial improvement, with modifications/rehabilitations/improvements to the existing structure or the common wall is structurally modified more than installing a

doorway, both the existing structure and the addition must comply with the standards for new construction.

(b) Additions to pre-FIRM or post-FIRM structures that are a substantial improvement with no modifications/rehabilitations/improvements to the existing structure other than a standard door in the common wall, shall require only the addition to comply with the standards for new construction.

(c) Additions and/or improvements to post-FIRM structures when the addition and/or improvements in combination with any interior modifications to the existing structure are:

(i) Not a substantial improvement, the addition and/or improvements only must comply with the standards for new construction consistent with the code and requirements for the original structure.

(ii) A substantial improvement, both the existing structure and the addition and/or improvements must comply with the standards for new construction.

(d) Any combination of repair, reconstruction, rehabilitation, addition or improvement of a building or structure taking place during a one (1) year period, the cumulative cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started must comply with the standards for new construction. For each building or structure, the one (1) year period begins on the date of the first improvement or repair of that building or structure subsequent to the effective date of this ordinance. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The requirement does not, however, include either:

(i) Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to assume safe living conditions.

(ii) Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.

(6) Recreational Vehicles. Recreational vehicles shall either:

(a) Temporary Placement

(i) Be on site for fewer than 180 consecutive days; or

(ii) Be fully licensed and ready for highway use. (A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities, and has no permanently attached additions.)

(b) Permanent Placement. Recreational vehicles that do not meet the limitations of Temporary Placement shall meet all the requirements for new construction.

(7) Temporary Non-Residential Structures. Prior to the issuance of a floodplain development permit for a temporary structure, the following requirements must be met:

(a) Applicants must submit to the floodplain administrator a plan for the removal of such structure(s) in the event of a hurricane or flash flood warning notification. The plan must include the following information:

(i) a specified time period for which the temporary use will be permitted;

(ii) the name, address, and phone number of the individual responsible for the removal of the temporary structure;

(iii) the time frame prior to the event at which a structure will be removed (i.e. minimum of 72 hours before landfall of a hurricane or immediately upon flood warning notification);

(iv) a copy of the contract or other suitable instrument with a trucking company to insure the availability of removal equipment when needed; and

(v) designation, accompanied by documentation, of a location outside the Special Flood Hazard Area to which the temporary structure will be moved.

(b) The above information shall be submitted in writing to the floodplain administrator for review and written approval.

(8) Accessory Structures. When accessory structures (sheds, detached garages, etc.) are to be placed within a Special Flood Hazard Area, the following criteria shall be met:

(a) Accessory structures shall not be used for human habitation (including working, sleeping, living, cooking or restroom areas);
(b) Accessory structures shall not be temperature-controlled;
(c) Accessory structures shall be designed to have low flood damage potential;
(d) Accessory structures shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters;
(e) Accessory structures shall be firmly anchored in accordance with the provisions of §16.01.005(A)(1);
(f) Accessory structures, regardless of the size or cost, shall not be placed below elevated buildings in V and VE Zones;
(g) All service facilities such as electrical shall be installed in accordance with the provisions of §16.01.005(A)(4); and
(h) Flood openings to facilitate automatic equalization of hydrostatic flood forces shall be provided below Regulatory Flood Protection Elevation in conformance with the provisions of §16.01.005(B)(4)(d).

An accessory structure with a footprint less than 150 square feet or that is a minimal investment of $5,000 or less and satisfies the criteria outlined above is not required to meet the elevation or floodproofing standards of §16.01.005(B)(2). Elevation or floodproofing certifications are required for all other accessory structures in accordance with §16.01.004(B)(3).

(9) Tanks. When gas and liquid storage tanks are to be placed within a Special Flood Hazard Area, the following criteria shall be met:

(a) Underground tanks. Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty;

(b) Above-ground tanks, elevated. Above-ground tanks in flood hazard areas shall be elevated to or above the Regulatory Flood Protection Elevation on a supporting structure that is designed to prevent flotation, collapse or lateral movement during conditions of the design flood. Tank-supporting structures shall meet the foundation requirements of the applicable flood hazard area;

(c) Above-ground tanks, not elevated. Above-ground tanks that do not meet the elevation requirements of §16.01.005(B)(2) of this ordinance shall not be permitted in V or VE Zones. Tanks may be permitted in other flood hazard areas provided the tanks are designed, constructed, installed, and anchored to resist all flood-related and other loads, including the effects of buoyancy, during conditions of the design flood and without release of contents in the floodwaters or infiltration by floodwaters into the tanks. Tanks shall be designed, constructed, installed, and anchored to resist the potential buoyant and other flood forces acting on an empty tank during design flood conditions.

(d) Tank inlets and vents. Tank inlets, fill openings, outlets and vents shall be:

(i) At or above the Regulatory Flood Protection Elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood; and

(ii) Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

(10) Other Development.

(a) Fences in regulated floodways and NEAs that have the potential to block the passage of floodwaters, such as stockade fences and wire mesh fences, shall meet the limitations of §16.01.005(F) of this ordinance.

(b) Retaining walls, sidewalks and driveways in regulated floodways and NEAs. Retaining walls and sidewalks and driveways that involve the placement of fill in regulated floodways shall meet the limitations of §16.01.005(F) of this ordinance.

(c) Roads and watercourse crossings in regulated floodways and NEAs. Roads and watercourse crossings, including roads, bridges, culverts, low-water crossings and similar means for vehicles or pedestrians to travel from one side of a watercourse to the other side, that encroach into regulated floodways shall meet the limitations of §16.01.005(F) of this ordinance.

(d) Commercial storage facilities are not considered “limited storage” as noted in this ordinance, and shall protected to the Regulatory Flood Protection Elevation as required for commercial structures.

(C) RESERVED.

(D) STANDARDS FOR FLOODPLAINS WITHOUT ESTABLISHED BASE FLOOD ELEVATIONS.

Within the Special Flood Hazard Areas designated as Approximate Zone A and established in §16.01.003(B), where no BFE data has been provided by FEMA, the following provisions, in addition to the provisions of §16.01.005(A), shall apply:

(1) No encroachments, including fill, new construction, substantial improvements or new development shall be permitted within a distance of twenty (20) feet each side from top of bank or five times the width of the stream, whichever is greater, unless certification with supporting technical data by a registered professional engineer is provided demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

(2) The BFE used in determining the Regulatory Flood Protection Elevation shall be determined based on the following criteria:

(a) When BFE data is available from other sources, all new construction and substantial improvements within such areas shall also comply with all applicable provisions of this ordinance and shall be elevated or floodproofed in accordance with standards in §16.01.005(A) and (B).

(b) When floodway or non-encroachment data is available from a Federal, State, or other source, all new construction and substantial improvements within floodway and non-encroachment areas shall also comply with the requirements of §16.01.005(B) and (F).

(c) All subdivision, manufactured home park and other development proposals shall provide BFE data if development is greater than five (5) acres or has more than fifty (50) lots/manufactured home sites. Such BFE data shall be adopted by reference in accordance with §16.01.003(B) and utilized in implementing this ordinance.

(d) When BFE data is not available from a Federal, State, or other source as outlined above, the reference level shall be elevated or floodproofed (nonresidential) to or above the Regulatory Flood Protection Elevation, as defined in §16.01.002. All other applicable provisions of §16.01.005(B) shall also apply.

(E) STANDARDS FOR RIVERINE FLOODPLAINS WITH BASE FLOOD ELEVATIONS BUT WITHOUT ESTABLISHED FLOODWAYS OR NON-ENCROACHMENT AREAS.

Along rivers and streams where BFE data is provided by FEMA or is available from another source but neither floodway nor non-encroachment areas are identified for a Special Flood Hazard Area on

the FIRM or in the FIS report, the following requirements shall apply to all development within such areas:

(1) Standards of §16.01.005(A) and (B); and

(2) Until a regulatory floodway or non-encroachment area is designated, no encroachments, including fill, new construction, substantial improvements, or other development, shall be permitted unless certification with supporting technical data by a registered professional engineer is provided demonstrating that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one (1) foot at any point.

(F) FLOODWAYS AND NON-ENCROACHMENT AREAS.

Areas designated as floodways or non-encroachment areas are located within the Special Flood Hazard Areas established in §16.01.003(B). The floodways and non-encroachment areas are extremely hazardous areas due to the velocity of floodwaters that have erosion potential and carry debris and potential projectiles. The following provisions, in addition to standards outlined in §16.01.005(A) and (B), shall apply to all development within such areas:

(1) No encroachments, including fill, new construction, substantial improvements and other developments shall be permitted unless:

(a) It is demonstrated that the proposed encroachment would not result in any increase in the flood levels during the occurrence of the base flood discharge, based on hydrologic and hydraulic analyses performed in accordance with standard engineering practice and presented to the Floodplain Administrator prior to issuance of floodplain development permit; or
(b) A Conditional Letter of Map Revision (CLOMR) has been approved by FEMA. A Letter of Map Revision (LOMR) must also be obtained within six months of completion of the proposed encroachment.

(2) If §16.01.005(F)(1) is satisfied, all development shall comply with all applicable flood hazard reduction provisions of this ordinance.

(3) Manufactured homes may be permitted provided the following provisions are met:

(a) The anchoring and the elevation standards of §16.01.005(B)(3); and

(b) The encroachment standards of §16.01.005(F)(1).

(G) COASTAL HIGH HAZARD AREA (ZONE VE).

Coastal High Hazard Areas are Special Flood Hazard Areas established in §16.01.003(B), and designated as Zones VE. These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, all new construction and substantial

improvements shall meet the following provisions in addition to the provisions of §16.01.003(5)(A) and (B):

(1) All new construction and substantial improvements shall:

(a) Be located landward of the reach of mean high tide;
(b) Comply with all applicable CAMA setback requirements.

(2) All new construction and substantial improvements shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) is no lower than the regulatory flood protection elevation. Floodproofing shall not be utilized on any structures in Coastal High Hazard Areas to satisfy the regulatory flood protection elevation requirements.

(3) All new construction and substantial improvements shall have the space below the bottom of the lowest horizontal structural member of the lowest floor either be free of obstruction or constructed with breakaway walls, open wood latticework or insect screening, provided they are not part of the structural support of the building and are designed so as to breakaway, under abnormally high tides or wave action without causing damage to the elevated portion of the building or supporting foundation system or otherwise jeopardizing the structural integrity of the building. The following design specifications shall be met:

(a) Material shall consist of open wood or plastic lattice having at least 40 percent of its area open, or
(b) Insect screening; or
(c) Breakaway walls shall meet the following design specifications:

(1) Design safe loading resistance shall be not less than 10 nor more than 20 pounds per square foot; or

(2) Breakaway walls that exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by State or local codes) shall be certified by a registered professional engineer or architect that the breakaway wall will collapse from a water load less than that which would occur during the base flood event, and the elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and non-structural). The water loading values used shall be those associated with the base flood. The wind loading values used shall be those required by the North Carolina State Building Code.

(4) All new construction and substantial improvements shall be securely anchored to pile or column foundations. All pilings and columns and the structure attached thereto shall be anchored to resist flotation, collapse, and lateral movement due to the effect of wind and water loads acting simultaneously on all building components.

(a) Water loading values used shall be those associated with the base flood.

(b) Wind loading values used shall be those required by the current edition of the North Carolina State Building Code.

(5) For concrete pads, including patios, decks, parking pads, walkways, driveways, pool decks, etc. the following is required:

(a) Shall be structurally independent of the primary structural foundation system of the structure and shall not adversely affect structures through redirection of floodwaters or debris; and
(b) Shall be constructed to breakaway cleanly during design flood conditions, shall be frangible, and shall not produce debris capable of causing damage to any structure. (The installation of concrete in small segments (approximately 4 feet x 4 feet) that will easily break up during the base flood event, or score concrete in 4 feet x 4 feet maximum segments is acceptable to meet this standard); and
(c) Reinforcing, including welded wire fabric, shall not be used in order to minimize the potential for concreted pads being a source of debris; and
(d) Pad thickness shall not exceed 4 inches; or
(e) Provide a Design Professional's certification stating the design and method of construction to be used meet the applicable criteria of this section.

(6) For swimming pools and spas, the following is required:

(a) Be designed to withstand all flood-related loads and load combinations.
(b) Be elevated so that the lowest horizontal structural member is elevated above the RFPE; or
(c) Be designed and constructed to break away during design flood conditions without producing debris capable of causing damage to any structure; or
(d) Be sited to remain in the ground during design flood conditions without obstructing flow that results in damage to any structure.
(e) Registered design professionals must certify to local officials that a pool or spa beneath or near a VE Zone building will not be subject to flotation or displacement that will damage building foundations or elevated portions of the building or any nearby buildings during a coastal flood.
(f) Pool equipment shall be located above the RFPE whenever practicable. Pool equipment shall not be located beneath an elevated structure.

(7) All elevators, vertical platform lifts, chair lifts, etc., the following is required:

(a) Elevator enclosures must be designed to resist hydrodynamic and hydrostatic forces as well as erosion, scour, and waves.
(b) Utility equipment in Coastal High Hazard Areas (VE Zones) must not be mounted on, pass through, or be located along breakaway walls.
(c) The cab, machine/equipment room, hydraulic pump, hydraulic reservoir, counter weight and roller guides, hoist cable, limit switches, electric hoist motor, electrical junction box, circuit panel, and electrical control panel are all required to be above RFPE. When this equipment cannot be located above the RFPE, it must be constructed using flood damage-resistant components.
(d) Elevator shafts/enclosures that extend below the RFPE shall be constructed of reinforced masonry block or reinforced concrete walls and located on the landward side of the

building to provide increased protection from flood damage. Drainage must be provided for the elevator pit.

(e) Flood damage-resistant materials can also be used inside and outside the elevator cab to reduce flood damage. Use only stainless steel doors and door frames below the BFE. Grouting in of door frames and sills is recommended.

(f) If an elevator is designed to provide access to areas below the BFE, it shall be equipped with a float switch system that will activate during a flood and send the elevator cab to a floor above the RFPE.

(8) Accessory structures, regardless of size or cost, shall not be permitted below elevated structures.

(9) Fill/Grading

(a) Minor grading and the placement of minor quantities of nonstructural fill may be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

(b) The fill material must be similar and consistent with the natural soils in the area.

(c) The placement of site-compatible, non-structural fill under or around an elevated building is limited to two (2) feet. Fill greater than two (2) feet must include an analysis prepared by a qualified registered design professional demonstrating no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent elevated buildings and structures.

(d) Nonstructural fill with finished slopes that are steeper than five (5) units horizontal to one (1) unit vertical shall be permitted only if an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent elevated buildings and structures.

(10) There shall be no alteration of sand dunes or mangrove stands which would increase potential flood damage.

(11) No manufactured homes shall be permitted except in an existing manufactured home park or subdivision. A replacement manufactured home may be placed on a lot in an existing manufactured home park or subdivision provided the anchoring and elevation standards of this Section have been satisfied.

(12) Recreational vehicles may be permitted in Coastal High Hazard Areas provided that they meet the Recreational Vehicle criteria of §16.01.005(B)(6)(a).

(13) A deck that is structurally attached to a building or structure shall have the bottom of the lowest horizontal structural member at or above the Regulatory Flood Protection Elevation and any supporting members that extend below the Regulatory Flood Protection Elevation shall comply with the foundation requirements that apply to the building or structure, which shall be designed to accommodate any increased loads resulting from the attached deck. The increased loads must be considered in the design of the primary structure and included in the V-Zone Certification required under §16.01.004(B)(3)(f).

(14) A deck or patio that is located below the Regulatory Flood Protection Elevation shall be structurally independent from buildings or structures and their foundation systems, and shall be designed and constructed either to remain intact and in place during design flood conditions or to break apart into small pieces to minimize debris during flooding that is capable of causing structural damage to the building or structure or to adjacent buildings and structures.

(15) In coastal high hazard areas, development activities other than buildings and structures shall be permitted only if also authorized by the appropriate state or local authority; if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent buildings and structures. Such other development activities include but are not limited to:

(a) Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures;
(b) Solid fences and privacy walls, and fences prone to trapping debris, unless designed and constructed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters.
(c) Docks, piers, and similar structures.

(16) No more than four (4) electrical outlets and no more than four (4) electrical switches may be permitted below RFPE unless required by building code.

(H) STANDARDS FOR COASTAL A ZONES (ZONE CAZ) LiMWA

Structures in CAZs shall be designed and constructed to meet V Zone requirements, including requirements for breakaway walls. However, the NFIP regulations also require flood openings in walls surrounding enclosures below elevated buildings in CAZs (see Technical Bulletin 1, Openings in Foundation Walls and Walls of Enclosures). Breakaway walls used in CAZs must have flood openings that allow for the automatic entry and exit of floodwaters to minimize damage caused by hydrostatic loads. Openings also function during smaller storms or if anticipated wave loading does not occur with the base flood.

(1) All new construction and substantial improvements shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) is no lower than the regulatory flood protection elevation. Floodproofing shall not be utilized on any structures in Coastal A Zones to satisfy the regulatory flood protection elevation requirements.

(2) All new construction and substantial improvements shall have the space below the bottom of the lowest horizontal structural member of the lowest floor either be free of obstruction or constructed with breakaway walls, open wood latticework or insect screening, provided they are not part of the structural support of the building and are designed so as to breakaway, under abnormally high tides or wave action without causing damage to the elevated portion of the building or supporting foundation system or otherwise jeopardizing the structural integrity of the building. The following design specifications shall be met:

(a) Material shall consist of open wood or plastic lattice having at least 40 percent of its area open, or
(b) Insect screening; or
(c) Breakaway walls shall meet the following design specifications:

(1) Breakaway walls shall have flood openings to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. To meet this requirement, the openings must either be certified by a professional engineer or architect or meet or exceed the design criteria in §16.01.005(B)(4)(d); and
(2) Design safe loading resistance shall be not less than 10 nor more than 20 pounds per square foot; or
Breakaway walls that exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by State or local codes) shall be certified by a registered professional engineer or architect that the breakaway wall will collapse from a water load less than that which would occur during the base flood event, and the elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and non-structural). The water loading values used shall be those associated with the base flood. The wind loading values used shall be those required by the North Carolina State Building Code.

(3) Concrete pads, including patios, decks, parking pads, walkways, driveways, etc. must meet the provisions of §16.01.005(G)(5).

(4) All new construction and substantial improvements shall meet the provisions of §16.01.005(G)(3).

(5) A registered professional engineer or architect shall certify that the design, specifications and plans for construction are in compliance with the provisions of §16.01.004(B) and §16.01.005(G)(3) and (4), on the current version of the North Carolina V-Zone Certification form or a locally developed V-Zone Certification form.

(6) Recreational vehicles may be permitted in Coastal A Zones provided that they meet the Recreational Vehicle criteria of §16.01.005(B)(6)(a).

(7) Fill/Grading must meet the provisions of §16.01.005(G)(9).

(8) Decks and patios must meet the provisions of §16.01.005(G)(15) and (16).

(9) In coastal high hazard areas, development activities other than buildings and structures must meet the provisions of §16.01.005(G)(17).

(I) STANDARDS FOR AREAS OF SHALLOW FLOODING (ZONE AO).

Located within the Special Flood Hazard Areas established in §16.01.003(B), are areas designated as shallow flooding areas. These areas have special flood hazards associated with base flood depths of

one (1) to three (3) feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and indeterminate. In addition to §16.01.005(A) and (B), all new construction and substantial improvements shall meet the following requirements:

(1) The reference level shall be elevated at least as high as the depth number specified on the Flood Insurance Rate Map (FIRM), in feet, plus a freeboard of 2 feet, above the highest adjacent grade; or at least 2 feet above the highest adjacent grade if no depth number is specified.

(2) Non-residential structures may, in lieu of elevation, be floodproofed to the same level as required in §16.01.005(I)(1) so that the structure, together with attendant utility and sanitary facilities, below that level shall be watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. Certification is required in accordance with §16.01.004(B)(3) and §16.01.005(B)(2).

(3) Adequate drainage paths shall be provided around structures on slopes, to guide floodwaters around and away from proposed structures.

(J) STANDARDS FOR AREAS OF SHALLOW FLOODING (ZONE AH).

Located within the Special Flood Hazard Areas established in §16.01.003(B), are areas designated as shallow flooding areas. These areas are subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are one (1) to three (3) feet. Base Flood Elevations are derived from detailed hydraulic analyses are shown in this zone. In addition to §16.01.005(A) and (B), all new construction and substantial improvements shall meet the following requirements:

(1) Adequate drainage paths shall be provided around structures on slopes, to guide floodwaters around and away from proposed structures.

§16.01.006 LEGAL STATUS PROVISIONS.

(A) EFFECT ON RIGHTS AND LIABILITIES UNDER THE EXISTING FLOOD DAMAGE PREVENTION ORDINANCE.

This ordinance in part comes forward by re-enactment of some of the provisions of the flood damage prevention ordinance enacted August 21, 1985 as amended, and it is not the intention to repeal but rather to re-enact and continue to enforce without interruption of such existing provisions, so that all rights and liabilities that have accrued thereunder are reserved and may be enforced. The enactment of this ordinance shall not affect any action, suit or proceeding instituted or pending. All provisions of the flood damage prevention ordinance of the Town of River Bend enacted on August 21, 1985, as amended, which are not reenacted herein are repealed.

(B) EFFECT UPON OUTSTANDING BUILDING PERMITS.

Nothing herein contained shall require any change in the plans, construction, size or designated use of any development or any part thereof for which a floodplain development permit has been granted by the floodplain administrator or his authorized agents before the time of passage of this ordinance; provided, however, that when construction is not begun under such outstanding permit within a period of six (6) months subsequent to passage of this ordinance or any revision thereto, construction or use shall be in conformity with the provisions of this ordinance.

(C) EFFECTIVE DATE.

This ordinance shall become effective upon adoption.

(D) ADOPTION CERTIFICATION.

I hereby certify that this is a true and correct copy of the flood damage prevention ordinance as adopted by the Town Council of the Town of River Bend, North Carolina, on the 18th day of June, 2020.

APPENDIX G-2

USDA CUSTOM SOIL REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Craven County, North Carolina

Potential River Bend WTP Site

January 12, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,210 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Craven County, North Carolina
Survey Area Data: Version 27, Sep 13, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 9, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GoA	Goldsboro loamy fine sand, 0 to 2 percent slopes	3.9	86.5%
On	Onslow loamy sand	0.6	13.5%
Totals for Area of Interest		**4.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Craven County, North Carolina

GoA—Goldsboro loamy fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 3wfs
Elevation: 20 to 330 feet
Mean annual precipitation: 38 to 55 inches
Mean annual air temperature: 59 to 70 degrees F
Frost-free period: 200 to 280 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Goldsboro and similar soils: 90 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Goldsboro

Setting

Landform: Broad interstream divides on marine terraces, flats on marine terraces
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy marine deposits

Typical profile

Ap - 0 to 10 inches: loamy fine sand
BE - 10 to 13 inches: fine sandy loam
Bt - 13 to 72 inches: sandy clay loam
Cg - 72 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F153BY040NC - Moist Loamy Rises and Flats, F153AY040NC - Moist Loamy Rises and Flats
Hydric soil rating: No

Minor Components

Rains, undrained

Percent of map unit: 5 percent

Landform: Broad interstream divides on marine terraces, carolina bays on marine terraces, flats on marine terraces
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F153AY060NC - Wet Loamy Flats and Depressions, F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

Muckalee, undrained

Percent of map unit: 1 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F153BY090NC - Flooded Mineral Soil Floodplains and Terraces, F153AY090NC - Flooded Mineral Soil Floodplains and Terraces
Hydric soil rating: Yes

On—Onslow loamy sand

Map Unit Setting

National map unit symbol: 3wgg
Elevation: 20 to 330 feet
Mean annual precipitation: 38 to 55 inches
Mean annual air temperature: 59 to 70 degrees F
Frost-free period: 200 to 280 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Onslow and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Onslow

Setting

Landform: Flats on marine terraces, broad interstream divides on marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy and sandy marine deposits

Typical profile

A - 0 to 4 inches: loamy fine sand
E/Bh - 4 to 20 inches: loamy fine sand
Bt - 20 to 68 inches: sandy clay loam
Cg - 68 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F153AY040NC - Moist Loamy Rises and Flats, F153BY040NC - Moist Loamy Rises and Flats
Hydric soil rating: No

Minor Components

Rains, undrained

Percent of map unit: 5 percent
Landform: Broad interstream divides on marine terraces, carolina bays on marine terraces, flats on marine terraces
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F153AY060NC - Wet Loamy Flats and Depressions, F153BY060NC - Wet Loamy Flats and Depressions
Hydric soil rating: Yes

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APPENDIX G-3

NCDEQ EROSION AND SEDIMENTATION CONTROL MANUAL CHAPTER 4

4

Preparing the Erosion and Sedimentation Control Plan

4

Preparing the Erosion and Sedimentation Control Plan

GENERAL CONSIDERATIONS

Before preparing an erosion and sedimentation control plan, the designer should have a sound understanding of the requirements of the North Carolina Sedimentation Control Law (*Chapter 1*), erosion and sedimentation control principles (*Chapter 2*), the role of vegetation and other surface protection in the erosion process (*Chapter 3*), and the appropriate uses of the principal erosion and sedimentation control practices (*Chapter 5*).

Developers and builders can minimize erosion, sedimentation, and other construction problems by selecting areas appropriate for the intended use. Tracts of land vary in suitability for development. Knowing the soil type, topography, natural landscape values, drainage patterns, flooding potential, and other pertinent data helps identify both beneficial features and potential problems of a site.

Purpose of the Plan

The purpose of an erosion and sedimentation control plan is to establish clearly which control measures are intended to prevent erosion and off-site sedimentation. The plan should serve as a blueprint for the location, installation, and maintenance of practices to control all anticipated erosion and prevent sediment from leaving the site.

The approved erosion and sedimentation control plan—showing the location, design, and construction schedule for all erosion and sedimentation control practices—should be a part of the general construction contract. State specifically the method of payment for implementing this plan in the contract, and consider erosion and sedimentation control an early pay item.

Elements of the Plan

An erosion and sedimentation control plan must contain sufficient information to describe the site development and the system intended to control erosion and prevent off-site damage from sedimentation. As a minimum, include in the plan:

- a site location or vicinity map,
- a site development drawing,

- a site erosion and sedimentation control drawing,
- drawings and specifications of practices designated with supporting calculations and assumptions,
- vegetation specifications for temporary and permanent stabilization,
- a construction schedule,
- a financial/ownership form, and
- a brief narrative.

Although a narrative is not specifically required by the law, it can clarify details of the plan as an aid for the inspector and the contractor. The narrative should be concise, but should describe:

- the nature and purpose of the proposed development,
- pertinent conditions of the site and adjacent areas, and
- the proposed erosion and sedimentation control measures.

The designer should assume that the plan reviewer has not seen the site, and is unfamiliar with the project. Map scales and drawings should be appropriate for clear interpretation.

Data Collection and Preliminary Analysis

The base map for the erosion control plan is prepared from a detailed topographic map. If available, a soil map should be obtained from the local office of the USDA Soil Conservation Service. Transferring the soil survey information to the topographic map is helpful for site evaluation.

The design engineer responsible for the plan should inspect the site to verify the base map with respect to natural drainage patterns, drainage areas, general soil characteristics, and off-site factors.

The base map should reflect such characteristics as:

- soil type and land slopes,
- natural drainage patterns,
- unstable stream reaches and flood marks,
- watershed areas,
- existing vegetation (noting special vegetative associations),
- critical areas such as steep slopes, eroding areas, rock outcroppings, and seepage zones,
- unique or noteworthy landscape values to protect,
- adjacent land uses—especially areas sensitive to sedimentation or flooding, and
- critical or highly erodible soils that should be left undisturbed.

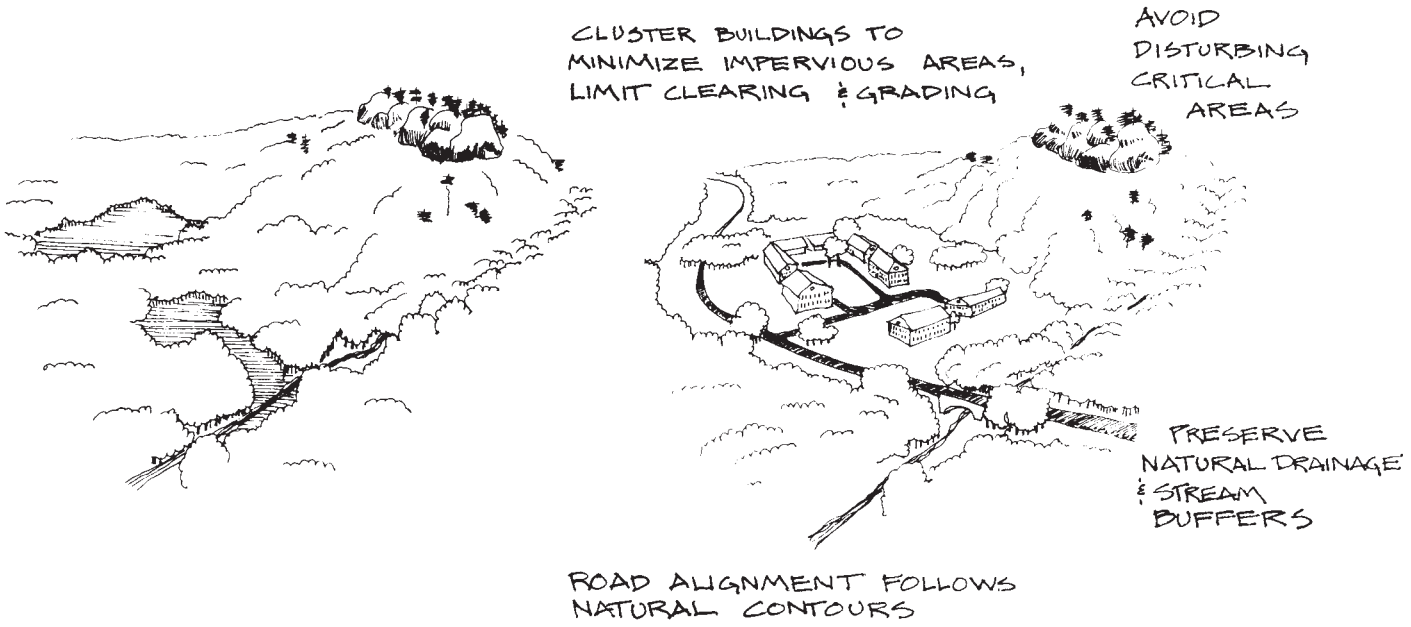


Figure 4.1 Site evaluation.

In the analysis of these data, identify:

- buffer zones,
- suitable stream crossing areas,
- access routes for construction and maintenance of sedimentation control devices,
- borrow and waste disposal areas, and
- the most practical sites for control practices.

The analysis of the topography, soils, vegetation, and hydrology should define the limitations of the site and identify locations suitable for development.

Principles of Site Development

The site evaluation data and the information shown on the field map serve as the basis for both the site development plan and the erosion and sedimentation control plan (Figure 4.1). Plan development to fit the proposed site, recognizing constraints determined in the site analysis. To determine the best layout of the site, observe the following principles:

Fit the development to the site—Follow natural contours as much as possible. Preserve and use natural drainage systems.

Limit clearing and grading—Clearly define work limit lines. Grade to minimize cut-and-fill slopes, preserve natural buffer areas, and limit the time that bare soil is exposed.

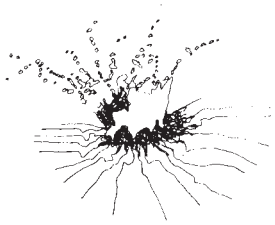
Minimize impervious areas—Build in clusters to provide more open space, minimize parking areas, and reduce disturbance for utility line construction. Use porous paving materials when practical. Maintain existing vegetation where possible.

Avoid disturbing critical areas—Identify and avoid areas vulnerable to concentrated runoff.

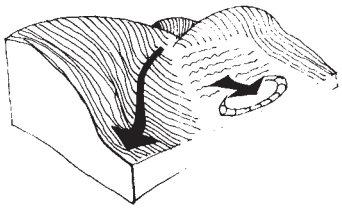
Maintain and enhance existing site values—Retain significant trees and other plant groups. Avoid disturbing unique land forms, very steep slopes, and rock outcroppings.

Strategy

The erosion and sedimentation control plan should seek to protect the soil surface from erosion, control the amount and velocity of runoff, and capture all sediment on-site during each phase of the construction project. Strategies for controlling erosion and sedimentation should consider the following elements:

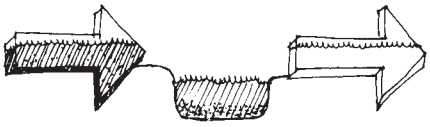


Schedule activities—Coordinate the installation of erosion and sedimentation control practices to coincide with the construction activities as the most cost-effective control strategy. Many sedimentation control practices should precede grading activities.



Protect the soil surface—Limit the extent of disturbance, and stabilize the soil surface immediately. Once the surface has been disturbed, it is subject to accelerated erosion, and should be protected with appropriate cover, such as mulch or vegetation, in an expedient manner.

Control surface runoff—Divert water from undisturbed areas to avoid disturbed areas. Break up long slopes with temporary diversions to reduce the velocity of runoff. Divert sediment-laden water to sediment impoundments. Make all outlets and channels stable for the intended flow.



Capture sediment on-site—Divert runoff that transports sediment to an adequate sediment-trapping device to capture sediment on the site.

Chapter 5 provides a practice selection guide (Table 5.1) for the selection of appropriate control practices. *Chapter 6* contains standards and specifications for the implementation of recommended erosion and sedimentation control practices.

WRITING THE PLAN

Phase I: Runoff-Erosion Analysis

Development of the erosion and sedimentation control plan can be viewed as a series of phases that occur in approximate chronological order. The phases overlap considerably and so are not presented as steps.

Landscape—Evaluate proposed changes in the landscape to determine their effect on runoff and erosion. Note all physical barriers to surface runoff, such as roads, buildings, and berms. Check slope grades and lengths for potential erosion problems. Designate intended collection points for concentrated flow and specify controls to dissipate energy or stabilize the surface. Designate areas to be protected or used as buffer zones in this phase (Figure 4.2).

Runoff yield—Evaluate surface runoff for the entire contributing drainage area—on-site and off-site. Delineate small subwatersheds on-site, and estimate peak runoff rates and volumes at selected collection points identified. Base runoff determinations on the peak discharge from the 10-year storm with site conditions during and after development—**not predisturbance conditions**. See *Appendix 8.03* for procedures for estimating peak runoff.

Sediment yield—Estimate sediment yield by subwatersheds. This aids in identifying preferred locations for sediment traps and barriers, and can be used to estimate the expected cleanout frequency. An area that is subject to excessive erosion may call for extra storage capacity in traps or additional precautions during construction.

Phase II: Sediment Control

Erosion control practices reduce the amount of sediment generated, but they do not eliminate the need for sediment control devices such as barriers and traps. Sediment control practices operate by reducing flow velocity, and creating shallow pools that reduce the carrying capacity of runoff. Thus, sedimentation occurs on-site rather than off-site. Sediment is generally not controlled by filtering, but by deposition. The designer should locate all traps and barriers

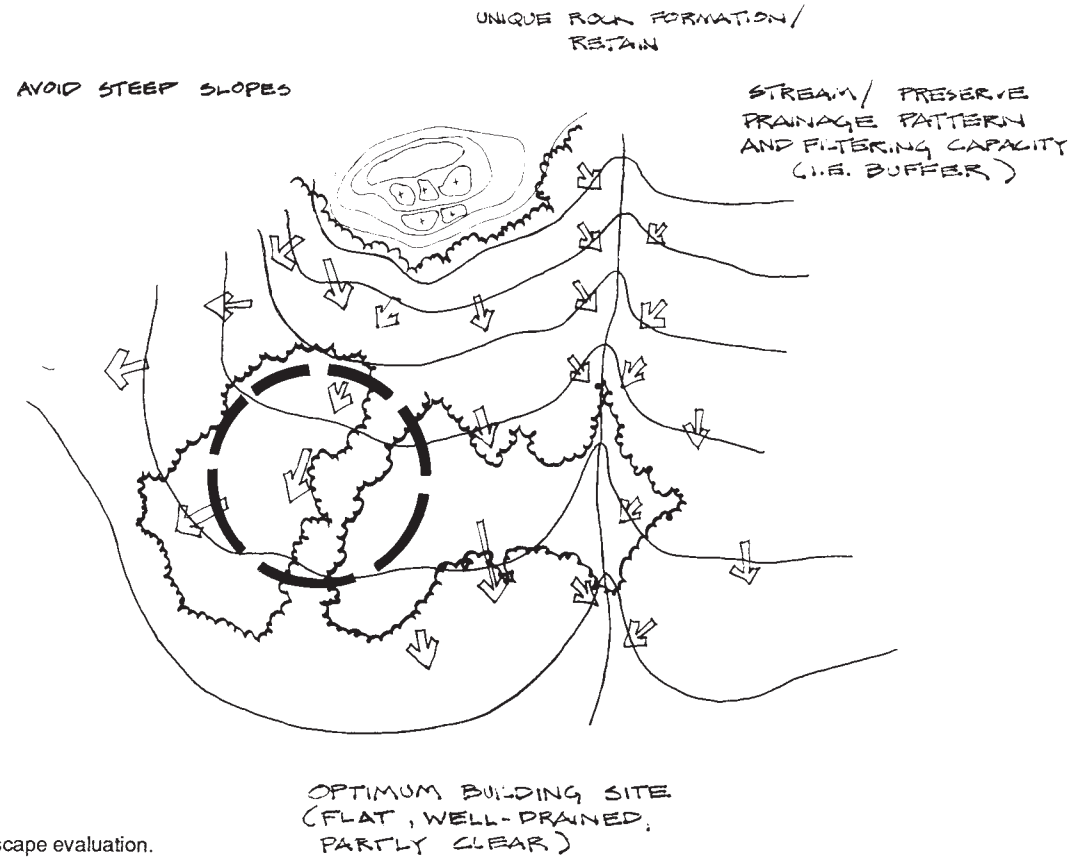
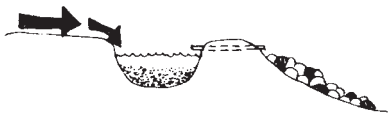


Figure 4.2 Landscape evaluation.

recognizing that they represent deposition points where access for maintenance will be necessary.

Sediment basins and traps—Select sites and install sediment basins and traps before other construction activities are started. Also consider locations for diversions, open channels, and storm drains at this time so that all sediment-laden runoff can be directed to an impoundment structure before leaving the construction site.

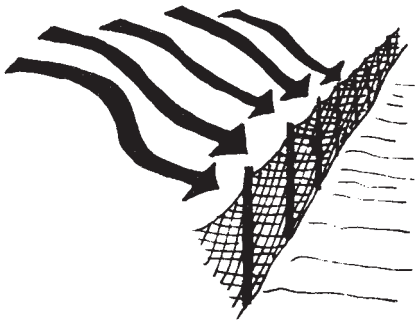


Divert sediment-free water away from sediment basins, and release it through stable outlets. This reduces construction costs, and improves basin efficiency.

This plan should show access points for cleanout of all traps and basins and indicate sediment disposal areas. Maintenance of storage capacity is essential throughout the construction period.

Practice standards in *Chapter 6* provide design criteria and construction specifications for sediment traps (Practice 6.60), sediment basins (Practice 6.61), rock dams (Practice 6.63), and skimmer sediment basins (Practice 6.64). Procedures for the design of sediment basins are contained in *Appendix 8.07*.

Sediment fences—Sediment fences (Practice 6.62) provide effective control of sediment carried in sheet flow. They are particularly useful where there is limited space to work such as near property lines, among trees, or near sidewalks or streets.



Sediment fences should never be used across streams, ditches, channels, or gullies.

The sediment fence operates primarily by reducing flow velocity and causing a shallow pool to form. If filtering action is required, the designer should assume that the barrier will clog rapidly so that all runoff must be retained behind the fence or released through a designated outlet. Any outlet points must be reinforced and stabilized, and should be designated in the plan.

Place sediment fences on relatively flat ground with sufficient area for a pool to develop without putting unnecessary strain on the fence. If a level area is not available at the fence location, excavate a trench directly upslope from the fence.

Show sediment fences on the topographic map, and clearly indicate deposition areas and needed overflow or bypass outlet points. Also show access routes for maintenance.

Inlet protection—Inlet protection devices for storm sewers, conduits, slope drains, or other structures make effective, low-cost deposition areas for trapping and holding sediment. A shallow excavation in conjunction with a sediment barrier can be effective at many locations. In the plan, show where these measures will be located, what type of device will be used, and how these devices will be constructed and maintained. Practice standards for the design of several types of inlet protection devices are included in *Chapter 6* (Practices 6.50, 6.51, 6.52, 6.53, 6.54, and 6.55).

Phase III: Protection of Disturbed Areas

Once an area is disturbed, it is subject to accelerated erosion. In the plan, show how erosion will be controlled on these disturbed areas. Erosion control can be achieved by:

- limiting the size of clearing and time of exposure by proper scheduling,
- reducing the amount of runoff over the disturbed surface,
- limiting grades and lengths of slopes, and
- re-establishment protective cover immediately after land-disturbing activities are completed or when construction activities are delayed for 30 or more working days.

Cut-and-fill slopes—Steep cut or fill slopes are particularly vulnerable to erosion. Protect such slopes by temporary or permanent diversions just above the proposed slope before it is disturbed. Provide a stable channel, flume, or slope drain, where it is necessary to carry water down a slope. Flow conveyances may have vegetative, mechanical, or combined vegetative and mechanical liners, depending on slope and soil conditions.

Shorten long slopes by installing temporary diversions across the slope to reduce flow velocity and erosion potential. Install permanent diversions with slope drains and protected outlets on long steep slopes (over 20%) as the slopes are constructed.

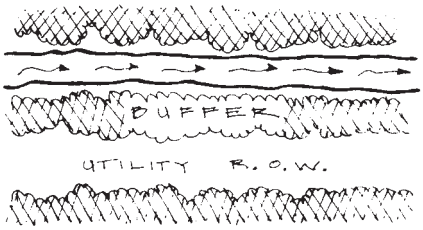
Finish final slope grades without delay, and apply the appropriate surface stabilization measures as soon as possible. Roughen slope surfaces to improve the success of vegetative stabilization. Consider both the stabilization measures and how they will be maintained before planning the steepness of the finished slope. For example, if the finished slope is to have smooth grass cover, it should be constructed on a grade of 3:1 or flatter to allow mowing.

Surface covers—Riprap, gravel, straw and other land covers can provide immediate surface protection to disturbed soil areas. Riprap is especially useful where concentrated runoff over steep slopes occurs. Riprap should be installed on a gravel or filter fabric bed.

Construction traffic—Carefully plan stabilization of construction access areas, construction roads, and parking areas. Ensure that traffic patterns follow site contours, and limit the length of routes up steeper slopes. Generally, road grades should not exceed 12%. Controlling surface runoff is necessary to prevent serious roadside erosion. Proper grading of the road surface, stable channel design, the use of water bars, other diversions, and culverts help prevent erosive flows. Where water tables are high, subsurface drainage may be needed to stabilize the sub-grade. Storm drains should be considered for water disposal where channel grade exceeds 5%. Plans should show all stabilization measures needed to control surface runoff from all roads.

Borrow and waste disposal areas—Clear borrow and waste disposal areas only as needed and protect them from surface runoff. Maintain berms as fill slopes are constructed to reduce slope length and control runoff. Slope all areas to provide positive drainage, and stabilize bare soil surfaces with

permanent vegetation or mulch as soon as final grades are prepared. Direct all runoff that contains sediment to a sediment-trapping device. In large borrow and disposal sites, shape and deepen the lower end to form an in-place sediment trap, if site conditions warrant it. Off-site borrow areas may be governed by the N.C. Mining Act.



Utilities—Use the spoil from utility trench excavations to divert flow from upslope areas, but use care in spoil placement to avoid blocking natural surface outlets. Diversions and water bars can reduce erosion when properly spaced across utility rights-of-way. When utilities are located near a stream, maintain an undisturbed buffer zone wherever possible. If site dewatering is necessary, pump or divert muddy water to sediment traps before discharging it to the stream. If streams must be crossed, make sure all necessary materials and equipment are on-site before construction begins, and complete work quickly. Finish all disturbed surfaces to design grade and immediately stabilize them with permanent vegetation or other suitable means. When utilities cross the stream, you must specify the plans to prevent sedimentation.

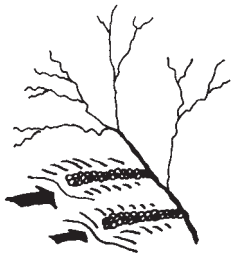
Perimeter protection—Consider diversion dikes for perimeter protection for all proposed developments, and install them where appropriate before clearing the site. Exercise care not to create flooding or erosion by blocking the natural drainage pattern. Be sure to provide an adequate outlet.

Dust control—Exposed soil surfaces that are nearly level have little potential for runoff erosion, but may be subject to severe wind erosion. Keeping the disturbed surface moist during windy periods is an effective control measure, especially for construction haul roads.

Preserving vegetation—Preserve existing vegetation on the site as long as possible as a cost-effective way to prevent on-site erosion and off-site sedimentation.

Phase IV: Runoff Conveyance

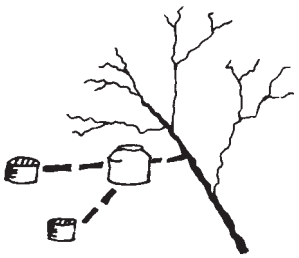
The safe conveyance of runoff water from a construction site is achieved by: (1) utilizing and supplementing existing stable watercourses, (2) designing and constructing stable open channels, or (3) installing storm drains with stable outlets. The plan should indicate locations and designs for these facilities. Complete and stabilize outlets for channels, diversions, slope drains, or other structures before installing the conveyance measure.



Existing watercourses—When using existing watercourses, either show that flow velocities are acceptable for increased runoff conditions, or indicate how necessary stabilization will be achieved.

Excavated channels—When channels are to be excavated, base a stability analysis on allowable velocity, or tractive force procedures. Include all calculations as part of the plan documentation.

Wide, shallow channels with established grass linings are usually stable on slopes up to 5%. These channels must be protected with temporary liners until grass is established. If channel gradients are too steep to use vegetation, riprap or concrete linings may be required, and in some instances grade stabilization structures may be needed.



Storm drains—Where the site plan calls for a system of storm drains, the drains may be used effectively in the erosion and sedimentation control plan. Build junction boxes or inlets early in the construction sequence, and grade the adjacent area to drain toward the inlet. Install an inlet protection device at all open pipe inlets, and excavate a shallow basin in the approach to the inlet for sediment storage. The storm drain flow from the protected inlets may be diverted to a sediment basin for additional sediment control. Restrict the drainage area for inlets to less than 1 acre, and frequently inspect inlet protections for needed maintenance.

Standards for runoff conveyance (Practices 6.30, 6.31, 6.32, and 6.33) and outlet protection measures (Practices 6.40 and 6.41) in *Chapter 6* provide the criteria necessary for the design of these practices. Design procedures for channels and outlet structures are contained in *Appendices 8.05, 8.06,* and *8.07*. Standards for the design of storm drains are not included.

Phase V: Stream Protection

Streambanks, streambeds, and adjoining areas are susceptible to severe erosion if not protected. Include sufficient detail to show that streams are stable for the increased velocities expected from the development activity. At a minimum, all streams should be stable for flows from the peak runoff from the 10-year storm.

When stability analysis shows that the stream requires protection, vegetation is usually the preferred approach because it maintains the stream nearest to its natural state. When flow velocities approach 4-6 ft/sec, or if frequent periods of bankful flows are expected, structural measures such as riprap lining or grade stabilization structures are usually necessary. In the plan, show where stream protection is needed, and how it will be accomplished.

Runoff into stream—Only sediment-free runoff may be discharged from construction sites directly into streams. Ensure that all other flows enter from desilting pools formed by sediment traps or barriers.

Velocity control—Keep the velocity of flow discharged into a stream within acceptable limits for site conditions. Control velocity by installing an appropriate outlet structure. Standards for two types of outlet protection devices are given in *Chapter 6* (Practices 6.40 and 6.41). Design procedures for riprap outlet structures are contained in *Appendix 8.06*.

Buffer zone—Areas adjoining streams should be left undisturbed as buffers (Figure 4.3). Existing vegetation, if dense and vigorous, will reduce flow velocities and trap sediment from sheet flow. However, the principal benefit of leaving natural buffer zones along streams is that they prevent excessive erosion in these sensitive areas. Maintaining stream canopies also protects fish and wildlife habitats; provides shade, wind breaks and noise barriers; protects the bank from out-of-bank flood flows; and generally preserves natural site aesthetics.

Indicate stream buffer zones in plans that involve natural streams. The width is determined by site conditions, but generally should not be less than 25 feet on each side of the stream. Where natural buffers are not available, provide artificial buffers. **Where work is required along a stream, you must provide a mechanical or artificial buffer**.

Figure 4.3 Wooded buffer zone.

Off-site stream protection—Increased rate and volume of runoff from development activities may cause serious erosion at points some distance downstream. The developer should work with downstream property owners to stabilize sensitive downstream channel areas.

Stream crossing—Minimize the number of stream crossings. Construct crossings during dry periods; if necessary, divert water during construction. The plan should show the type of crossing to be used and the associated control measures to minimize erosion from surface runoff such as diversions, outlet structures, riprap stabilization, etc. Design guidelines are given in *Chapter 6* (Practices 6.70, 6.71, 6.72, 6.73, and 6.74) for stream protection practices.

Phase VI: Construction Scheduling

Appropriate sequencing of construction activities can be the most effective means for controlling erosion and sedimentation. Consequently, present the construction activity schedule of the general contract as part of the erosion and sedimentation control plan. **Put into place the primary erosion and sedimentation control practices for the site, i.e., sediment basins and traps, and a water conveyance system before undertaking major land-disturbing activities**.

Install sediment basins and primary sedimentation control practices as the first structural measures. Next install the overall water disposal outlet system for the site.

Stabilize all construction access routes, including the construction entrance/exit and the associated drainage system, as the roads are constructed. Install storm drains early in the construction sequence, and incorporate them in the sedimentation control plan. Then install low-cost inlet protection devices for efficient sedimentation control in the area around the inlets. This allows early use of the inlets and the drain system.

Install diversions above areas to be disturbed and, where appropriate, locate diversion dikes along boundaries of areas to be graded before grading takes place.

After all principal erosion and sedimentation control measures are in place, perform the land clearing and rough grading. Clear areas only as needed.

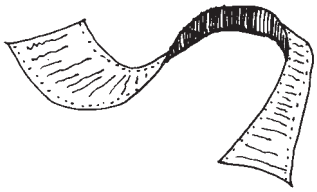
Complete final grading and surface stabilization in an expedient manner and within the construction schedule. Minimize the time of exposure, and select temporary ground cover according to the location and season. Temporary surfaces should be stabilized as soon as active grading is suspended, and graded slopes and fills must be stabilized within 21 calendar days, regardless of the time of year.

Phase VII: Maintenance

In the erosion and sedimentation control plan, indicate who is responsible for maintenance and when it will be provided. The maintenance schedule should be based on site conditions, design safeguards, construction sequence, and anticipated weather conditions. Specify the amount of allowable sediment accumulation, design cross-section, and required freeboard for each practice and what will be done with the sediment removed. The plans should also state when temporary practices will be removed and how these areas and waste disposal areas will be stabilized.

Phase VIII: Performance Requirement

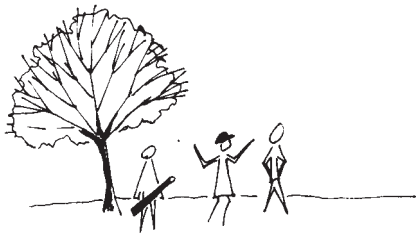
Even though the developer may have an approved plan that is properly installed and maintained, he/she is not relieved of responsibility for off-site sediment damage resulting from his/her construction activities. Therefore, frequently inspect the property boundary for evidence of sedimentation. If off-site damage occurs, the developer may be responsible for immediate corrective measures. Modification of the plan and re-approval may also be necessary.



The erosion and sedimentation control plan should be flexible enough to allow for modification to correct problems. It is common for unanticipated events or construction changes to occur during project development that may require major alterations in the plan. Resubmit significant changes for approval before they are implemented.

Phase IX: Preconstruction Conference

A preconstruction conference with the owner, contractor, and erosion control personnel at the site is recommended as a means of assuring proper implementation of the erosion and sedimentation control plan. This conference is required by some local ordinances. A preconstruction conference allows all parties to meet, review the plans and construction schedule, and agree on responsibility and degree of control expected. Discuss maintenance requirements, phasing of operations, and plan revisions at this time.



A preconstruction meeting is especially important for large, complex jobs or when the contractor and/or developer has had little experience in this type of work.

If the job foreman assigned responsibility for on-site sediment control cannot be present at the conference, give his/her name to the erosion control representative at this time.

APPENDIX G-4

USDA SOIL DATA ACCESS PRIME AND OTHER IMPORTANT FARMLANDS CRAVEN COUNTY, NC

Soil Data Access (SDA) Prime and other Important Farmlands

An SDA-populated select list is used to pick a state and SSA which enables creation of a "Prime and other Important Farmlands" based upon those selections. The data is not static; it hits Soil Data Access Live. To reset the table hit F5 on the keyboard. Once a survey is selected and table appears, if a new survey is selected it will append to the table at the bottom. For more information about the table,

North Carolina

selected stateId = NC

Craven County, North Carolina

selected SSA areasymbol = NC049

State_Sym	Area_Symbol	Area_Name	mukey	Mapunit_SYM	Mapunit_Name	Farm_Class
NC	NC049	Craven County, North Carolina	115731	BrB	Bragg soils, 0 to 8 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115736	CnB	Conetoe loamy sand, 0 to 5 percent slopes	Farmland of statewide importance
NC	NC049	Craven County, North Carolina	115738	CrB	Craven silt loam, 1 to 4 percent slopes	All areas are prime farmland
NC	NC049	Craven County, North Carolina	115742	DO	Dorovan muck	Not prime farmland
NC	NC049	Craven County, North Carolina	115743	DA	Dare muck	Not prime farmland
NC	NC049	Craven County, North Carolina	115744	De	Deloss fine sandy loam	Prime farmland if drained
NC	NC049	Craven County, North Carolina	115755	La	Leaf silt loam	Farmland of statewide importance
NC	NC049	Craven County, North Carolina	115756	Lc	Lynchburg-Urban land complex	Not prime farmland
NC	NC049	Craven County, North Carolina	115757	Le	Lenoir silt loam	Farmland of statewide importance
NC	NC049	Craven County, North Carolina	115759	Ln	Leon sand	Farmland of unique importance
NC	NC049	Craven County, North Carolina	115761	MM	Masontown mucky fine sandy loam and Muckalee sandy loam, frequently flooded	Not prime farmland

NC	NC049	Craven County, North Carolina	115762	Me	Meggett sandy loam	Farmland of statewide importance
NC	NC049	Craven County, North Carolina	115764	Mu	Murville mucky loamy sand	Farmland of unique importance
NC	NC049	Craven County, North Carolina	115765	NoA	Norfolk loamy fine sand, 0 to 2 percent slopes	All areas are prime farmland
NC	NC049	Craven County, North Carolina	115766	NoB	Norfolk loamy fine sand, 2 to 6 percent slopes	All areas are prime farmland
NC	NC049	Craven County, North Carolina	115767	NuB	Norfolk-Urban land complex, 0 to 6 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115768	On	Onslow loamy sand	All areas are prime farmland
NC	NC049	Craven County, North Carolina	115782	TaB	Tarboro sand, 0 to 6 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115783	Tc	Torhunta-Urban land complex	Not prime farmland
NC	NC049	Craven County, North Carolina	115784	Tm	Tomotley fine sandy loam	Prime farmland if drained
NC	NC049	Craven County, North Carolina	115785	To	Torhunta fine sandy loam	Prime farmland if drained
NC	NC049	Craven County, North Carolina	115786	TuB	Tarboro-Urban land complex, 0 to 6 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115789	Ud	Udorthents, loamy	Not prime farmland
NC	NC049	Craven County, North Carolina	115790	Ur	Urban land	Not prime farmland
NC	NC049	Craven County, North Carolina	115791	W	Water	Not prime farmland
NC	NC049	Craven County, North Carolina	115724	AaA	Altavista fine sandy loam, 0 to 2 percent slopes	All areas are prime farmland
NC	NC049	Craven County, North Carolina	115725	AcA	Altavista-Urban land complex, 0 to 2 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115726	Ag	Augusta fine sandy loam	Prime farmland if drained
NC	NC049	Craven County, North Carolina	115727	Ap	Arapahoe fine sandy loam	Prime farmland if drained
NC	NC049	Craven County, North Carolina	115728	AuB	Autryville loamy sand, 0 to 6 percent slopes	Farmland of statewide importance

NC	NC049	Craven County, North Carolina	115730	Ba	Bayboro mucky loam	Farmland of statewide importance
NC	NC049	Craven County, North Carolina	115746	ExA	Exum silt loam, 0 to 2 percent slopes	All areas are prime farmland
NC	NC049	Craven County, North Carolina	115747	GoA	Goldsboro loamy fine sand, 0 to 2 percent slopes	All areas are prime farmland
NC	NC049	Craven County, North Carolina	115748	Gr	Grantham silt loam	Prime farmland if drained
NC	NC049	Craven County, North Carolina	115749	GuA	Goldsboro-Urban land complex, 0 to 2 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115753	KuB	Kureb sand, 0 to 6 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115754	LF	Longshoal muck, very frequently flooded	Not prime farmland
NC	NC049	Craven County, North Carolina	115770	PO	Ponzer muck	Farmland of statewide importance
NC	NC049	Craven County, North Carolina	115771	Pa	Pantego fine sandy loam	Prime farmland if drained
NC	NC049	Craven County, North Carolina	115773	Pt	Pits	Not prime farmland
NC	NC049	Craven County, North Carolina	115776	Rc	Rains-Urban land complex	Not prime farmland
NC	NC049	Craven County, North Carolina	115777	Ro	Roanoke fine sandy loam	Farmland of statewide importance
NC	NC049	Craven County, North Carolina	115778	Sc	Seabrook-Urban land complex	Not prime farmland
NC	NC049	Craven County, North Carolina	115779	Se	Seabrook loamy sand	Not prime farmland
NC	NC049	Craven County, North Carolina	115780	StA	State loamy sand, 0 to 2 percent slopes	All areas are prime farmland
NC	NC049	Craven County, North Carolina	115781	SuD	Suffolk loamy sand, 10 to 30 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115735	CT	Croatan muck, ponded, 0 to 2 percent slopes	Not prime farmland
NC	NC049	Craven County, North Carolina	115760	Ly	Lynchburg fine sandy loam, 0 to 2 percent slopes, Atlantic Coast Flatwoods	Prime farmland if drained
NC	NC049	Craven County, North Carolina	115774	Ra	Rains fine sandy loam, 0 to 2 percent slopes, Atlantic Coast Flatwoods	Prime farmland if drained

Report Metadata: Back to top

- **Area_Symbol:** A symbol that uniquely identifies a single occurrence of a particular type of area (e.g. Dane Co., Wisconsin is WI025).
- **Area_Name:** The name given to the specified geographic area.
- **mukey:** A non-connotative string of characters used to uniquely identify a record in the Mapunit table.
- **Mapunit_SYM:** The symbol used to uniquely identify the soil mapunit in the soil survey.
- **Mapunit_Name:** Correlated name of the mapunit (recommended name or field name for surveys in progress).
- **Prime and other Important Farmlands:** Identification of map units as prime farmland, farmland of statewide importance, or farmland of local importance.

Prime and other Important Farmlands Description:

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature,

humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be farmland of local importance for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

APPENDIX G-5

TOWN OF RIVER BEND ZONING ORDINANCE

CHAPTER 15.02: ZONING

Section

Cross-reference: Damage to private and town property, see § 13.01.003, Planning Board, see Ch. 3.05, Posting of county building permits, see § 13.01.005, Subdivisions, see Ch. 15.01

GENERAL PROVISIONS

§ 15.02.001 ENACTMENT.

A. A chapter establishing comprehensive zoning regulation for the Town of River Bend, a municipal corporation of the State of North Carolina, and providing for the administration, enforcement, and amendment thereof, in accordance with the provisions of G.S. Chapters 143 and 160-A.
B. Therefore, be it, and the same hereby is, enacted by the Town Council of the Town of River Bend, North Carolina.

§ 15.02.002 TITLE.

A. These regulations shall be known, referred to, and cited as the Zoning Chapter of the Town of River Bend, North Carolina, and the map herein referred to as zoning map is identified by the title official zoning map, Town of River Bend, North Carolina.
B. This zoning map is hereinafter made a part of these regulations, to be the same extent as if the information set forth on the map were fully described and incorporated herein.
C. The zoning map shall be certified, sealed and kept at the town office.

§ 15.02.003 JURISDICTION.

The provisions of this chapter shall apply within the territorial and extraterritorial limits of the Town of River Bend, North Carolina, as now or hereafter fixed and shown on the zoning map as from time to time amended.

§ 15.02.004 PURPOSE.

This chapter is designed for the purpose of promoting health and safety, insuring orderly development, facilitating adequate parks and other public requirements, and promoting the general welfare of the community, and also providing standards and procedures to minimize the damage to the environment and property due to runoff of stormwater and during periods of flooding, providing a stormwater management plan that identifies paths through which stormwater will flow to the Trent River in a controlled manner.

§ 15.02.005 VALIDITY AND SEPARABILITY.

Should any section or provision of this chapter be declared invalid by the courts, the declaration shall not affect the validity of the chapter as a whole.

§ 15.02.006 EFFECTIVE DATE.

A. This chapter shall take effect and shall be in force from and after 6-1-1981.
B. Duly adopted by the Town Council of the Town of River Bend, North Carolina on 5-26-1981.

GENERAL INTERPRETATION

§ 15.02.020 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

ACCESSORY USE. A use customarily incidental and subordinate to the principal use of land or building, and located on the same lot with the principal use.

ADULT DAY CARE CENTERS. Adult day care centers shall comply with G.S. § 131D-6, which governs the inspection, licensing and certification of adult day care programs.

ALLEY. Privately or publicly owned right-of-way, primarily for service access to the back or side of abutting property, and not intended for general traffic circulation.

BUFFERING. Landscaping or other architectural measures to screen dissimilar uses from adjoining properties or private developments that abut the street right of way. Refer to §§ 15.02.220 et seq.

BUILDING. Any structure enclosed and isolated by exterior walls constructed or used for residence, business, industry or other public or private purposes, or accessory thereto, and including mobile homes and unattached carports consisting of a roof and supporting members, and similar structures whether stationary or movable, built in accordance with the North Carolina State Building Code and manufactured homes built in accordance with the HUD Code.

BUILDING, ACCESSORY. A subordinate building on the same lot as the principal building, consisting of walls or supporting members and a roof, the use of which is customarily incidental to the use of a principal building on the same lot.

BUILDING, PRINCIPAL/MAIN. A building in which is conducted the principal or main use of the lot on which it is located. Principal and main are synonymous here and in all other usage throughout the code.

BUILDING SETBACK LINE. A line parallel to the front property line in front of which no structure shall be erected.

CHILD DAY CARE CENTERS AND NURSERIES. Child day care centers or nurseries shall comply with the G.S. § 110, Article 7, which governs the licensing of day care facilities.

COMMERCIAL USE. Any use permitted by this chapter in a commercial district.

COMMERCIAL VEHICLE. A vehicle:

(1) With lettering or signage indicating use for commercial purposes; or
(2) In excess of ½ ton load capacity of a type customarily used for commercial purposes.

CONDITIONAL ZONING**. A legislative zoning map amendment with site-specific conditions incorporated into the zoning map amendment.**

COUNTY. Craven County, North Carolina.

DIMENSIONAL NON-CONFORMITY. A non-conforming situation that occurs when the height, size, or minimum floor space of a structure or the relationship between an existing building or buildings and other buildings or lot lines does not conform to the regulations applicable to the district in which the property is located.

DWELLING. A building or portion thereof designed, arranged or used for permanent living quarters for 1 or more families. The term ***DWELLING*** shall not be deemed to include a motel, hotel, tourist home or any structures designed for transient residence.

DWELLING, MULTIPLE. A building, including an apartment house, or portion of 1 used or designed as a residence for 3 or more families living independently of each other and doing their own cooking therein.

DWELLING, SINGLE-FAMILY. A building used or designated as a residence for a single family.

DWELLING, 2-FAMILY. A building or portion thereof used or designed as a residence for 2 families living independently of each other and doing their own cooking therein.

ELEVATION. In relation to mean sea level, new construction shall have the minimum elevation no less than 10.5 feet to the floor joist or no less than 11 feet to the lowest habitable floor, whichever is more restrictive.

FAMILY. One or more persons occupying a single family dwelling unit, provided that, unless all members are related by blood or marriage, no family shall contain more than 5 persons.

FRONT LOT LINE. The line of a lot contiguous with the street right-of-way.

IMPERVIOUS SURFACE. Any surface which because of its material or composition or compacted nature impedes or prevents natural infiltration of storm water into the soil. Impervious surfaces include, but are not limited to, roofs, roof extensions, patios, balconies, decks (except wood slotted decks), athletic courts, swimming pools (excluding the water are of swimming pool), streets, parking areas, driveways, sidewalks, and any concrete, stone, brick, asphalt, or compacted gravel surface.

Added 03/18/10

INCIDENTAL HOME OCCUPATION. Any use conducted entirely within a dwelling and carried on by the occupants thereof, which use is clearly incidental and secondary to the use of the dwelling for dwelling purposes. See § 15.02.067.

INSTITUTIONAL USE. Any use permitted by this chapter in an institutional district.

JUNKYARD. Any land or area used, in whole or in part, for commercial storage and/or sale of waste paper, rags or scrap metal, and including commercial storage of inoperative motor vehicles and boats, and dismantling of vehicles or machinery.

LOT.

(1) A portion of a subdivision, or any other parcel of land, intended as a unit for transfer of ownership, or occupied or intended for occupancy by a principal building, together with its accessory buildings, including the open space required under this chapter.
(2) For the purpose of this chapter, ***LOT*** shall mean any number of contiguous lots of record for location of 1 principal building and its accessory buildings.

LOT, CORNER.

(1) A lot which occupies the interior angle of the intersection of 2 street rights-of-way which make an angle of more than 45 degrees and less than 135 degrees with each other.
(2) A ***CORNER LOT*** shall be deemed to have 2 front yards (1 contiguous with each street right-of-way), 1 side yard and 1 rear yard; provided, however, that for a ***CORNER LOT*** of record prior to 12-19-1990, the minimum side yard requirements for the main building shall be applicable to the front yard which is opposite the side yard.
(3) The owner shall be required to specify which is the side yard and which is the rear yard in his application for an initial zoning permit.

LOT DEPTH. The depth of a lot is the distance measured in the mean direction of the side lines of the lot from the midpoint of the front lot line to the midpoint of the rear lot line.

LOT OF RECORD. A lot which is part of a subdivision, a plat of which has been recorded in the office of the Register of Deeds of Craven County prior to the adoption or applicable amendment of this chapter, or a lot described by metes and bounds, the description of which has been recorded prior to the adoption or applicable amendment of this chapter.

LOT WIDTH. The distance between the side lot lines as measured at the building line.

LOW IMPACT DEVELOPMENT (LID). Low Impact Development (LID) is a design strategy with the goal of maintaining or replicating the pre-development hydrologic regime through the use of design techniques to create a functionally equivalent hydrologic site design. Hydrologic functions of storage, infiltration and ground water recharge, as well as the volume and frequency of discharges are maintained through the use of integrated and disturbed micro-scale stormwater retention and detention areas, reduction of impervious surfaces, and the lengthening of run-off flow paths and flow time. Other strategies include the preservation/protection of environmentally sensitive site features such as riparian buffers, wetlands, steep slopes, valuable (mature) trees, floodplains, woodlands, and highly permeable soils.

Added 06/18/2009

MAJOR RECREATIONAL EQUIPMENT. A boat, boat trailer, or any form of mobile camping equipment.

MANUFACTURED HOME.

(1) As provided in G.S. § 143-145(7), or any successor statutory definition.
(2) In the event that G.S. § 143-145(7) is repealed with no successor statutory definition, the term ***MANUFACTURED HOME*** shall mean a structure, transportable in 1 or more sections, which, in the traveling mode, is 8 feet or more in width or is 40 feet or more in length, or when erected on site, is 320 or more square feet, and which is built on a permanent chassis and is designed to be used as a dwelling with or without a permanent foundation when connected to required utilities, and includes plumbing, heating, air conditioning and electrical systems contained therein.
(3) Notwithstanding anything to the contrary hereinabove, for purposes of this chapter, the term ***MANUFACTURED HOME*** shall also include an on-frame modular home as defined herein, but shall not include an off-frame modular home as defined herein.

MANUFACTURED HOME OVERLAY AREA. Lots 21 to 41 of Piner Estates, as shown on the Town of River Bend Map #8-205-1.

NON-CONFORMING LOT. A lot existing at the effective date of this chapter that does not meet the minimum area and dimensional requirements of the zoned area in which the lot is located.

NON-CONFORMING PROJECT. Any structure, development, or undertaking that is incomplete at the effective date of this chapter and would be inconsistent with any regulation applicable to the district in which it is located if completed as proposed or planned.

NON-CONFORMING USE. A non-conforming situation that occurs when property is used for a purpose or in a manner made unlawful by the use regulations applicable to the zoned area in which the property is located. The term also refers to the activity that constitutes the use made of the property.

OFF-FRAME MODULAR HOME. A structure that is designed to be used as a dwelling, is manufactured in accordance with the specifications of modular homes under the North Carolina State Residential Building Code, and bears a seal or label issued by the Department of Insurance pursuant to G.S. § 143-139.1, is composed of components substantially assembled in a manufacturing plant, and which is not transported to its site on an integral/permanent chassis.

ON-FRAME MODULAR HOME.

(1) A factory-built structure that is designed to be used as a dwelling, is manufactured in accordance with the specifications for modular homes under the North Carolina State Residential Building Code, and bears a seal or label issued by the Department of Insurance pursuant to G.S. § 143-139.1, and which is transported to its site on an integral/permanent chassis, or any other type of modular unit that does not expressly meet the definition of off-frame modular home as defined herein.
(2) For purposes of this chapter, an on-frame modular home constitutes a manufactured home as well, and is regulated herein as a manufactured home.

PERSONAL SERVICES. Occupations dealing with the body and/or physical appearance of a person that are regulated by the State of North Carolina by certification and/or registration.

PRIVATE CLUBS AND LODGES. Fraternal, athletic, dining and civic organizations or societies which are not inimical to the public health, welfare, safety, order or convenience.

PROFESSIONAL SERVICES. Occupations requiring special knowledge and academic degree and are regulated by the State of North Carolina by certification and/or registration.

QUASI-JUDICIAL DECISION. A decision involving the finding of facts regarding a specific application of development regulation and that requires the exercise of discretion when applying the standards of the regulation. Quasi-judicial decisions include but are not limited to decisions involving variances, special use permits, certificates of appropriateness, and appeals of administrative determinations. Decisions on the approval of subdivision plats and site plans are quasi-judicial in nature if the regulation authorizes a decision-making board to approve or deny the application based not only upon whether the application complies with the specific requirements set forth in the regulation, but also on whether the application complies with one or more generally stated standards requiring a discretionary decision on the findings to be made by the decision making board.

REGULATED TREE. Regulated trees shall be defined as any tree with a circumference of 12.5 inches or greater, measured at 54 inches above the ground.

Added 01/17/2008, Amended 04/16/2009

***SPECIAL USE PERMIT*.** A permit issued to authorize development or land uses in a particular zoning district upon presentation of competent, material, and substantial evidence establishing compliance with one or more general standards requiring that judgment and discretion be exercised as well as compliance with specific standards. This definition includes permits previously referred to as "conditional use permits" or "special exceptions."

STREET. A road or highway which affords the principal means for vehicular traffic access to abutting property and which has been dedicated to public use. ***STREET***, road and highway are synonymous.

STREET LIGHTING. Night time street illumination intensity meeting NCDOT requirements. Placed on town right-of-way so as not to interfere with traffic or property access.

STRUCTURE. Includes but not limited to a building, deck, swimming pool, bulkhead, dock, wall or fence, storage shed, tennis court, gazebo, and satellite antenna, but excluding specifically satellite antennas with dishes of 24 inches or less in diameter.

TIMBER HARVESTING. Timber Harvesting shall be defined as the cutting and removal of a quantity of timber: (i) for delivery of merchantable timber to market, or (ii) pursuant to a practice that reduces tree density and competition to concentrate growth on fewer, high-quality trees (sometimes referred to as thinning); or (iii) otherwise resulting in the removal of more than twenty (20) regulated trees per acre.

Added 09/17/2007, Amended 04/16/2009

TOURIST HOME. A residential or commercial structure wherein rooms or the entire structure are rented to provide overnight accommodations or rental terms of less than thirty (30) days for transient guests.

Amended 11/17/2022

TOWN. The Town of River Bend.

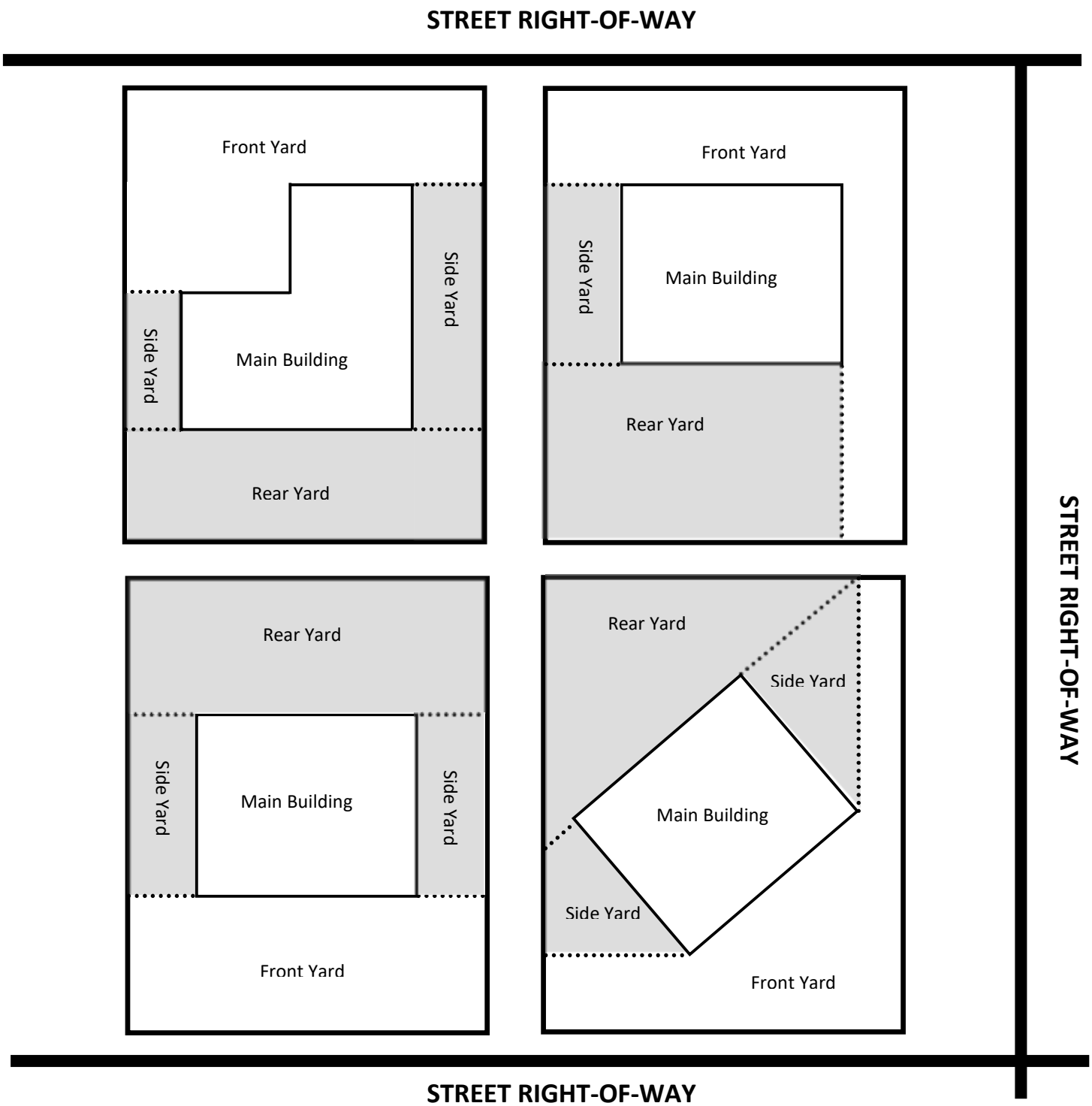
TOWN COUNCIL. The Town Council of the Town of River Bend.

WATERWAYS. The system of canals, ponds (including private bodies of water) rivers or other natural or manmade water features that stormwater drains to, through and from and that are expected to act as a reservoir, conduit or collection point for storm water or areas classified as wet lands.

YARD.

(1) The space on the same lot with the main building between the main building and the front lot line(s) (front yard), between the main building and the side lot line(s) (side yard), and between the main building and the rear lot line (rear yard).

(2) See examples below.



Shaded areas indicate where major recreational equipment, trailers, and commercial vehicles may be parked.

Updated 11/15/18

ZONING ADMINISTRATOR. The official charged with the administration of the Zoning Chapter.

§ 15.02.021 DISTRICT BOUNDARIES.

When uncertainty exists with respect to the boundaries of any district as shown on the official zoning map, Town of River Bend, North Carolina, the following rules shall apply.

A. Boundaries indicated as approximately following the center lines of streets, highways, alleys, or railroads shall be construed to follow center lines.
B. Boundaries indicated as approximately following platted lot lines shall be construed as following lot lines.
C. Boundaries indicated as following shore lines shall be construed to follow the shore lines, and in the event of change in the shore line shall be construed as moving with the actual shore line; boundaries indicated as approximately following the course of streams, rivers, canals or other bodies of water shall be construed to follow center lines.
D. Distances not specifically indicated on the official zoning map shall be determined by the scale of the map.
E. Where physical or cultural features existing on the ground are at variance with those shown on the official zoning map, the Board of Adjustment shall interpret the district boundaries.
F. If a district boundary divides a lot, the requirements for the district in which the greater portion of the lot lies shall be extended to the balance of the lot; provided that this section shall not prohibit any division of any lot at the district boundary and use of the portion of the lot lying within any district or the uses permitted under the district classification on which portion of the lot is located, so long as the portion of the lot or the portion of the lot and additional adjacent property in the same ownership meet the minimum standards for the district in which located.

§ 15.02.022 DISTRICT REGULATIONS.

Regulations set by this chapter for each district shall be minimum regulations and shall apply uniformly to each class or kind of structure or land, except as hereinafter provided:

A. No building, structure or land hereafter shall be used or occupied, and no building or structure or part thereof hereafter shall be erected, constructed, reconstructed, moved or structurally altered except in conformance with all of the regulations herein specified for the district in which it is located.
B. No yard or lot existing at the time of passage of this chapter shall be reduced in dimension or area below the minimum requirements set forth herein. Yards or lots created after the effective date of this chapter shall meet, at least, the minimum requirements established by this chapter.

§ 15.02.023 CONFLICT WITH OTHER ORDINANCES.

A. This chapter shall not repeal, annul, or impair any existing provisions of law, ordinance or rules or regulations previously adopted or issued or which shall be adopted or issued pursuant to law relating to the use of buildings or premises; provided, however, wherever the terms of this chapter require a greater width or size of yards, courts or other open spaces, or impose other higher standards than are required in any other statute or local ordinance or regulations, the provisions of this chapter shall govern.
B. Wherever the provisions of any other statute, local ordinance or regulations require greater width or size yards, courts or other open space, or require a greater percentage of plot to be left unoccupied, or impose other higher standards than are required in this chapter, the provisions of the statute, local ordinance or regulation shall govern.
C. All modifications heretofore granted by the Town Council shall remain in effect and binding.
D. This chapter shall remain in effect insofar as required for the initiation of any proceedings against any violations and for the prosecution of violations heretofore commenced.
E. Nothing in this chapter shall modify or repeal any deed restriction on land within the area of jurisdiction of this chapter, but no deed restriction shall constitute a basis for failing to comply with the chapter.

§ 15.02.024 DEVELOPMENT APPROVALS RUN WITH THE LAND.

Unless provided otherwise by law, all rights, privileges, benefits, burdens, and obligations created by development approvals made pursuant to this Chapter attach to and run with the land.

ESTABLISHMENT OF DISTRICTS

§ 15.02.035 GENERALLY.

A. For the purpose of this chapter, the town is divided into use districts.
B. Each type of district is listed with permitted uses and dimensional requirements.
C. Any use not specifically permitted by this chapter is prohibited.

§ 15.02.036 RESIDENTIAL DISTRICTS.

Use District	***Permitted Uses***	***Dimensional Requirements***
R-20	Single Family Residential	20,000 square feet minimum lot area
R-20A		
R-15	Single Family Residential	15,000 square feet minimum lot area
PDR-SF	Planned Development Residential	Single family district is intended to provide for the unified development of permanent residential

Use District	*Permitted Uses*	*Dimensional Requirements*
		neighborhoods containing only single family detached dwellings. No tract shall be considered for PDR-SF zoning unless it contains at least 10 acres. The total density in a PDR-SF district shall not exceed 4 dwellings per acre of land.
PDR-MF	Planned Development Residential	Multi-family district is intended to provide for unified development of permanent residential neighborhoods with 1 and 2 story attached condominiums, apartments, and townhouses with no more than 4 dwelling units in a single building. No tract shall be considered for PDR-MF zoning unless it contains at least 5 acres. The total density in a PDR-MF district shall not exceed 6-1/2 dwellings per acre of land. Minimum distance between MF residential buildings is 20 feet.

§ 15.02.037 INSTITUTIONAL DISTRICTS.

Use District	*Designation*
ID	Established to allow churches, private clubs, academic day schools or preparatory schools, and health related facilities, provided they are located on adequate sites and have provision for parking for times of maximum attendance or use of the premises, with landscaping and controls over lighting and signs so as not to affect adversely adjoining properties.

§ 15.02.038 BUSINESS DISTRICTS.

Use District	*Designation*
BD	Established to allow commercial development for retailing of goods and services and to provide offices and personal services. All these businesses shall provide a pleasing appearance, ample parking, controlled traffic movement and suitable landscaping and controls over lighting and signs so as not to affect adversely any adjoining properties.
PD-BD	Planned Development- Business District Land to be developed with an intent to either sell or rent 2 or more completed buildings or separated portions of the same building. All provisions of §§ 15.02.135 et seq. shall apply.
The area of a Business District development not covered by building shall be illuminated after dark and until the last of the business close for the day. Direct illumination on non-business district property, including public highways, by business district area lighting is prohibited. Reduced intensity illumination for security purposes during non-business hours may be used and is encouraged. All provisions of §§ 15.02.135 et seq. shall apply.	

§ 15.02.039 WILDLIFE PRESERVE DISTRICTS.

Use District	*Designation*
WP	Established to assure the continuing existence of the fragile wetland habitat for perpetuation of plants and wildlife essential to the preservation of the present and unique quality of the River Bend Community. County soil surveys have identified the wildlife preserve as lying within soil areas classified as muck, subject to flooding, and basically suitable only as habitat for wetlands, plants and wildlife. Muck lands as described by County Soil Conservation Specialists are unsuitable for sanitary facilities and for building site development.
The Wildlife Preserve may include coastal wetlands and public trust areas, which are areas of environmental concerns as identified by NCAC Title 15, Subchapter 7H .0205 and .0207.	
Also included may be Wetlands or other areas that may be subject to the regulatory jurisdiction of the U.S. Army Corps of Engineers.	

§ 15.02.040 AGRICULTURAL DISTRICTS.

Use District	*Designation*
AGR	As noted on the River Bend land use plan, nearly all lands north and east of the Plantation Canal within the River Bend planning area are designated as prime farmland (about 80%) or important farmland (about 20%). In the interest of protecting and preserving this agricultural land and preserving River Bend's unique rural flavor, and agricultural district is hereby established.

§ 15.02.041 PERMITTED USES FOR RESIDENTIAL DISTRICTS.

A. *Generally*. In these districts, no structures or premises shall be used and no structures or group of structures or part of a structure shall be erected, constructed, enlarged, altered, restored, converted, or relocated, or shall be designated to be used in whole or in part, except for 1 of the principal uses and 1 or more of the accessory uses set forth.

B. *Permitted principal uses for R20, R-20A and R-15 Districts*:
   1. One family dwelling; and
   2. Village park.

C. *Permitted accessory uses for R-20, R-20A, R-15, PDR-MF and PDR-SF Districts*:
   1. Private garden house, tool house, playhouse, greenhouse, bathhouse, boathouse, hobby shop, and studio not used for commercial or public purposes;
   2. Private swimming pool, tennis court or dock;
   3. Private garage or carport; and
   4. Storage for boat, house trailer, boat trailer or camper vehicle.

D. *Permitted principal uses for PDR-SF & PDR-MF Districts*. A single-family detached dwellings or multi-family dwellings as defined in § 15.02.036.

E. *Permitted accessory uses for MH District*. Private garden house, tool house, playhouse and greenhouse.

Penalty, see § 1.01.999

§ 15.02.042 PERMITTED USES FOR INSTITUTIONAL DISTRICTS.

Permitted uses for Institutional Districts:

A. Private clubs and lodges;
B. Academic day or preparatory schools;
C. Health related facilities; and
D. Churches.

Penalty, see § 1.01.999

§ 15.02.043 PERMITTED USES FOR BUSINESS DISTRICTS.

Permitted uses for Business Districts:

A. Commercial development for stores, personal services, banks, restaurants, social and business associations and offices; and
B.
    1. Residential use in a business district is allowed as long as the use is incidental to the intended business use.
    2. Where more than 1 business is located on a property or within a structure, such as but not limited to, a strip mall or office complex, this residential allowance shall be applied to each individual business location within the property or structure.

Penalty, see § 1.01.999

§ 15.02.044 PERMITTED USES FOR WILDLIFE PRESERVE DISTRICTS.

Only development or other uses as are allowed by the United States Army Corps of Engineers and the North Carolina Department of Natural Resources and Community Development and for which required permits of the aforesaid agencies and/or the Town of River Bend have been issued.

Penalty, see § 1.01.999

§ 15.02.045 PERMITTED USES FOR AGRICULTURAL DISTRICTS.

Crop production, gardening, orchards, forestry and logging. Property that is located in the Town's extraterritorial planning and development regulation jurisdiction and that is used for bona fide farms purposes is exempt from the Town's zoning regulation to the same extent bona fide farming activities are exempt from county zoning pursuant to this section. Property that ceases to be used for bona fide farm purposes shall become subject to exercise of the Town's extraterritorial planning and development regulation jurisdiction under this Chapter.

Penalty, see § 1.01.999

§ 15.02.046 MAPS.

A. The districts are bounded and defined as shown on a map entitled map of the Town of River Bend, Craven County, North Carolina which, with all explanatory matter thereon, hereby is adopted and made a part of this chapter.
B. The zoning map shall be identified by the signature of the Mayor attested by the Town Clerk and shall bear the seal of the town under the following words: "This is to certify that this is the Official Zoning Map referred to in §§ 15.02.035 et seq. of the Zoning Chapter of the Town of River Bend, North Carolina," together with the date of adoption of this chapter.
C. Zoning district maps, both current and prior, shall be maintained for public inspection in the office of the local government clerk or such other office as specified in the development regulation. The maps may be in paper or a digital format approved by the local government.
D. Development regulations adopted pursuant to this Chapter may reference or incorporate by reference flood insurance rate maps, watershed boundary maps, or other maps officially adopted or promulgated by state and federal agencies. For these maps, a regulation text or zoning map may reference a specific officially adopted map or may incorporate by reference the most recent officially adopted version of such maps. When zoning district boundaries are based on these maps, the regulation may provide that the zoning district boundaries are automatically amended to remain consistent with changes in the official promulgated state or federal maps, provided a copy of the currently effective version of any incorporated map shall be maintained for public inspection as provided in subsection (C) of this section.

§ 15.02.047 DISTRICT REQUIREMENTS.

For convenience in the administration of this chapter, there is hereby established and made a part of this chapter the following schedule for the several districts setting forth minimum limitations and requirements. The requirements listed for each district as designated are subject to all provisions of this chapter and, unless otherwise indicated, shall be deemed to be the minimum requirements in every instance of their application.

Schedule of District Requirements										
	R-20	**R-20A**	**R-15**	**PDR-MF**	**PDR-SF**	**ID**	**BD**	**WP**	**AGR**	**PD-BD**
Min. Lot Area (SF)	20,000	20,000	15,000	-	6,500	20,000	20,000	-	-	20,000
District Size	-	-	-	5 acres	10 acres	-	-	-	-	4 acres
Density	-	-	-	*	†	-	‡	-	-	‡
Min. Front Lot Line (FT)	90**	90**	85**	50††	50††	-	100	-	-	100
Min. Bldg. Set Back (FT)	30	30	30	25	25	40	40	-	-	40

Schedule of District Requirements										
	R-20	**R-20A**	**R-15**	**PDR-MF**	**PDR-SF**	**ID**	**BD**	**WP**	**AGR**	**PD-BD**
Min. Side Yard (FT)										
Main Building	10	10	10	10	10	10	10	-	-	10
Accessory Building	5	5	5	5	5	-	-	-	-	-
Swimming Pool	10	10	10	-	-	10	-	-	-	-
Tennis Court	15	15	15	-	-	10	-	-	-	-
Min. Rear Yard (FT)										
Main Building	15	15	15	15	15	10	20	-	-	20
Accessory Building	10	10	10	10	10	-	-	-	-	-
Swimming Pool	10	10	10	-	-	10	-	-	-	-
Tennis Court	15	15	15	-	-	10	-	-	-	-
Accessory Building	PLEASE REFERENCE CHART IN §15.02.061									
Max. Lot Coverage by Bldg. (%)	24	24	24	24	30	24	24	-	-	24
Max. Height (FT)										
Main Building	34	34	34	34	34	34	34	-	-	34
Accessory Building	The lesser of 18 FT or one (1) story									
CAMA and FEMA setbacks, if applicable, take priority to Town designated setbacks.										
*Density – PDR-MF – No more than 6.5 dwelling units per acre. †Density – PDR-SF – No more than 4 dwelling units per acre. ‡Density – BD, PD-BD – Nor more than 4 business units per acre. **Min. Front Lot Line – R-20, R-20A, R-15 – 40 FT on cul-de-sac. ††Min. Front Lot Line – PDR-MF, PDR-SF – 25 FT on cul-de-sac.										

Penalty, see § 1.01.999 *Amended 11/18/2021*

§ 15.02.048 APPLICATION REQUIREMENTS FOR BUSINESS DISTRICT AREAS ZONED BD AND BD-PD IN HEAVILY TRAFFICKED AREAS.

A. *General provisions*.

1. The purpose of this section is to visually enhance and provide for the orderly development of business and commercial areas along the Highway 17 corridor that is adjacent to or within the town and its extraterritorial jurisdiction, and along Shoreline Drive from Highway 17 to the first intersection with Plantation Drive. A site plan review process regulates the development of structures and sites in a manner that considers the following concerns, and where necessary, requires modification of development proposals to eliminate or minimize potential problems and nuisances, and to encourage architecturally and aesthetically integrated development in accordance with adopted architectural and site design guidelines. In addition, this section is designed to complement Article XXII of the City of New Bern's Code which outlines the architectural and aesthetic development of entrance corridors to the City of New Bern.
2. The principal areas of interest are:
    a) Protection of property values;
    b) The balancing of the landowner's rights to use his land, with the corresponding right of abutting and neighboring landowners to live without nuisances such as noise, smoke, fumes, odors, and glare of lights, visual pollution and the like;
    c) The convenience and safety of vehicular and pedestrian movement within the site, and in relation to adjacent areas or roads;
    d) Applicant's efforts to integrate the proposed development into the existing landscape, or to create a new "image" streetscape through design features such as vegetative buffers, berms, roadside plantings and the retention of open space; and
    e) The building setbacks, area and location of parking, architectural compatibility, and how these features harmonize with the surrounding developments and the natural landscape.

B. *Projects site plan review*.
1. Site plan review shall be required for all developmental projects involving the construction, exterior alteration, relocation, occupancy, or change in use of any building in the area zoned business or planned development business whose property lies adjacent to Highway 17 in the Town of River Bend or its extraterritorial jurisdiction area, or whose property is the result of the subdivision of those areas zoned business planned development business that would have been adjacent to Highway 17 had they not been subdivided. It also applies to the areas zoned business planned development business along Shoreline Drive from Highway 17 to Plantation Drive. Should there be any question of the areas to which this section applies, the overlay prepared by the Town of River Bend defining these areas shall be the determining document.
2. The site plan shall be reviewed by the Planning Board and Zoning Administrator.
3. Site plan review shall be required for the resumption of any use discontinued for more than 6 months that involves an exterior change, or for the expansion of any use. Expansion shall include any activity that requires an increase in square footage of at least 15%, or a change in occupancy that requires a new certificate of occupancy. Required approval includes

proposals for commercial, office, institutional, utility, multiple dwelling residential developments or recreational uses.

a) It is the responsibility of the owner to notify the Zoning Administrator of any change of occupancy or usage on their property, in writing.
b) The Zoning Administrator will determine if a site plan review or a new zoning permit is required.

C. *Application procedures*.

1. An application for site plan review in the overlay areas shall be submitted to the Zoning Administrator in accordance with the procedure set forth in § 15.02.166, by filing 3 copies of the site plan documents drawn to a scale not to exceed one inch equals 100 feet on standard 24 inch by 36 inch sheets. The town shall acknowledge receipt of these plans by endorsing them with a signature and date.
2. The Zoning Administrator shall review the site plan and supporting documents, taking into consideration the reasonable fulfillment of the objectives listed in this section and shall render a decision which shall consist of either:
   a) Approval of the site plan based upon a determination that the proposed plan will constitute a suitable development and is in compliance with the standards set forth in this section;
   b) Approval of the site plan subject to any conditions, modifications, and restrictions as required by the Zoning Administrator which will insure that the project meets the listed principal areas of interest; or
   c) Disapproval of the site plan based upon a determination that the proposed project does not meet the standards for review set forth in this section.

D. Site plan submission requirements.

1. Site plans shall be prepared by a registered professional surveyor, landscape architect, architect, engineer or other professional with demonstrated skills to complete the site plan at a scale of 1 inch equals 100 feet, on standard 24 inch by 36 inch sheets, with continuation sheets on 8-1/2 inch by 11 inch sheets as necessary for written information.
2. The site plan shall include the following data, details and supporting plans. All of the requirements must be met in each plan with notations explaining the reasons for any omissions. Items required for submission include:
   a) Name of project, boundaries, north arrow, scale, square footage or acreage in tract, and site plan vicinity map;
   b) Name and address of owner, developer, and seal of architect or similar professional, if applicable;
   c) Names and addresses of all abutting property owners;
   d) All existing and proposed lot lines, easements and rights-of-way;
   e) Location of all existing buildings and structures;
   f) Location of all existing and proposed public and private ways, parking areas, driveways, sidewalks, ramps, curbs, fences and walls. Location, type and screening details for waste disposal;

g) Locations, dimensions and sketches of all proposed signage;
h) A planting and berm plan showing all existing natural features, trees and water resources, and all proposed changes to those features including size and type of plant material;
i) Zoning district classifications of subject site and abutting properties;
j) Traffic flow patterns within the site, entrances and exits, loading and unloading areas, and curbing on the site;
k) Elevation plans to a minimum scale of 1/8 inch equals 1 foot for all exterior facades of proposed or existing structures and additions;
l) Approximate percentage of land to be covered by buildings;
m) Proposed uses;
n) Anticipated architectural style(s).

E. *Enforcement*.
1. The Zoning Administrator may revoke any zoning, special use, or conditional zoning permit to insure compliance with the plan and stated conditions of approval.
2. The Zoning Administrator may also suspend any permit or license when work is not performed within 1 year of approval of the site plan.
3. The permit issuing authority may extend the 1 year prior for good cause.
4. Appeals to the decisions of the permit issuing authority may be made to the Board of Adjustment through procedures outlined in §§ 15.02.173 et seq. of this chapter.

F. *Design guidelines and performance standards*.
1. The following are the design guidelines and performance standards.
2. Exceptions to these guidelines may be granted by the Board of Adjustment after reviewing the petition of the developer along with the recommendations of the Zoning Administrator.
   a) Required standards.
      (1) For those developments abutting Highway 17, entrance shall be from Pirates Road or Efird Boulevard. An exception may be granted for any single property not directly connected to Pirates Road or Efird Boulevard.
      (2)
         (a) For all developments, each development under single ownership shall be limited generally to 1 driveway access to provide both ingress and egress.
         (b) In cases where it is determined by the Zoning Administrator that more than 1 driveway access would provide a more efficient circulation pattern within the development and would promote improved traffic safety, 1 additional driveway access may be permitted.
      (3)
         (a) Shared driveway access between 2 neighboring developments shall also be recommended as a suitable alternative to the above mentioned requirement.
         (b) In these cases, it is recommended that the driveway midpoint be the property line between the 2 parcels.

(c) The driveway must meet standard specifications, and the estimated driveway volume will be the sum of the trip generation rate of both land uses in question.

(4) Those portions of the principal building visible from any street right-of-way shall be sheathed in materials such as wood siding, stone, stucco (drivet), brick or other masonry materials (excluding cinder block or regular concrete block). Metal facades may be used only with special permission of the Board of Adjustment upon recommendation of the Zoning Administrator.

Amended 06/20/2007

(5) All utilities leading to the buildings shall be underground.

(6) State and county rules shall apply to the construction of holding ponds and other drainage issues and all drainage plans shall be in conformity with the North Carolina Stormwater Site Planning Guidance Manual to show how the land will be used. The proposed specifications and drawings defining the stormwater drainage plans for the new project and for any changes to existing drainage features outside the new area necessary to accommodate the plan, will be submitted. The use of LID design approaches is preferred and should be implemented to the maximum extent practical given the site's soil characteristics, slope, and other relevant factors. If LID design approaches are not proposed in the stormwater management plan, the applicant shall provide a full justification and demonstrate why the use of LID approaches is not possible before proposing to use conventional structural stormwater management measures which channel stormwater away from the development site. The proposed drainage plan shall be in conformity with the North Carolina Stormwater Site Planning Guidance Manual to show how the land will be used. It shall be signed and sealed by a Registered Professional Engineer, licensed to practice in North Carolina.

Amended 06/18/2009

(7) All buffering shall meet the town's standard requirements as outlined in the town's Zoning Chapter, §§ 15.02.220 et seq.

(8) All signs should be compatible with the building in terms of design, scale and materials, and meet the town's size and standard requirements as outlined in the town's Zoning Chapter.

b) Recommended standards. In addition to the previous requirements, the following standards are recommended:

(1) No more than 60% of the facade of any principal building facing the highway corridor should be of glass or other reflective material; and

(2) Whenever possible, a planting area measuring an average of 5 feet in width should be provided around the periphery of all principal buildings in a development.

Penalty, see § 1.01.999

GENERAL DISTRICT REGULATIONS

§ 15.02.060 APPLICATION.

The regulations set forth in this subchapter shall affect all land, every building and every use of land and/or building existing at the time of the adoption of this chapter, and to new construction as follows.

A. *New uses or construction*. After the effective date of this chapter, all new construction of buildings or structures and/or all use of land shall conform with the requirements for the district in which it is located.
B. *Access and parking*. Each lot shall provide access to an approved street and shall provide adequate off-street parking. Each front lot line shall abut an approved street right-of-way line.
C. *Completion of existing construction*. Nothing herein shall require any change in the plans, construction or designated use of a building actually under construction at the time of the passage of this chapter, or of a building for which a building permit has been issued and in which the entire building is completed within 1 year from the date of the adoption of this chapter.
D. *Conforming uses or structures*. After the effective date of this chapter, any existing structures or uses of land or structures which then conform with the regulations for that district may be continued without specific permit, provided that any subsequent alteration or change in use shall conform with the requirements of this chapter.
E. *Added territory*. All territory which hereinafter may be included within the town's jurisdiction either through annexation or extension of the town's extraterritorial area shall be classified into zoning districts determined by the Town Council, after the Town Council receives recommendations from the Planning Board and after advertised public hearing. The Town of River Bend must provide mailed notice to owners of all parcels of land proposed for addition to the area of extraterritorial jurisdiction, as shown on the county tax records, thirty days prior to the date of the extraterritorial jurisdiction (ETJ) hearing, and may hold one hearing (with single mailed notice) regarding ETJ and initial zoning amendment.

Penalty, see § 1.01.999

§ 15.02.061 PRINCIPAL AND ACCESSORY BUILDINGS.

A. *Principal building*. No lot in any residential district shall be occupied by more than 1 principal building.
B. *Manufactured home*. An off-frame manufactured home must meet the following additional requirements:
    1. Assembled on a permanent foundation consisting of a continuous perimeter weight bearing wall with storm ties embedded;
    2. Permanent underpinning of solid masonry;
    3. Permanent interior foundation support of solid masonry or its equivalent;

4. Permanent steps and/or stoops to all exterior entries; a roofing surface of materials other than sheet goods; and
5. An exterior siding of wood, masonry, vinyl or other non-metal construction.

C. *Accessory building*. Except for detached garages and detached carports which may be located in a side yard, accessory buildings may be located only in a rear yard. The square footage (SF) of accessory structures located on a lot shall not exceed the following maximum square footage:

Lot Size*	One Accessory Building	Total Combined SF of All Accessory Buildings
Less than 1 acre	800 square feet	1,000 square feet – maximum of two (2) structures
1 to 3 acres	1,200 square feet	1,800 square feet – maximum of three (3) structures
More than 3 acres	2,400 square feet	4,800 square feet – maximum of four (4) structures
For properties in PDR-MF and PDR-SF, only one (1) accessory building is allowed and it shall not exceed 400 square feet.		

Provided, however, all accessory buildings shall conform to the applicable requirements of § 15.02.047 for the district in which located and no accessory building shall be located closer than 10 feet to the main building located on the same lot or closer than 10 feet to any other building located on the same lot. Any patio, deck, porch, stairs, and/or ramps, roofed or unroofed (attached or immediately proximate thereto), shall be considered a part of a building in the determination of yard setback and of distance between the accessory building and all other buildings located on the same lot. All accessory buildings must be constructed and anchored in accordance with currently applicable North Carolina Residential Codes and FEMA Flood Damage Prevention Ordinances.

Amended 11/15/2018

Penalty, see § 1.01.999

§ 15.02.062 FENCES AND WALLS.

The purpose and intent of this section is to recognize that fences and/or walls serve legitimate private and public uses including but not limited to security and creating visual buffers between properties. These regulations are intended to establish standards that maximize the effectiveness of the fencing while preserving the views and safety of motorists, adjacent property owners and the public in general.

A. A fence or wall, unless otherwise stated, hereinafter referred to as fence, is defined as a freestanding, vertical structure, constructed of man-made or natural materials, or a combination thereof. While it may accomplish the same objective as a man-made fence, living vegetative materials such as trees and shrubs are not considered a fence that requires a permit.

B. A fence may provide any or all of the following: indicate a boundary; provide a barrier (either physical or visual); protect property; provide privacy; serve as an enclosure; control erosion or provide stability (such as is accomplished with a retaining wall); create a landscaping or ornamental effect.

C. Fences are a permitted use in all zoning districts, provided that:

1. No fences shall be allowed in any front yard, except where specifically authorized herein.
2. Fences shall be limited to seven (7) feet in height within any side or rear yard.
3. Fences shall be constructed of wood, brick, vinyl, ornamental iron or metal railing, chain link or stone. The exposed framing of each section of fence shall face the interior yard or property, e.g. the finished side shall face out.
4. The owner of the property on which the fence is located is required to maintain the fence in a safe condition and plumb (vertical) to the ground. For fences erected close to a property line, fence owners are advised to consider future access to the exterior side of the fence for maintenance.
5. Retaining walls over five (5) feet in height shall be designed and constructed under the responsible charge of a NC registered professional engineer.
6. Fences built in conjunction with electric or gas substations, public works facilities, public recreation facilities or other similar uses shall not exceed ten (10) feet in height without specific approval of the Zoning Administrator. Fences of this type may be located within front yards with approval of the Zoning Administrator.
7. No fence shall be constructed within or upon any street right-of-way. In addition, no fence shall be constructed within ten (10) feet of any street pavement.
8. No fence or wall shall alter or impede the natural flow of water in any stream, creek, drainage swale, ditch or similar drainage feature.
9. Fences made of mesh-type material, which may be easily trimmed/cut with scissors and used as a means to protect vegetation from animals may be located within front yards, provided it does not exceed six (6) feet in height or encompass more than 225 square feet (cumulatively) of the front yard.
10. In residential zoning districts, fences shall not be constructed of material which may be dangerous or hazardous to the public, such as barbed or razor wire or other similar materials except in association with those uses permitted as a special use.
11. Fences constructed on or over utility easements are subject to be removed at the owner's expense subject to the terms of the easement.
12. Nothing in this section shall prevent the installation of temporary fences related to construction sites or sediment and erosion control. Temporary fences shall be removed within ten (10) days of the issuance of a certificate of zoning compliance for the project. Temporary fences must be removed within (90) days of their installation. A temporary permit may be extended for thirty (30) days.
13. It is the responsibility of the fence owner to insure that the fence is installed on their property.

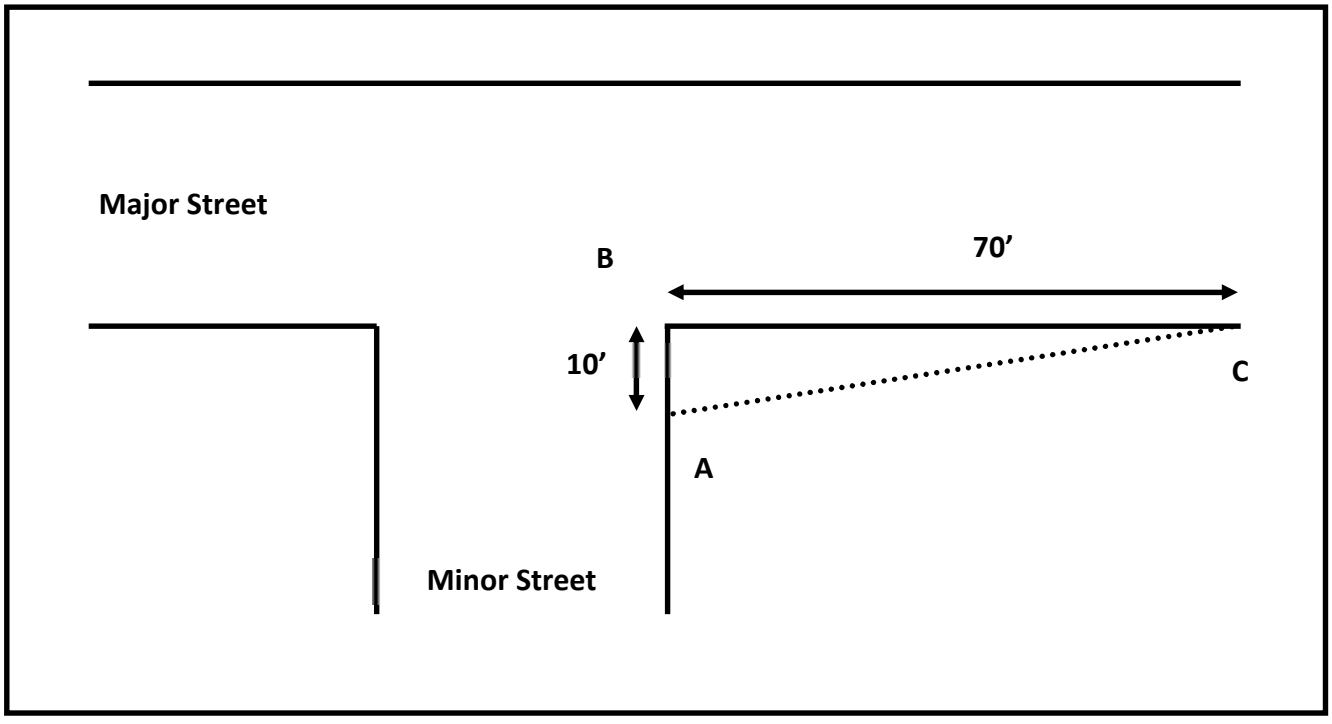
14. Non-opaque fences may be located in the front yard of a lot zoned Business (BD), provided that the lot has a minimum of 100 feet of uninterrupted road frontage with a road maintained by the North Carolina Department of Transportation.
15. A zoning permit is required for the installation of any fence, except for the mesh-type fences described in Item 9, above.

Amended 11/18/2021

D. Visibility at intersections.
   1. In all districts, a clear line of sight must be maintained within each line of sight triangle formed at the intersection of any street (public or private), excluding private driveways, with another street (public or private), so intersected.
   2. To maintain a clear line of site, no fence, wall or other structure or planting of more than 3 feet may be placed within this sight triangle.
   3. The dimensions of the line of sight triangle shall be a point 70 feet along and with the street so intersected from the point of intersection, a point 10 feet along and with the street from the point of intersection, and a straight line extending from the 2 points so located. (See example below.)

Amended 04/16/2009

   a) Point B – The point of intersection of the major street (street with the right of way) with the minor street (street which must yield to oncoming traffic).
   b) Point A – A point located 10 feet (measured along the pavement) from Point B on the minor street.
   c) Point C – A point located 70 feet (measured along the pavement) from Point B on the major street



E. Buffering. In applicable Zoning Districts, the provisions of §§ 15.02.220 et seq. of the Zoning Chapter shall apply.

§ 15.02.063 OTHER APPURTENANT STRUCTURES, UTILITIES AND RECREATIONAL EQUIPMENT.

A. For the purpose of these regulations, swimming pools, TV satellite dish antennas and tennis courts as referenced in this section pertain to those that are an accessory use on a private residential lot.

B. Those at a recreation center or club are considered separately and must meet the regulations for the district where they are permitted.

1. *Swimming pools*. Swimming pools may be permitted as an accessory use in residential districts, provided the pool is not more than 6 feet above ground level, and provided further that the pool retaining wall is not within 10 feet of any rear or side lot line. No swimming pool shall be permitted in the required front yard of a lot. Swimming pools permanently constructed below the ground level and exceeding 40 square feet in water area shall be protected by a 4 foot fence which may enclose the whole or part of the entire lot and which shall have self-closing gates and latches. Spill-offs and drainage from swimming pools shall not be permitted to flow onto adjacent property or streets.
2. *Tennis courts*. Tennis courts may be permitted as an accessory use in residential districts, provided the minimum side yard is 15 feet and the minimum total of both side yards is 30 feet, and the minimum rear yard is 15 feet. No tennis court shall be permitted in the required front yard of a lot.
3. *Recreational equipment, trailers and commercial vehicles*. Major recreational equipment, trailers and commercial vehicles shall be parked or stored behind the front line of the main building.
4. *TV satellite dish antennas*.
    a) No satellite antenna with a dish larger than 24 inches in diameter for the purpose of receiving television or other communication signals from orbiting satellites shall be located on any vacant lot, on any building on any lot forward of the rear elevation of the principal building located on the lot, closer than 10 feet to the side lot line, closer than 10 feet to the rear lot line or at a height in excess of 15 feet above the existing grade of the lot upon which the antenna is located with the antenna in its vertical position. All dishes shall be effectively screened on the non-receptive sides to the height of the unit by evergreen natural screening. The shrubbery selected for the screening should be large enough to reach the height of the unit in 3 years. All TV antennas must be permanently installed. No mobile, temporary, or trailer mounted units are permitted.
    b) This section does not prohibit the installation of amateur radio antennas or towers.
5. *Liquefied petroleum gas (LPG) tanks and cylinders*. All LPG tanks and cylinders must be effectively screened by shrubbery or fence which will block the tank from view when

observed from the adjoining property, streets, golf course and waterways and shall be located only in the side or rear yard. This visual barrier must be in compliance with the code for access, venting and all other requirements of the National Fire Protection Association and River Bend's Zoning Chapter.

6. *Dumpsters and off-street trash handling facilities*.

Amended 10/17/2007

a) All dumpster and trash handling facilities shall be located on the same zoning lot as the use served.

b) All dumpster and trash handling facilities other than those temporarily placed for use during construction, shall be completely screened from public view, and from the view of all adjoining property. A wall, solid wood fence, evergreen hedge, earth berm or any combination thereof shall be provided to obscure these facilities. However, when the service side(s) of the particular facility faces any property line, a wall or solid wood fence with gates or doors, must be provided. If shrubs are used as the screening material, they shall be from 4 to 5 feet in height, spaced no farther than 4 feet apart. If a wall, solid wood fence or earth berm is used as the screening material, its minimum height shall be 6 inches above the proposed facility.

c) All dumpster and trash handling facilities shall be designed with appropriate, unobstructed means of access to a publicly maintained street or alley in a manner which will least interfere with traffic movement, and which will most facilitate the service of the facilities.

d) Space allocated to any off-street dumpster and trash handling facilities shall not, while so allocated, be used to satisfy the space requirements for off-street parking and/or loading facilities or portion thereof, nor shall any parking or loading spaces be used to satisfy the space requirements for any dumpster or trash handling facility.

e) Each dumpster, or other trash container, shall be properly covered so as to prevent debris from falling from, or otherwise coming out of the container. Covers shall be secured so as to guard against entry by children and animals.

Penalty, see § 1.01.999

§ 15.02.064 HEIGHT LIMIT.

A. Building height is determined by calculating the distance from the average elevation of the finished grade at the front of the building facing the street to the highest point of the roof surface (for a flat roof) or the mean height level between the eaves and the ridge (for a gable, hip or gambrel roof).

B. Architectural features and mechanical appurtenances such as steeples, cupolas, chimneys, antennas, ventilators, water towers or similar features which occupy no greater than 5% of the total square footage of a building may exceed the height limits of the district in which located, provided that they shall be erected only to the height as is necessary to accomplish the purpose

they are intended to serve. Water towers shall be exempt from the 5% maximum restriction of total building square footage. Exceptions may be granted by the Board of Adjustment.

Penalty, see § 1.01.999

§ 15.02.065 TEMPORARY USES.

Temporary use of property for construction offices may be permitted and shall be limited to the construction site. Temporary construction offices shall be removed immediately upon completion or abandonment of construction.

Penalty, see § 1.01.999

§ 15.02.066 WATER SUPPLY AND SEWAGE DISPOSAL.

A. *Approval*. Each application for an initial zoning permit or a special use permit shall be accompanied with plans of the proposed method of water supply and sewage disposal. All new construction having available public and/or community water and/or sewage disposal systems upon payment of applicable tap-on and other user fees and charges shall provide for connection to the water systems and/or sewage disposal systems and in accordance with § 5.01.007 of this Code, remain connected to said system(s) as the sole means of supplying potable water to and/or wastewater removal from all improvements on the property. No excavation for or construction of any building or use of land shall be commenced until approval of the Craven County Health Department is noted on the plans and an initial zoning permit is issued.

Amended 06/18/2009

B. *Method to be specified*.
   1. Any application shall specify the method or methods to be used and shall describe any special conditions to be met.
   2. Subject to the provisions of division (A) above requiring connection to available public and/or community and/or sewage disposal systems, the methods and the approvals required, include the following:
      a) Connection to public water or sewage disposal systems operated by the town, or other governmental unit or agency with connection approval by an authorized officer of each system.
      b) Connection to community water or sewage disposal systems operated by a person, firm or corporation other entity other than a governmental unit or agency with connection approval by an authorized officer of each system.
      c) Installation of other than public water or sewage disposal systems of each appropriate authorizing agency.

Penalty, see § 1.01.999

§ 15.02.067 HOME OCCUPATIONS.

A. Customary occupations and offices of a professional person such as a physician, dentist, architect, lawyer, engineer, artist, musician, real estate, insurance agent, accountant and the like, are permitted, provided the use is clearly incidental and subordinate to the residential use of a dwelling unit, and not more than 25% of the floor area is used in the conduct of home occupations.
B. There shall be no change in the outside appearance of the building, no display shall be allowed upon the premises, and no person not a resident on the premises shall be employed specifically in connection with the home occupation. No process shall be used which may create noise, vibration, fumes or other nuisance.
C. Parking generated by the conduct of home occupation shall be met by providing the space behind the front line of the dwelling.
D. No signs are permitted in conjunction with home occupations.

Penalty, see § 1.01.999

§ 15.02.068 NON-CONFORMING SITUATIONS.

A. *Generally*.
    1. A non-conforming situation occurs when, on the effective date of this chapter, an existing lot or structure or use of an existing lot or structure does not conform to 1 or more of the Town of River Bend Zoning Chapter and regulations applicable to the zoned area in which the lot or structure is located.
    2. Among other possibilities, a non-conforming situation may arise because:
        a) A lot does not meet minimum square footage requirements;
        b) Structures exceed maximum height limitations;
        c) The relationship between existing buildings and the land (in such matters as density and setback requirements) is not in conformity with this chapter; or
        d) The land or buildings are used for purposes not permitted by this chapter.
B. Continuation of non-conforming situations and completion of non-conforming projects.
    1. Non-conforming situations that were otherwise lawful on the effective date of this chapter may be continued, subject to the restrictions and qualifications set forth in the divisions below.
    2. Non-conforming projects may be completed only in accordance with the provisions of division (H) below.
C. Non-conforming lots.
    1. When a non-conforming lot, existing prior to the adoption of this chapter, can be used in conformity with all of the regulations applicable to the intended use, except that the lot is smaller than the required minimum set forth in the town's Zoning Chapter, the lot may be used as proposed just as if it were conforming. However, no use, (e.g., a duplex) that requires a greater lot size for a particular zone is permissible on a non-conforming lot.

2. When the use proposed for a non-conforming lot is 1 that is conforming in all other respects but the applicable setback requirements (see Town of River Bend Zoning Chapter § 15.02.047) cannot be complied with, then the Board of Adjustment, authorized by this chapter may issue a permit for the proposed use, in accordance with Town of River Bend Zoning Chapter § 15.02.175, variance if it finds that:
   a) The property cannot be developed for the use proposed without these deviations; or
   b) The property can be developed as proposed without any adverse impact on surrounding properties or the public health or safety.
3. This section applies only to undeveloped non-conforming lots. A lot is undeveloped if it has no structures upon it.
4. If, on the date this division becomes effective, an undeveloped non-conforming lot adjoins and has continuous frontage with 1 or more other undeveloped lots under the same ownership, then neither the owner of the non-conforming lot nor his successors in interest may take advantage of the provisions of this section. This division shall not apply to a non-conforming lot if a majority of the developed lots located on either side of the street where the lot is located and within 500 feet of the lot are also non-conforming. The intent of this division is to require non-conforming lots to be combined with other undeveloped lots to create conforming lots under the circumstances specified herein, but not to require the combination when that would be out of character with the way the neighborhood has previously been developed.

D. Extension or enlargement of non-conforming situations.
   1. Except as specifically provided in this section, no person may engage in any activity that causes an increase in the extent of non-conformity of a non-conforming situation. In particular, physical alterations of structures or the placement of new structures on open land is unlawful if the activity results in:
      a) An increase in the total amount of space devoted to a non-conforming use; or
      b) Greater non-conformity with respect to dimensional restrictions such as setback requirements, height limitations or density requirements or other requirements such as parking requirements.
   2. Notwithstanding division (D)(1) above, any structure used for single family residential purposes (other than manufactured homes) and maintained as a non-conforming use may be enlarged or replaced with a similar structure of a larger size, so long as the enlargement or replacement does not create new non-conformities or increase the extent of existing non-conformities. Manufactured homes used for single family residential purposes may be enlarged or replaced in accordance with this division; provided, however, the enlargement or expansion in the case of those manufactured homes that have remained vacant beyond the 180 day discontinuance period shall be prohibited by this chapter. This division is subject to the limitations stated in division (G).

E. Repair, maintenance and reconstruction.
   1. Minor repairs to and routine maintenance of property where non-conforming situations exist are permitted and encouraged. Renovation work estimated to cost more than 25% of

the appraised valuation of the structure prior to damage and/or renovation, may be done only in accordance with a zoning permit issued pursuant to this section.

2. For purposes of division (E)(1) above:
   a) The cost of renovation or repair or replacement shall mean the fair market value of the materials and services necessary to accomplish the renovation, repair, or replacement.
   b) The cost of renovation or repair or replacement shall mean the total cost of all the intended work, and no person may seek to avoid the intent of division (E)(1) by doing the work incrementally.
   c)
      (1) The appraised valuation shall mean either the appraised valuation for property tax purposes, updated as necessary by the increase in the consumer price index since the date of the last valuation or the valuation determined by a professionally recognized property appraiser.
      (2) It shall be the responsibility of the property owner to supply the town with the appraised valuation of the property. The valuation shall include the necessary documentation to support the valuation.
      (3) The Zoning Administrator may issue a permit authorized by this section if he finds that, in completing the renovation, repair or replacement work:
         (a) No violation of division (D) above will occur; and
         (b) The permittee will comply to the extent possible with all provisions of this chapter applicable to the existing use except that the permittee shall not lose his right to continue a non-conforming use, except for those reasons outlined in division (G) below with a requirement of this division is not possible if compliance cannot be achieved without adding additional land to the lot where the non-conforming situation is maintained or moving a substantial structure that is on a permanent foundation.

F. Change in use of property where a non-conforming situation exists.
   1.
      a) A change in use of property that is sufficiently substantial to require a new zoning permit (§ 15.02.166) or special use permit (§§ 15.02.120 et seq.) may not be made except in accordance with divisions (F)(2) and (3) below.
      b) However, this requirement shall not apply if only a sign permit is needed.
   2. If the intended change in use is to a principal use that is permissible in the district where the property is located, and all of the other requirements of this ordinance applicable to that use can be complied with, permission to make the change must be obtained in the same manner as permission to make the initial use of a vacant lot. Once conformity with this chapter is achieved, the property may not revert to its non-conforming status.
   3. If the intended change in use is to a principle use that is permissible in the district where the property is located, but all of the requirements of this chapter applicable to that use cannot be complied with, then the Zoning Administrator may issue a permit authorizing the change.

If the Zoning Administrator finds, in addition to any other findings that may be required by this chapter, that:

a) The intended change will not result in a violation of division (D) above; and

b) All of the applicable requirements of this chapter that can be complied with will be complied with. Compliance with a requirement of this chapter is not possible if compliance cannot be achieved without adding additional land to the lot where the non-conforming situation is maintained or moving a substantial structure that is on a permanent foundation. And in no case may an applicant be given permission pursuant to this division to construct a building or add to an existing building if additional non-conformities would thereby be created.

4. A change in use to another principal use that is also non-conforming is not permissible.

G. Abandonment and discontinuance of non-conforming situations.

1. When a non-conforming use is discontinued for a continuous period of 180 days, the property involved may thereafter be used only for conforming purposes.
2. If a non-conforming use is maintained in conjunction with a conforming use, discontinuance of a non-conforming use for the required 180 day period shall terminate the right to maintain it thereafter.
3. When a structure or operation made non-conforming by this chapter is vacant or discontinued at the effective date of this chapter, the 180-day period for purposes of this division begins to run at the effective date of this chapter.

H. Completion of non-conforming projects.

1. All non-conforming projects on which construction was begun at least 180 days before the effective date of this chapter as well as all non-conforming projects that are at least 25% completed in terms of the total expected cost of the project on the effective date of this chapter may be completed in accordance with the terms of their permits, so long as these permits were validly issued and remain unrevoked and unexpired. If a development is designed to be completed in stages, this division shall apply only to the particular phase under construction.
2. Except as provided in division (H)(1) above, all work on any non-conforming project shall cease on the effective date of this chapter, and all permits previously issued for work on non-conforming projects shall be revoked as of that date. Thereafter, work on non-conforming projects may begin or may be continued only pursuant to a zoning, special use or sign permit issued in accordance with this section by the individual or Board authorized by this chapter to issue permits for the type of development proposed. The Zoning Administrator may issue a permit if he finds that the applicant has in good faith made substantial expenditures or incurred substantial binding obligations or otherwise changed his position in some substantial way in reasonable reliance on the land use law as it existed before the effective date of this chapter and thereby would be unreasonably prejudiced if not allowed to complete his project as proposed. In considering whether these findings may be made, the Zoning Administrator shall be guided by the following, as well as other relevant considerations.

a) All expenditures made pursuant to a validly issued and unrevoked building, zoning, sign or a special use permit shall be considered as evidence of reliance on the land use law that existed before this chapter became effective.
b) Except as provided in division (H)(2)(a) above, no expenditures made more than 180 days before the effective date of this chapter may be considered as evidence of reliance on the land use law that existed before this ordinance became effective. An expenditure is made at the time a party incurs a binding obligation to make that expenditure.
c) To the extent that expenditures are recoverable, a party shall not be considered prejudiced by having made those expenditures. For example, a party shall not be considered prejudiced by having made some expenditure to acquire a potential development site if the property obtained is approximately as valuable under the new classification as it was under the old, for the expenditure can be recovered by a resale of the property.
d) To the extent that a non-conforming project can be made conforming and that expenditures made or obligations incurred can be effectively utilized in the completion of a conforming project, a party shall not be considered prejudiced by having made these expenditures.
e) An expenditure shall be considered substantial if it is significant both in dollar amount and in terms of:
    (1) The total estimated cost of the proposed project; and
    (2) The ordinary business practices of the developer.
f) A person shall be considered to have acted in good faith if actual knowledge of a proposed change in the land use law affecting the proposed development site could not be attributed to him.
g) Even though a person had actual knowledge of a proposed change in the land use affecting a development site, the Zoning Administrator may still find that he acted in good faith if he did not proceed with his plans in a deliberate attempt to circumvent the effects of the proposed chapter. The Zoning Administrator may find that the developer did not proceed in an attempt to undermine the proposed chapter if he determines that:
    (1) At the time the expenditures were made, either there was considerable doubt about whether any ordinance would ultimately be passed, or it was not clear that the proposed ordinance would prohibit the intended development; and
    (2) The developer had legitimate business reasons for making expenditures.

3. The Zoning Administrator shall not consider any application for the permit authorized by division (H)(2) above that is submitted more than 60 days after the effective date of this chapter. The Zoning Administrator may waive this requirement, but in no case may extend the application deadline beyond 1 year.

4. The Zoning Administrator may establish expedited procedures for hearing applications for permits under this section, so that construction work is not needlessly interrupted.
5. When it appears from the developer's plans or otherwise that the non-conforming project was intended to be, or could be completed in stages, segments or other discrete units, the Zoning Administrator shall not allow the non-conforming project to be constructed or completed in a fashion that is larger or more extensive than is necessary to ensure completion of the project.

I. Non-conformity use of land or minor structures. Where at the time of passage of this chapter lawful use of land exists which would not be permitted by the regulations imposed by this chapter, and where the use involves no individual structure with an appraised value (APPRAISED VALUE is the value recorded by the county tax assessor for county and municipal tax purposes.) exceeding $ 3,000, the use may be continued so long as it remains lawful, provided:
   1. No non-conforming use shall be enlarged or increased, nor extended to occupy a greater area of land than was occupied at the effective date of adoption of this chapter;
   2. No non-conforming use shall be moved in whole or in part to any portion of the lot or parcel other than that occupied by the use at the effective date of adoption of this chapter;
   3. Non-conforming uses of land involving minor structures such as signs or stored junk materials such as storage yards, junk yards or salvage yards, shall be removed according to the following schedule after the effective date of this chapter:

Appraised Value of Minor Structure or Junk Material	Time for Removal
Less than $500	1 year
$500 to $999	2 years
$1,000 to $1,999	3 years
$2,000 to $2,999	4 years
$3,000 or more	5 years

Penalty, see § 1.01.999

§ 15.02.069

This section is intentionally left blank. See § 9.03.010 Stormwater Drainage.

Amended 11/19/2020

OFF-STREET PARKING AND LOADING

§ 15.02.080 OFF-STREET PARKING REQUIREMENTS.

A. There shall be provided at the time of the erection of any building permanent off-street parking space in the amount specified by this section.

B. The parking space may be provided in a parking garage or properly paved open area.
C. Except for residential parking spaces, all the parking area shall be in accordance with North Carolina State Department of Transportation standards.
    1. Each application for an initial zoning permit shall include information as to the location and dimension of off-street parking and loading space and the means of ingress and egress to the space. This information shall be sufficient detail to enable a determination whether or not the requirements of this section are met.
    2. The required parking space for any number of separate uses may be combined in 1 lot but the required space assigned to 1 use may not be assigned to another use, except that ½ of the parking space required for churches, theaters or assembly halls whose peak attendance will be at night or on Sundays may be assigned to a use which will be closed at night and on Sundays.
    3. If the off-street parking space required by this chapter cannot be reasonably provided on the same lot on which the principal use is located, the Board of Adjustment may, as a special use, permit the space to be provided on any land within 400 feet of the main entrance to the principal use, provided the land is in association with the principal use and is zoned for the principal use involved. The land shall be used for no other purpose so long as no other adequate provision for parking space meeting the requirements of this chapter has been made for the principal use and is zoned for the principal use involved.
    4.
        a) The minimum number of required off-street parking spaces shall be calculated from the following table. In the case of a building or use not expressly provided for, the number of off-street spaces shall be the same as for a similar use of inclusive category which is provided for.
        b) Where there is more than 1 use in a single structure or on a single tract, or 2 or more instances of the same use, the minimum number of required off-street parking spaces shall be equal to the sum of the requirements of the various uses.
    5. The following parking requirements shall be applied as indicated in the schedule of district use regulations of this chapter.

Minimum Off-street Parking Facility Requirements	
Category	**Parking Spaces Required**
A	2 parking spaces per dwelling unit
B	2 parking spaces per dwelling unit plus 1 for each 4 dwelling units
C	1 parking space per room plus 10% of the number of employees
D	3 parking spaces in addition to residence requirements
E	1 parking space for each 4 seats in the principal place of assembly
F	Parking space requirements are conditional with individual special use permits granted

Minimum Off-street Parking Facility Requirements	
Category	**Parking Spaces Required**
G	1 parking space for each 200 square feet of gross floor area
H	1 parking space for each 600 square feet of gross floor area
I	1 parking space for each 1,000 square feet of gross floor area
J	2 parking spaces for the lot plus 1 parking space for each service bay area

Penalty, see § 1.01.999

§ 15.02.081 OFF-STREET LOADING REQUIREMENTS.

A.
1. The number of off-street loading berths required by this section shall be considered as the absolute minimum.
2. For purposes of this section, an off-street loading berth shall have minimum plan dimensions of 12 feet by 25 feet and 14 feet overhead clearance with adequate means for ingress and egress.

B. For non-residential structures containing not more than 25,000 square feet of gross floor area, 1 berth shall be required.

C. For non-residential structures containing 25,000 or more square feet of gross floor area, the number of berths specified in the table below shall be provided.

Square Feet of Gross Floor Area	Required Number of Berths
25,000 – 40,000	1
40,000 – 100,000	2
100,000 – 160,000	3
160,000 – 240,000	4
240,000 – 320,000	5
320,000 – 400,000	6
Each 90,000 and above 400,000	1

Penalty, see § 1.01.999

§ 15.02.082 OFF-STREET MINIMUM PLANTING REQUIREMENTS.

Parking areas in all commercial office and institutional, multi-family, non-residential uses in a residential district, and planned unit developments which have 10 or more parking spaces shall be planned as follows:

A.
1. For every 10 spaces provided, 1 planting area of not less than 9 by 18 feet shall be required. This area shall either be spaced between each 10 parking spaces or otherwise randomly combined or spaced within the parking area to provide a planting area which shall be planted according to a planting plan.
2. There must be uniform planting of trees and other plant material with a parking area, rather than having all required planting space combined into 1 area or along the perimeter of the parking lot.
3.
    a) There shall be 1 tree no less than 2 inches in caliper for each 9 by 18 foot planting area. The type of tree and the planting must be consistent with good design standards, as shown on a planting plan sealed by a licensed landscaper, and given to the Community Appearance Commission (CAC).
    b) The CAC shall review the plan and make written recommendations for approval or revision within 30 days to the Town Zoning Administrator, together with reasons therefor for final approval by the Town Zoning Administrator.

B. Shrubbery, hedges and other live plant material may be used to complement the tree planting, but shall not be substituted for the tree.

C. Each planting area approved in accordance with division (A) above may be counted as 1 parking space when computing the number of parking spaces required.

D. The owners, their heirs and assigns shall be responsible for protecting and maintaining all planting in a healthy growing condition, replacing it when necessary and keeping it free of refuse and debris.

E. All planting plans shall provide the following general information:
1. Approximate locations of required plant material to be planted on the site; and
2. Information on the quality and caliper of all trees to be planted or retained on the site.

Penalty, see § 1.01.999

§ 15.02.083 ACCESS TO OFF-STREET PARKING AND OFF-STREET LOADING.

A. No portion of any driveway providing access from a public street to off-street parking or off-street loading as required under this chapter shall be constructed within the right-of-way of any street or over any adjacent drainage ditch which, in the opinion of the Zoning Administrator, would create a safety hazard or would retain or impede unduly the flow of water in the drainage ditch; and each application for an initial zoning permit shall include information as to the design

of the driveway providing access to off-street parking and off-street loading together with information as to the type, size and proposed elevation of any drainage tile or pipe proposed for installation within the right-of-way of any street or within any drainage ditch in sufficient detail to enable a determination of whether or not the requirements of this section are met.

1. Parking only on an improved parking area: any motor vehicle located on a property in which the principal use is a residential dwelling and which is parked, stored, or otherwise located between the street and the front or corner side building line of the dwelling shall be parked, stored, or otherwise located only on an improved parking area for the property.

Added 03/18/2010, Amended 07/18/2013

An improved parking area shall be that portion of the property that is graveled or paved with an all-weather surface (such as asphalt, concrete, brick, stone, or similar material) and provides access to the street.

Added 03/18/2010

The improved parking area shall:

a) Be maintained in a safe, sanitary, and neat condition;
b) Not contribute to or increase soil erosion;
c) In any new area, be graveled or paved with an all-weather surface;
d) Connect directly with the existing driveway and, to the extent practical on the site, be located such that it is not located directly in front of the dwelling. This ordinance is not meant to prohibit residents or their guests from parking on existing driveways, whether improved or not, and shall not prohibit a resident or their guests from parking in front of a building when an existing driveway, whether improved or not, is located in front of the building.

Added 03/18/2010, Amended 07/18/2013

The foregoing provisions do not apply to short-term parking for guests, contractors, and the like, provided that the short-term parking is infrequent and of a duration that does not exceed two consecutive days.

Added 03/18/2010, Amended 07/18/2013

B. All driveways constructed within the right-of-way of any street or over any adjacent drainage ditch and all drainage tiles or pipes installed within the right of way of any street or within any drainage ditch shall be constructed and/or installed in strict conformity with the information provided as aforesaid.
C. Drainage ditch integrity shall be maintained against soil erosion and/or drainage changes at all stages of construction with marl rip-rap, mulching, sodding and the like.
D. The portion of any driveway between the front lot line and the street pavement shall be paved.

Penalty, see § 1.01.999

SIGNS

§ 15.02.095 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

ADVERTISING SIGN. A sign which directs attention to a business, commodity, service or entertainment conducted, sold or offered:

(1) Only elsewhere than upon the premises where the sign is displayed; or

(2) Is as a minor and incidental activity upon the premises where the sign is displayed.

BUSINESS SIGN. A sign which directs attention to a business or profession located upon the premises where the sign is displayed, to type of products sold, manufactured, or assembled, and/or to service or entertainment offered on the premises, but not a sign pertaining to the preceding if the activity is only minor or incidental to the principal use of the premises.

FREESTANDING SIGN. A sign that:

(1) Is permanent; and

(2) Is attached to, erected on, or supported by some structure such as a pole, mast, or frame that is not itself an integral part of a building or other structure having a principal function other than the support of a sign.

NON-CONFORMING SIGN. A sign that, on the effective date of this chapter, does not conform to 1 or more of the regulations set forth in this chapter.

OFF-PREMISES SIGN. A sign that draws attention to or communicates information about a business, service, commodity, accommodation, attraction or other activity that is conducted, sold or offered at a location other than the premises on which the sign is located. The structure on which an advertising sign is displayed of type commonly known as billboard is also an advertising sign.

SHINGLE SIGN. A small signboard hanging or protruding so that both sides are visible, which has no dimension more than 2 feet which is no larger in area than 3 square feet. A SHINGLE SIGN may be mounted as a wall sign so that only 1 side is visible.

SIGN. Any surface, fabric or device bearing lettered, pictorial or sculptured matter designed to convey information visually and exposed to public view; or any structure designed to carry the above visual information.

TEMPORARY SIGN.

(1) A sign located in a non-residential zoning district that:

(a) Is used in connection with a circumstance, situation or event that is designed, intended or expected to be completed within 15 days after the erection of the sign; or

(b) Is intended to remain on the location where it is erected or placed for a period of not more than 2 days following the completion of the event; or

(c) Is displayed on a premises only during normal operating hours and then removed from that location; and

(d) Is not affixed to any building or structure.

(2) If a sign display area is permanent, but the message displayed is subject to periodic changes, that sign shall not be regarded as temporary.

WALL SIGN. A sign attached or erected against the wall of a building or structure, only 1 side of which is visible.

YARD SALE SIGNS. Signs advertising a yard sale on private property.

§ 15.02.096 SIGN PERMIT REQUIRED.

A. Except as otherwise provided in §§ 15.02.097 and 15.02.098, no sign may be erected, moved, enlarged or substantially altered except in accordance with the provisions of this subchapter.

B. Signs not exempted under the provisions referenced in division (A) above may be erected, moved, enlarged or substantially altered only in accordance with a sign permit issued by the Zoning Administrator.

1. Sign permit applications and sign permits shall be governed by the same provisions of this chapter applicable to zoning permits.

2.

a) In the case of a lot occupied or intended to be occupied by multiple business enterprises (e.g. a shopping center), sign permits shall be issued in the name of the property owner rather than in the name of the individual business, and it shall be the responsibility of the owner to allocate among the tenants the permissible maximum sign surface area that has been approved by the Zoning Administrator.

b) Upon application by the owner, the Zoning Administrator must approve a master sign plan that allocates permissible sign surface area to the various buildings or businesses within the development according to an agreed-upon formula, and thereafter sign permits may be issued to individual tenants by the Zoning Administrator or his designee only in accordance with the allocation contained in the master sign plan. In the event an owner is unwilling or unable to devise a master sign plan, the plan shall be developed by the Zoning Administrator using building frontage as a calculation for total sign area.

Penalty, see § 1.01.999

§ 15.02.097 SIGNS EXEMPT FROM REGULATION.

Amended 04/18/2013

The following signs are exempt from regulation under this subchapter except for the regulations embodied in § 15.02.107:

A. Signs not exceeding 2 square feet in area that are customarily associated with residential use and that are not of a commercial nature, such as signs giving property identification names or numbers or names of occupants, signs on mailboxes or paper tubes and signs posted on private property related to private parking or warning the public against trespassing or danger from animals.
B. Signs erected by or on behalf of or pursuant to the authorization of a governmental body, including legal notices, identification and informational signs and traffic, directional or regulatory signs.
C. Official signs of an informational nature erected by public utilities.
D. Flags, pennants or insignia of any governmental or nonprofit organization when not displayed in connection with a commercial promotion or as an advertising device.
E. Signs directing and guiding traffic on private property that do not exceed 2 square feet each and that bear no advertising information.
F. Signs painted on or otherwise permanently attached to currently licensed motor vehicles that are not primarily used as signs.

§ 15.02.098 CERTAIN SIGNS; PERMIT EXEMPTIONS AND ADDITIONAL REGULATIONS.

Amended 04/18/2013, 09/15/2022

A. The following types of signs are permitted without a sign permit. However, these signs shall conform to the requirements set forth below as well as all other applicable requirements of this subchapter except those contained in § 15.02.101 and 15.02.103.
    1. Real estate signs. Signs containing the message that the real estate on which the sign is located (including buildings) is for sale, lease or rent, together with information identifying the owner or agent. Real estate signs advertising residential properties shall not exceed 4 square feet in area and shall not be illuminated. Real estate signs advertising commercial property shall not exceed 32 square feet in area and shall not be illuminated. All real estate signs shall be removed within 10 days of sale, lease or rental. Only 1 real estate sign is permitted for each property with the exception of properties abutting waterways or the golf course, which may have 2 signs.
    2. Construction site identification signs. These signs may identify the project, the owner or the developer, architect, engineer, contractor, and subcontractors and funding sources and may contain related information. Not more than 1 sign may be erected per site and may not exceed 32 square feet in area. These signs may be erected no more than 30 days prior to the

issuance of a building permit, and shall be removed within 10 days after the issuance of the final occupancy permit.

3. Yard sale signs. Yard sale signs shall not exceed 4 square feet in area and may be erected only 2 days prior to the event. The signs shall be removed immediately at the conclusion of the event for which the sign was posted. The signs must be self-supporting and may not be attached in any manner to utility poles, traffic sign posts or any other structure, including specifically but not limited to any sign maintained by the town. Notwithstanding contrary provisions of this subchapter, signs regulated by this section may be placed within street rights of way or public property provided that the signs are removed within the time limits prescribed by this section and are not placed in any area adjacent to any residential property of any type unless permission is received from the occupant.
4. Other signs. Any other type of sign that is not related to a business function or activity.

B. Except for directional, warning, or regulatory signs, the number of signs allowed pursuant to § 15.02.098 on any one parcel of land shall not exceed two (2). However, this limitation shall not be in effect forty-five (45) days prior to the beginning date of "one-stop" early voting in Craven County and the ten (10) days following the date of any election; and

C. Such a sign shall not exceed four (4) square feet in area per sign face or be placed more than forty-two (42) inches in height above the ground; and

D. These type signs cannot be located on public property, except within a street right-of-way as described herein, unless approved by the Town Council or its designee. Within a street right-of-way, no sign shall be located less than 15 feet from the edge of the pavement. In some cases, this 15 feet set-back may be within the street right-of-way. Additionally, only the owner/occupant of the private property adjacent to the street right-of-way may erect a sign within the street right-of-way adjacent to their property or on their property. For example, Resident A cannot place a sign in front of or on Resident B's property, including the street right-of-way, without the permission of Resident B; and

E. The property occupant or, in the case of an unoccupied property, the property owner, shall be responsible for violations contained therein.

F. Signs used in connection with local or special events of interest to the residents of the town may be erected upon approval from the Zoning Administrator who will review the reason for the sign, proposed location and size. These signs shall be erected no sooner that 10 calendar days prior to the event and removed within 2 calendar days after the close of the event. These signs shall not be in place for a period exceeding 30 calendar days.

Penalty, see § 1.01.999

§ 15.02.099 DETERMINING THE NUMBER OF SIGNS.

Without limiting the generality of the definitions of signs outlined in § 15.02.095, a multi-sided sign shall be regarded as 1 sign as long as:

A. With respect to V-type signs, the 2 sides are at no point separated by a distance that exceeds 5 feet; and
B. With respect to double-faced (back-to-back) signs, the distance between the backs of each face does not exceed 2 feet.

§ 15.02.100 COMPUTATION OF SIGN AREA.

A.
1. The surface area of a sign shall be computed by including the entire area that forms the extreme limits of the writing representation, emblem or other display, forming a square, rectangle, triangle or circle as appropriate, together with any material or color forming an integral part of the background of the display used to differentiate the sign from the backdrop or structure against which it is placed.
2. This does not include any supporting framework or bracing that is clearly incidental to the display itself. This definition also applies to letters, symbols or other types of signage placed on the side of a building.

B. If the sign consists of more than 1 section or module, all of the area including that between sections or modules, shall be included in the computation of the sign area.

C.
1. Unless otherwise provided for in § 15.02.099 (B), the surface area of 2-sided, multi-sided or 3-dimensional signs shall be computed by including the total of all sides designed either to attract attention or communicate information that can be seen at 1 time by a person from any vantage point.
2. For example, with respect to a typical 2-sided sign where a message is printed on both sides of a flat surface, the sign surface area of only 1 side (rather than the sum total of both sides) shall be regarded as the total sign surface area of that sign, since one can see only 1 side of the sign from any vantage point.

§ 15.02.101 TOTAL SIGN SURFACE AREA.

A. Unless otherwise provided in this subchapter, the total surface area devoted to all signs on any lot shall not exceed the limitations set forth in this section. Temporary signs shall not be included in this calculation. Freestanding signs, while included in this calculation, are subject to maximum sizes as contained in § 15.02.102.
B. Unless otherwise provided in this subchapter, the maximum sign surface area permitted on any lot in a residential zoning district is 2 square feet.

C. Subject to other provisions of this subchapter, the maximum sign surface area permitted on any lot in an area zoned BD, BD-PD or ID as set forth in this Zoning Chapter shall be determined by the following charts:

Where the Speed Limit is Over 50 MPH	
Property Frontage (Linear Feet)	**Maximum Sign Surface (Square Feet)**
100 or fewer	54
101 – 125	56
126 – 150	67
151 – 175	79
176 – 200	90
201 – 225	101
226 – 250	112
251 – 275	124
276 – 300	135
301 – 325	146
326 – 350	157
351 – 375	169
376 or more	180

Where the Speed Limit is Under 50 MPH	
Property Frontage (Linear Feet)	**Maximum Sign Surface (Square Feet)**
200 or fewer	54
201 – 225	56
226 – 250	63
251 – 275	69
276 – 300	75
301 – 325	81
326 – 350	87
351 – 375	94

Where the Speed Limit is Under 50 MPH	
Property Frontage (Linear Feet)	**Maximum Sign Surface (Square Feet)**
376 or more	100

D. If a lot has frontage on more than 1 street, then the owner shall designate which street frontage constitutes the primary street frontage of the property and shall receive 100% of the allowable sign surface area for the street. For that street frontage that is deemed to be secondary, the owner shall receive up to 50% of the total sign surface area for that street frontage.
E. In a commercial shopping center consisting of 3 or more units that share common party walls, the developer or owner of the shopping center may determine the sign surface area requirements by following the provisions outlined above in division (C) above concerning lot frontage or by using a building frontage calculation in which 1 square foot of signage is allowed for each square foot of retail frontage.
F. The sign surface area of any sign located on a wall of a structure shall not exceed 25% of the total surface area of the wall of a building from end to end. Penalty, see § 1.01.999

§ 15.02.102 FREESTANDING SIGN SURFACE AREA.

A. For purposes of this section, a side of a free-standing sign is any plane or flat surface included in the calculation of the total sign surface area as provided in § 15.02.100. For example, wall signs typically have 1 side. Free standing signs typically have 2 sides (back-to-back), although 4-sided and other multi-sided signs are also common.
B. With respect to freestanding signs that have no discernible "sides" such as spheres or other shapes not composed of flat planes, no freestanding sign may exceed the surface area delineated in § 15.02.100.

Penalty, see § 1.01.999

§ 15.02.103 NUMBER OF FREESTANDING SIGNS.

A. Except as authorized in this section, no development (e.g. shopping center, office complex) may have more than 1 freestanding sign.
B. If a development is located on a corner lot that has at least 200 feet of frontage on each of the 2 intersecting public streets, then the development may have not more than 1 free standing sign on each side of the development bordered by these streets.
C. If a development is located on a lot that is bordered by 2 public streets that do not intersect at the lot's boundaries (double front lot), then the development may not have more than 1 freestanding sign on each side of the development bordered by these streets.

Penalty, see § 1.01.999

§ 15.02.104 SUBDIVISION DEVELOPMENT ENTRANCE SIGNS.

One sign is permitted at any entrance to a subdivision. A single side of any sign may not exceed 32 square feet. The signs must be located on the subdivision site and may only be illuminated by external lighting in accordance with state and county electrical codes.

Penalty, see § 1.01.999

§ 15.02.105 LOCATION AND HEIGHT REQUIREMENTS.

A.
1. No sign may extend above any parapet or be placed upon any roof surface, except that for purposes of this section, roof surfaces constructed at an angle of 75 degrees or more from horizontal shall be regarded as wall space.
2. This section shall not apply to displays, including lighting, erected in connection with the observances of holidays on the roofs of residential structures.

B.
1. No part of a freestanding sign located in an area zoned BD or BD-PD may exceed a height of 28 feet, measured from the grade of the street from which access to the property is provided if the speed limit of the street toward which the sign is primarily oriented is 50 mph or greater, and a height of 20 feet if the speed limit of the street toward which the sign is primarily oriented is less than 50 mph.
2. No part of a freestanding sign located in an area zoned Institutional (ID) may exceed a height of 15 feet measured from the grade of the street from which access to the property is provided.

C.
1. No sign may project from any building over any street right-of-way.
2. No free standing sign may project over any street right-of-way.

D. No sign may be placed within the right-of-way of any public street maintained by the Town, unless expressly permitted by any other provision of the Town's Code of Ordinances or approval by the Town Manager. Any sign placed in violation of this section shall be deemed a public nuisance and may be seized and disposed of by an enforcement official or other representative of the Town.

Added 07/18/2013

Penalty, see § 1.01.999

§ 15.02.106 SIGN ILLUMINATION AND SIGNS CONTAINING LIGHTS.

A. Unless otherwise prohibited by this chapter, signs may be illuminated if the illumination is in accordance with this section. All illuminated signs shall comply with the North Carolina Electrical Code and shall be approved by the Zoning Administrator.
B. Lighting directed toward a sign shall be shielded so that it illuminates only the face of the sign and does not shine directly into a public right-of-way or residential premises. The reflection from these signs shall not exceed 25% of the lumens directed toward the sign measured from the property line of the lot upon which the sign is located.
C. Festoons of lights that outline property lines, sales areas, roof lines, doors, windows or similar areas are prohibited. This does not apply to temporary signs erected in connection with the observance of holidays.
D. No illuminated sign shall be of the flashing or intermittent variety.
E.
    1. Temporary signs may be illuminated only with the special permission of the Zoning Administrator.
    2. This permission shall be in writing with a copy of the permission provided to the Police Department and a second copy kept in the Zoning Administrator's files.

Penalty, see § 1.01.999

§ 15.02.107 NON-CONFORMING SIGNS.

A. A non-conforming sign may not be altered or relocated except to bring the sign into complete conformity with the Town of River Bend Zoning Chapter, §§ 15.02.095 et seq.
B. If a non-conforming sign is destroyed by natural causes, it may not thereafter be repaired, reconstructed or replaced except in conformity with all the provisions of the Town of River Bend Zoning Chapter, §§ 15.02.095 et seq., and the remnants of the former sign structure shall be cleared from the land. For purposes of this section, a non-conforming sign is destroyed if damaged to the extent that the cost of restoring the sign to its former stature, or replacing it with an equivalent sign, equals or exceeds 25% of its value.
C. The message of a non-conforming sign may be changed so long as this does not create new non-conformities (for example, by creating an off-premises sign under circumstances where a sign would not be allowed.)
D. Subject to the other provisions of this section, non-conforming signs may be repaired and renovated so long as the cost of the work does not exceed 25% of its fair market value within any 12 month period.
E.
    1. Within 1 year after the effective date of this chapter, the Zoning Administrator shall make every effort to identify all the non-conforming signs within the town's planning jurisdiction. He shall then contact the person responsible for each sign (as well as the owner of the property where the non-conforming sign is located, if different from the former) and inform the person:

a) The sign is nonconforming;
b) How it is non-conforming;
c) What must be done to correct it and by what date; and
d) The consequences of failure to make the necessary corrections.

2. The Town Clerk working with the Zoning Administrator shall keep complete records of all correspondence, communications and other actions taken with respect to these non-conforming signs.

Penalty, see § 1.01.999

§ 15.02.108 MISCELLANEOUS.

A. No off premises signs are permitted.
B. Window signs shall be placed only inside buildings and shall not exceed the lesser of 12 square feet or 25% of the total glass area upon which the signs are displayed.
C. No sign shall be mounted on a mobile framework or movable apparatus.
D. No sign may be located so that it substantially interferes with the view necessary for motorists to proceed safely through intersections or to enter onto or exit from public streets or private roads.
E. All signs must be constructed and erected in accordance with the Southern Building Code and its related North Carolina building code amendments and shall be able to withstand wind pressures and load distributions as specified in the most current edition of the North Carolina Building Code and any International Building Codes.
F. All signs not properly maintained and determined to be a nuisance by the Zoning Administrator are subject to repair and/or removal by the town at the expense of the owner of the sign. The sign owner will be provided with written notice by the town 10 working days prior to the sign's removal. Furthermore, whenever an outdoor advertising structure has outlived any useful purpose for which it was intended, it shall be removed forthwith.
G. No sign may be erected on town-maintained or private rights-of-way so that by its location, color, size, shape, nature or message it would tend to obstruct the view of or be confused with official traffic signs or other signs erected by governmental agencies.
H.
    1. Signs on the town's water towers are permitted.
    2. The water tower sign may only identify the Town of River Bend and should not be more than 10% of the total surface area of the vessel containing the water.
I.
    1. In addition to signs already permitted, churches, schools and other non-commercial institutions may have 1 on-site bulletin board not exceeding 12 square feet in area.
    2. The bulletin board may be illuminated, shall be set back a minimum of 15 feet from the right-of-way and shall not exceed 10 feet in height.

J. For each lot located in an area zoned ID, 1 sign or bulletin board not exceeding 54 square feet in area and 15 feet in height measured from the grade of the street from which access to the property is provided, may be erected.
K. Violations of any provision of this section shall be subject to all penalties under this chapter, as provided for in § 1.01.999.

Penalty, see § 1.01.999

Cross-reference: General District regulations, see § 15.02.060 et seq.

SPECIAL USE REGULATION

§ 15.02.120 GENERAL REGULATIONS.

A. Permission may be granted by the Board of Adjustment for the establishment of uses listed as special uses (SU) in the district use regulation tables in this subchapter, after Planning Board review and recommendations and after a public hearing held by the Board of Adjustment. And further, that the Board of Adjustment finds that:
    1. The proposed use does not affect adversely the general plans for the physical development of the town as embodied in these regulations or in any plan or portion thereof adopted by the Planning Board and/or the Town Council;
    2. The proposed use will not be contrary to the purposes stated in these regulations;
    3. The proposed use will not affect adversely the health and safety of residents and workers in the zoned area;
    4. The proposed use will not be detrimental to the use or development of adjacent properties or other neighborhood uses;
    5. The proposed use will not be affected adversely by the existing uses;
    6. The proposed use will be placed on a lot of sufficient size to satisfy the space requirements of the use;
    7. The proposed use will not constitute a nuisance or hazard because of number of persons who will attend or use these facilities, vehicular movement, noise or fume generation or type of physical activity;
    8. The standards set forth for each particular use for which a permit may be granted have been or will be met;
    9. The proposed use shall be subject to the minimum area, setback and other dimensional requirements of the zoning district in which it will be located; and
    10. The proposed use shall be subject to the off-street parking and service requirements of these regulations.
B. The Board of Adjustment shall impose or require any additional restrictions and standards as may be necessary to protect the health and safety of workers and residents of the community, and to protect the value and use of property in the general neighborhood.

C. Whenever the Board of Adjustment shall find, in the case of any permit granted pursuant to the provisions of these regulations, that any of the terms, conditions or restrictions upon which the permit was granted are not being complied with, the Board shall rescind and revoke the permit after giving due notice to all parties concerned.
D. If construction of a use authorized by a special use permit does not begin within 6 months of the time the permit is issued, the permit shall be revoked.

Penalty, see § 1.01.999

§ 15.02.121 APPLICATION FOR SPECIAL USE PERMITS.

A.
1. An application for special use permits shall be made in duplicate to the Zoning Administrator on forms furnished by the Zoning Administrator.
2. If rezoning is to be requested in connection with the request for a special use, the request shall be made concurrent with the application for the special use.

B. A fee shall be paid the Town of River Bend for each application for a special use permit. In addition, costs for retaining legal, planning, engineering and other technical or professional services in connection with the review of special use permit applications may be charged to the applicant.

Penalty, see § 1.01.999

§ 15.02.122 REVIEW AND APPROVAL OF SPECIAL USES.

A.
1. The application forms for a special use permit shall be transferred along with required plans, plats and the like to the Planning Board by the Zoning Administrator 7 days before a regularly scheduled Planning Board meeting so that the application can be placed on the Board's agenda.
2. At this meeting, the owner of the property for which the special use is sought or his agent shall appear.

B. The Planning Board shall review the application for details, where applicable, of the site, situation, existing and proposed structures, architectural plans, neighboring land and water uses, proposed parking areas, driveway locations, highway access, traffic generation and circulation potential, drainage, waste disposal, water supply systems and the effects of the proposed use, structure, operation and potential changes in water quality, shoreland cover, natural beauty and wildlife habitat.

C.
1. The Planning Board shall consider recommending conditions that may be placed in the granting of the special use permit by the Board of Adjustment.
2. These conditions may include items such as landscaping, architectural design, type of construction, construction commencement and proposed completion dates, sureties, lighting, fencing, location, size and number of signs, water supply and waste disposal systems, performance standards, street dedication, certified survey maps, floodproofing, ground cover, sedimentation control from the project construction, terraces, stream bank protection, planting of buffer screens, operational control, hours of operation, improved traffic circulation, deed restrictions, highway access restrictions, yard sizes or additional parking.

D. In addition, the Planning Board shall check for compliance of the requested special use with all other relevant provisions of this subchapter, such as lot dimensional requirements, building heights, parking and loading standards.

E. The Planning Board shall consider the application at the first regular meeting of the Planning Board after receiving the completed application. Within 45 days after the meeting at which the application is considered, the Planning Board shall make its written recommendations and pass them on to the Board of Adjustment.

F. The Zoning Administrator shall set a date and advertise for Board of Adjustment public hearing. The Board of Adjustment shall review the application and all recommendations from the Planning Board.

G. The Board of Adjustment shall approve or deny the application following a public hearing provided for in division (F) above.

H. After approval or conditional approval of the special use by the Board of Adjustment, the Board shall notify the Zoning Administrator of the approval. Notification shall be by a written letter signed by the Chairperson of the Board of Adjustment, and a copy of the approval letter shall be

forwarded to the special use permit applicant and the Planning Board Chairperson. Applicant/landowner must give written consent to conditions related to the special use permit to ensure enforceability.

I.

1. Rejection of an application for a special use permit shall be recorded in the minutes of the Board of Adjustment meeting during which the decision was made.
2. Notification of the rejection or denial of an application for a special use permit shall be a letter signed by the Chairperson of the Board of Adjustment.
3. The letter shall state reasons for denial and reference the specific sections or paragraphs in this chapter that would be violated if the special use were granted.
4. The denial letter shall be forwarded to the applicant by certified or registered mail and copies of the letter shall be forwarded to the Chairperson of the Planning Board and the Zoning Administrator.
5. One copy shall be retained in the files of the Board of Adjustment.

Penalty, see § 1.01.999

§ 15.02.123 SPECIFIC REQUIREMENTS FOR SOME SPECIAL USES.

A. *Accessory building in Business Districts (BD)*.
   1. May be allowed in the event that state or federal regulations require storage of flammable or other dangerous materials outside of the principal building and where these materials are necessary for the principal use to be continued.
   2. Accessory building shall not be allowed in the front yard.

B. *Churches*.
   1. Minimum side and rear yards of at least 50 feet.
   2. All buildings and related uses shall be no closer than 25 feet from the nearest property line.

C. *Day care centers and nurseries*. Day care centers or nurseries shall comply with the G.S., Chapter §110, Article 7, which governs the licensing of day care facilities.

D. *Hospitals, nursing homes and/or extended medical facilities*. Side, front and rear yards shall be at least 50 feet.

E. *Schools, public or private*.
   1. Minimum side and rear yards of at least 50 feet.
   2. All accessory buildings and related uses shall be at least 25 feet from the nearest property line.
   3. An off-street loading and unloading area for vehicles carrying pupils shall be provided.

F. *Service stations and other automotive-oriented business establishments*. Due to the nature of the materials handled, the light, noise and other nuisances that sometimes are related to service stations, automobile repair facilities, automobile washing facilities and similar establishments catering to the needs of the motoring public, certain minimum standards for development of these business uses are established as follows:

1. A buffer shall be provided along all property lines of the uses which abut a residential district or lot which is occupied by a residential use;
2. All gasoline pumps and other stationary equipment shall be at least 24 feet off the edge of pavement and 12 feet off the edge of right of way; and
3. All areas subject to daily or frequent use of vehicles shall be paved.

G. *Janitorial supplies*. Due to the nature of the materials handled which could be a safety hazard, the business owner must demonstrate strict control of chemical supplies by showing capability to comply with all federal and state regulations.

Penalty, see § 1.01.999

§ 15.02.124 DISTRICT USE REGULATIONS.

For convenience in the administration of this chapter, there hereby is established and made a part of this chapter the following schedule of district use regulations.

SCHEDULE OF DISTRICT USE REGULATIONS									
KEY: **P** – Use permitted by right **SU** – Special use permitted upon approval by Board of Adjustment after recommendation of the Planning Board **Blank/Unlisted** – Prohibited use									
Use	**R20/ R20A**	**R15**	**PDR-SF**	**PDR-MF**	**ID**	**BD**	**BD-PD**	**AGR**	**Parking Code***
Accessory Building	P	P	P	P	SU	SU	SU	P	
Adult Day Care					P	P	P		G
Bakery, Retail						P	P		G
Financial Services						P	P		G
Barber Shop/Beauty Shop						P	P		G
Boats and Trailer Sales						SU	SU		G
Cabinet, Woodworking or Upholstery Shops						P	P		G
Child Day Care						SU			
Churches	SU	SU	SU	SU	P	SU	SU		E

SCHEDULE OF DISTRICT USE REGULATIONS

KEY:
P – Use permitted by right
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Blank/Unlisted – Prohibited use

Use	R20/ R20A	R15	PDR-SF	PDR-MF	ID	BD	BD-PD	AGR	Parking Code*
Clubs and Lounges, Private					P	SU	SU		F
Clothing Store						P	P		G
Computer Sales and Service						P	P		G
Dairy Bar and Ice Cream Parlors						P	P		G
Drug Store						P	P		F
Dry Cleaners/Drop Off/Pick Up Only						P	P		G
Dwellings, Single-Family	P	P	P	P		SU			A
Dwellings, 2-Family				P		SU			A
Dwellings, Multi-Family				P		SU			A
Fire Department Buildings	SU	SU	SU	SU	SU	SU	SU		F
Fitness Center						P	P		G
Florists/Gift Shop						P	P		G
Furniture Store						P	P		G
Golf Course	SU	SU	SU	SU	P	SU	SU		F
Grocery Store						P	P		G
Hardware Sales						P	P		G
Home Occupations	P	P	P		P				G

SCHEDULE OF DISTRICT USE REGULATIONS

KEY:
P – Use permitted by right
SU – Special use permitted upon approval by Board of Adjustment after recommendation of the Planning Board
Blank/Unlisted – Prohibited use

Use	R20/ R20A	R15	PDR-SF	PDR-MF	ID	BD	BD-PD	AGR	Parking Code*
Tourist Home***	P	P			P	P	P		D
Jewelry and Watch Repair						P	P		G
Libraries	SU	SU	SU	SU		P	P		G
Marina						P			G
Nursing Home and Rest Home					P				G
Office for Business, Professional and Personal Services						P	P		G
Pet Shops (excluding Veterinary Services)						P	P		G
Pharmacy						P	P		G
Photo Shop/Supply						P	P		G
Police Station	SU	SU	SU	SU	SU	SU	SU		F
Public Enterprise**	SU	SU	SU	SU		SU	SU		F
Public Utility	SU	SU	SU	SU	SU	SU	SU		F
Restaurants					P	P	P		F
Schools	SU	SU	SU	SU	SU				F
Service Station						SU	SU		J
Shoe Sales and Repair						P	P		G

SCHEDULE OF DISTRICT USE REGULATIONS

KEY:
P – Use permitted by right
SU – Special use permitted upon approval by Board of Adjustment after recommendation of the Planning Board
Blank/Unlisted – Prohibited use

Use	R20/ R20A	R15	PDR-SF	PDR-MF	ID	BD	BD-PD	AGR	Parking Code*
Sporting Goods Sales						P	P		G
Storage Rental Units/Areas						P	P		G
Travel Agency						P	P		G
Utility Tanks, Pumps, Electrical Substations & Related Services	SU	SU	SU	SU	SU	SU	SU	SU	
Wholesale and/or Retail Janitorial Sales & Services						SU	SU		F
Youth Center					P	P	P		G

*Parking code described in §15.02.080
** As defined by G.S. § 160A-311
*** Non-conforming uses of tourist home at the time of its addition to this ordinance shall be amortized for a period of 12 months from November 17,2022. After that date, the use must terminate if not permitted in the corresponding zone or a special use permit has not been obtained, as applicable.

Penalty, see § 1.01.999

Amended 11/17/22

§ 15.02.125 CONTROL OF BACKFLOW AND CROSS-CONNECTIONS.

A. *Purpose*.
   1. The purpose of this section is to protect the public potable water supply of the town from the possibility of contamination or pollution by isolating within the consumer's internal distribution system(s) or the consumer's private water system(s) such contaminants or pollutants which could backflow into the public water system.
   2. This section shall apply to all users connected to the town's public potable water supply regardless of whether the user is located within the town limits or outside the town limits.

B. *Definitions*. For the purpose of this section, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

AIR-GAP SEPARATION. An unobstructed vertical distance through the atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the receptacle. An approved air-gap vertical separation shall be at least double the diameter of the supply pipe. In no case shall the air-gap be less than 1 inch.

APPROVED. Certified in writing by the Operator in Responsible Charge as an acceptable device or methodology for the purpose of backflow prevention.

AUXILIARY INTAKE. Any piping connection or other device whereby water may be secured from a source other than public water supply.

BACKFLOW. Any flow of water into the public water supply from any other source due to a cross-connection, auxiliary intake, interconnection, backpressure, back siphonage, any combination thereof, or other cause.

BACKPRESSURE. Any pressure on any source of water other than the public water supply that may be greater than the pressure on the public water supply and may result in a backflow.

BACKFLOW PREVENTION DEVICE. An approved effective device method used to prevent backflow from occurring in the potable water supply. The type of device required shall be based on degree of hazard, existing or potential.

BACK-SIPHONAGE. Any circumstance in which the pressure on the public water supply may be reduced to the point that the elevation and atmospheric pressure on a source of water other than the public water supply may result in a pressure to be greater than the pressure on the public water supply and may result in a backflow.

CERTIFIED TESTER. A person who has proven his competency to test, repair, overhaul and make reports on backflow prevention devices as evidenced by certification of successful completion of a training program approved by the (Operator in Responsible Charge).

CONFINEMENT DEVICE. A backflow prevention device, as approved and required, installed within a private plumbing or distribution system to isolate a localized hazard from the remainder of the system.

CONSUMER. Any person, firm, or corporation responsible for any property at which water from the town public water supply 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. A backflow prevention device as approved installed at the point of separation between the public water supply and a private service or private distribution system or at the point of metering.

CONTAMINATION. The presence of any foreign substance (organic, inorganic, radiological, or biological) in water that tends to degrade its quality as to constitute a hazard or impair the usefulness of the water.

CONTAINMENT DEVICE. A backflow prevention device, as approved and required, installed at the point of separation between the public water supply and a private service or private distribution system or at the point of metering.

CROSS-CONNECTION. Any physical connection whereby the public water supply is connected with any other water supply system, whether public or private, either inside or outside of any building or buildings, in such a manner that a flow of water into the public water supply is possible either through the manipulation of valves or because of ineffective check or back-pressure valves, or because of any other arrangement.

CROSS-CONNECTION CONTROL COORDINATOR. The official position established and authorized by the town designated by the Operator in Responsible Charge to administer, interpret this section, and who shall be a certified tester.

DOUBLE CHECK VALVE BACKFLOW PREVENTION DEVICE. An approved assembly composed of 2 single, spring-loaded independently operating check valves, including tightly closing shut-off valves located at each end of the assembly, and having suitable connections for testing the water tightness of each check valve.

DUAL CHECK VALVE. An approved device containing 2 independently acting check valves in series.

FIRE LINE. A system of pipes and equipment used to supply water in an emergency for extinguishing fire.

INTERCONNECTION. Any system of piping or other arrangement whereby the public water supply is connected directly with a sewer, drain, conduit, pool, heat exchanger, storage reservoir, or other device which does or may contain sewage or other waste or substance which would be capable of imparting contamination to the public water supply.

OPERATOR IN RESPONSIBLE CHARGE. A person who holds a cross-connection control certification issued by the state of North Carolina and is designated in writing by the town to serve in this position

PRESSURE VACUUM BREAKER. An approved assembly containing an independently operating spring loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly must be equipped with suitable connections for testing the proper operation of the device and tightly closing shut-off valves located at each end of the assembly.

PUBLIC WATER SUPPLY. The water and waterworks system of the town and its customers outside the town limits, for general use and which supply is recognized as the public water supply by the North Carolina Department of Environmental Health and Natural Resources.

REDUCED PRESSURE ZONE PRINCIPLE BACKFLOW PREVENTION DEVICE (RPZ). An approved device containing within its structure, 2 spring loaded independently operating check valves, together with an automatically operating pressure differential relief valve located between the 2 check valves. The first check valve reduces the supply pressure a predetermined amount so that during normal flow and at cessation of normal flow, the pressure between the checks shall be less than the supply pressures. In case of leakage of either check valve, the differential relief valve, by discharging to the atmosphere, shall operate to maintain the pressure between the check valves less than the supply pressure. This device shall have suitable connections for testing the proper operation of the device, including tightly closing shut-off valves located at each end of the device.

C. *Compliance with federal and state law*. The town will comply with the Federal Safe Drinking Water Act, the North Carolina Drinking Water Act, and North Carolina State Building Code, which pertain to cross-connections, auxiliary intakes and interconnections, and establish an effective ongoing program to control potential sources of contamination of the public water supply.

D. *Unlawful connections*. It shall be unlawful for any person to cause a cross-connection, auxiliary intake or inter-connection to be made; or allow one to exist for any purpose whatsoever.

E. *Inspection of property*. It shall be the duty, upon request of the Operator in Responsible Charge, of the Cross Connection Coordinator to cause inspections to be made of properties served by the public water supply where cross-connections with the public water supply are deemed possible. The frequency of inspections and re-inspections shall be set by the Operator in Responsible Charge.

F. *Right of access*. The Operator in Responsible Charge, or authorized representative, shall have the right to enter, at reasonable time, any property served by a connection to the town public water supply for the purpose of performing the duties of this section. In those cases in which the property owner chooses not to provide such access, the Operator in Responsible Charge, or authorized representative, may designate the location as a high hazard in accordance with division (H).

G. *Existing conditions*. Any consumer shall be allowed 90 days to correct any cross-connections, auxiliary intakes, interconnections or other hazard as defined by division (H) in violation of the provisions of this section. The 90 days will be from the date of receipt of the notification given by the Cross Connection Coordinator.

H. *Hazardous uses*.

1. The following uses shall be classified as hazardous uses:
    a) Hazardous uses include, but are not limited to: pumps and tanks handling sewage, radioactive, lethal, or toxic substances, boiler and steam connections, sewer waste lines, low inlets to receptacles containing toxic substances, coils or jackets used as heat exchangers, flush valve toilets without vacuum breaks, bacterial and viral materials, private wells or other private water supply, irrigation systems, water systems or hose

connections, with booster pumps, carbonation equipment, or similar hazard potential as determined by the cross connection coordinator.

b) Any location at which the nature or mode of operations within a premises are such that frequent alterations are made to the plumbing or at which there is a likelihood in the determination of the Cross Connection Coordinator that protective measures may be subverted, altered, or disconnected.

c) Any facility which contains, but is not limited to, a bottling plant, cannery, building having 5 or more stories, battery manufacturer, exterminator, greenhouse, chemical processing plant, dairy, dye works, film laboratory, car wash, hospital, commercial laboratory, laundry, metal fabricating operations, mortuary, swimming pool, morgue, x-ray equipment, medical office with laboratory, aspirator, medical washing equipment, packing house, plating plant, poultry house, power plant, nuclear reactor, those fire sprinkler systems equipped with facilities for introduction of freeze preventive chemicals or other substances other than water, dental office, any radioactive material, restaurant, shopping mall with tenant conducting any activity listed in this section and sewage pump or treatment facilities.

2. All installations described in subsection (1) shall be deemed hazardous uses, and must have a containment device in the form of a reduced pressure zone backflow prevention device unless the consumer demonstrates to the satisfaction of the Cross Connection Coordinator that sufficient internal confinement devices have been installed and tested. The Cross Connection Coordinator may require that the consumer provide engineering drawings sealed by a professional engineer of installations within the premises, which provide complete internal protection against cross-connection as approved by the Cross Connection Coordinator. Any connection shall be considered another connection for determining the type of containment device required. Each internal confinement device shall be 1 of the following, as approved by the Operator in Responsible Charge or his authorized representative: reduced pressure zone principle backflow prevention device, double check valve backflow prevention device, air gap, vacuum break-pressure type, or dual check valve. Each reduced pressure zone principal backflow prevention device serving as an internal confinement device shall have a mesh strainer immediately upstream of the inlet gate valve.
3. No person shall fill any tanks or tankers which include the following: those containing pesticides, fertilizers, other toxic chemicals or residues, flush trucks, street sweepers, and non-potable water tankers from a public water system except with an approved air gap fill or an approved reduced pressure backflow preventer properly installed on the tank or tanker or on the public water supply fill pipeline or hose.

I. *Other connections*.

1. Services to single-family residential units, not otherwise required by this code to have other containment devices, shall have a containment device in the form of an approved dual check valve assembly installed by the Water Resources Department at the water meter. Maintenance of dual check valve containment devices installed in accordance with this section shall be conducted by the Water Resources Department. Testable containment

devices are required on lawn irrigation water systems and must be tested every 3 years by a contractor that has been approved by the town.

2. Residential services installed prior to 1999 shall not be required to be retrofitted with containment devices. However, if at any time the meter must be replaced, an approved dual check valve device shall be installed by the Water Resources Department at the time of the meter replacement.

J. *Installation of containment devices*.

1. The containment devices shall be located off street right-of-way on the water main side of any plumbing connections. When installed in a building, the device shall be located on the service line immediately after its entrance into the building. Each containment and confinement device shall be installed in a location that is physically accessible for inspection and testing as determined by the Cross Connection Coordinator. Containment devices, which have been buried in the ground, do not satisfy the provisions. Each reduced pressure principle zone device shall be installed such that flooding of the device is unlikely as determined by the Cross Connection Coordinator.
2. The Operator in Responsible Charge shall maintain a list of approved manufacturers and models of hazard containment devices and drawings of standard installation, copies to be made available through the Office of the Water Resources Department office and the Zoning Administrator's office. Only those reduced pressure zone principle backflow prevention devices and double check valve backflow prevention devices which have been approved by the Foundation for Cross Connection Control and Hydraulic Research (or its successor) shall be used with the public water system of the town. Only those vacuum breakers, dual check valve devices, and reduced pressure zone devices which have been approved by the American Society for Sanitary Engineers or the University of Southern California (or their successors) shall be used with the public water system of the town. All installations and materials shall conform to town standards as set by the Operator in Responsible Charge.
3. The consumer shall be financially responsible for any costs associated with the maintenance, testing, and replacement as applicable of any containment or confinement devices.
4. The cost of the means of containment, and any other plumbing modifications necessary and convenient thereto, and the testing and maintenance thereof is to be paid for by the consumer.

K. *New construction*. All buildings, proposing to connect to the public water system of the town receiving building permits, on or after the effective date of this section, shall be equipped with an approved and properly functioning backflow prevention device(s), as prescribed herein, prior to the issuance of a Certificate of Code Compliance for that building. If a building permit was issued for the building prior to the effective date of this section, or a building permit was not

required, the building shall be considered to be an existing building prior to the effective date, in accordance with division (G).

L. *Notification of consumer*.
   1. Upon identification of a hazard, or hazard potential, as defined in divisions (H) and (I) , the Cross Connection Coordinator, shall notify the consumer, of record, of the property on which the hazard exists of the following:
      a) Location of hazard.
      b) Nature of hazard observed.
      c) Date hazard observed.
      d) Section of code applicable.
      e) Requirements of code.
   2. The notification to be made by certified mail, with return receipt requested.

M. *Change in nature of use*. The consumer shall report any change in the nature of use of a property which may affect the hazard classification of the property to the Operator in Responsible Charge.

N. *Consumer responsibilities*.
   1. The consumer shall, upon notification, as defined in division (L), install the hazard containment device(s) as required within 90 days from the date of notification.
   2. If, after expiration of 90 days, the containment device(s) has not been installed in conformance with standards set by the Operator in Responsible Charge, in a proper working condition, the Operator in Responsible Charge may discontinue the public water supply service at that premises, and service shall not be restored until the devices have been installed. The Operator in Responsible Charge may permit an extension of up to 90 additional days if compliance efforts are underway and the existence of hardship can be demonstrated.
   3. The town shall bear no liability for direct or consequential damages proximately caused by the discontinuance of service pursuant to this section.

O. *Testing and maintenance of devices*. The consumer at each property at which containment and/or confinement device(s) have been installed, except those with devices installed in accordance with division (I), shall have each containment and/or confinement device(s) tested on an annual basis, and perform any routine maintenance to the device as recommended by the manufacturer, and provide the Cross Connection Coordinator with a report of that inspection and work. The consumer shall cause the maintenance, or repairs to be made, rendering the device fully operational. Failure of the consumer to perform that testing and maintenance may result in the premises being deemed an immediate public health hazard. The Operator in Responsible Charge may immediately thereafter discontinue public water supply service to that premises and service shall not be restored until the devices have been rendered operational. Where the use of water is critical to the continuance of normal operations or protection of life, property, or equipment, duplicated containment or confinement devices shall be provided by the property owner to avoid the necessity of discontinuing water service to test or repair the device or devices.

P. *Enforcement by civil penalty*.
   1. Penalty.
      a) Violation of any provision of this section may subject the offender to a civil penalty to be recovered by the town in a civil action in the nature of debt if the offender does not pay the penalty within 30 days after the assessment has become final by exhaustion of the appeal process established by this section, or by failure to appeal the assessment.
      b) The civil penalty for violation of any provision of this cross connection control section shall not exceed $500 per day for each day of continuous violation, or a cumulative or single civil penalty of $10,000. The civil penalty for willful violation of any provision of this section shall not exceed $1,000 per day for each day of a continuous violation, or a cumulative or single civil penalty of $20,000.
   2. *Assessment*. Any civil penalty shall be assessed by the Town Manager, upon the recommendation of the Operator in Responsible Charge, and shall be based upon the reasonable estimated cost of correcting the cited violation, the magnitude of the potential risk posed to the public health, safety and welfare by the violation, and the cost of the public safety or other emergency response caused by the violation. The Town Manager shall serve written notice of the civil penalty assessment to the offender and set out with reasonable care the basis of the amount so assessed.
   3. *Equitable relief*. An appropriate equitable remedy, including a mandatory or prohibitory injunction, issuing from a court of competent jurisdiction may enforce the provisions of this section.
   4. *Enforcement option*. The penalties and enforcement provisions established by this section may be applied in additional to or instead of the penalties established by other sections of the town code.

Q. Limitation of liability. The town shall not be held liable, for any cause, for failure to detect any unit failing to operate adequately, or failure to identify any specific hazard, which may result in contamination of its public water supply, nor shall this section diminish the responsibility of any property owner from whose property a contamination of the public water supply may originate.

Penalty, see § 1.01.999

§ 15.02.126 IRRIGATION WATER METERS.

Added 04/16/2009

A. *New irrigation systems*. All irrigation systems, served by the Town's water system, installed after the effective date of this ordinance shall be required to have a separate irrigation water meter. Prior to the installation of a new in-ground irrigation system to be connected to the Town's water system, the customer shall request the town to install and operate a town-approved irrigation meter pursuant to procedures established (and as modified from time-to-time) by the Town's Water Resources Department. All such irrigation meters, meter boxes, pipes and other equipment furnished or used by the town in installing any such irrigation meter shall be and

remain the property of the town. Prior to installation of any such irrigation meter, the customer shall pay to the town all charges specified in the schedule of fees established (and as modified from time-to-time) by the Town Council.

B. *Single-family residential customers with existing irrigation systems*. Any utility customer of the town in good standing may request the town to install and operate a town-approved irrigation meter at any single-family residential dwelling owned by such customer to which the town provides utility services, pursuant to procedures established (and as modified from time-to-time) by the Town's Water Resources Department. All such irrigation meters, meter boxes, pipes and other equipment furnished or used by the town in installing any such irrigation meter shall be and remain the property of the town. Prior to installation of any such irrigation meter, the customer shall pay to the town all charges specified in the schedule of fees established (and as modified from time-to-time) by the Town Council.

C. *Other customers*. Except as provided in subsection (b) hereof, any other utility customer of the town in good standing may request the town to install and operate a town-approved irrigation meter at any property owned by such customer to which the town provides utility services, pursuant to procedures established (and as modified from time-to-time) by the Town's Water Resources Department. All such irrigation meters, meter boxes, pipes and other equipment furnished or used by the town in installing any such irrigation meter shall be and remain the property of the town. Prior to installation of any such irrigation meter, the customer shall pay to the town all charges specified in the schedule of fees established (and as modified from time-to-time) by the Town Council.

D. *Capital Investment Fees*. Prior to installation of any irrigation meter pursuant to this section, any new water customer shall pay to the town a Capital Investment Fee (CIF) to cover a portion of the costs associated with providing additional water capacity to such customers, in the amount specified in the schedule of fees established (and as modified from time-to-time) by the Town Council and approved by the town council. Such CIF shall be payable in addition to (i) all charges specified in the schedule of fees established (and as modified from time-to-time) by the Town Council. Payment of capital fees does not relieve the owner of the obligation to build water line extensions in accordance with the town's ordinances, regulations, rules, policies and procedures. In no instance shall a property owner be charged a CIF for a potable water meter and a second CIF for an irrigation water meter.

PLANNED DEVELOPMENT PROJECT

§ 15.02.135 PLANNED DEVELOPMENT AUTHORIZATION.

A. The Town Council may authorize the issuance of conditional zoning permits for Planned Developments in accordance with the procedures and development standards specified in this subchapter.

B. Whenever the Town Council shall find, in the case of any permit granted pursuant to the provisions of the regulations, that any of the terms, conditions or restrictions, upon which the permit were granted are not being complied with, the Town Council shall have the authority to rescind, after granting the permittee notice and hearing.

§ 15.02.136 PLANNED DEVELOPMENTS, GENERALLY.

A. *Intent*.
   1. Within districts now existing or which hereafter may be created, it is intended to permit and encourage, on application and approval of detailed development plans, establishment of new Planned Developments for specified purposes where tracts of land suitable in location, area and character are to be planned and developed as a whole and in a unified manner. Suitability of these tracts for Planned Development purposes shall be determined primarily by reference to the Town of River Bend land development plan and the developer's master land use plan as approved by the Town Council.
   2. Where Planned Developments are permitted, regulations adopted for unified developments are intended to accomplish the purposes of zoning and subdivision regulations, and other applicable regulations, to the same degree as in cases in which those regulations are intended to control development on a lot-by-lot rather than unified basis.

B. *Planning Board action*.
   1. The Planning Board shall review and take action on each preliminary plat within 45 days after first consideration by the Planning Board. First consideration shall be at the next regularly scheduled meeting of the Planning Board that follows at least 14 days after the plat is submitted. The Planning Board, Community Appearance Commission, Public Works Advisory Board, Parks and Recreation Board, Waterways/Environment Board and the Town Council shall review the master land use plan preliminary and final site plans for the proposed planned development for conformity with the Town of River Bend land development plan. The other Town Boards will give their recommendations before the next Planning Board meeting.
   2. If there is no response from the other Town Boards, the Planning Board will assume that there are no comments. The Planned Development shall provide appropriate relationships between uses around the boundaries and uses within the Planned Development so as to insure that no property shall be adversely affected.

C. *Basis for control*. The approved master land use plan, preliminary and final site plans shall be the basis for control of land development within Planned Developments.

D. *Permit choice*. If an application made in accordance with local regulation is submitted for a development approval required pursuant to this Chapter and a development regulation changes between the time the application was submitted and a decision is made, the applicant may choose which version of the development regulation will apply to the application. If the development permit applicant chooses the version of the rule or ordinance applicable at the time of the permit application, the development permit applicant shall not be required to await

the outcome of the amendment to the rule, map, or ordinance prior to acting on the development permit.

Penalty, see § 1.01.999

§ 15.02.137 APPLICATION REQUIREMENTS FOR PLANNED DEVELOPMENTS.

Applications for development approvals may be made by the landowner, a lessee or a person holding an option or contract to purchase or lease land, or an authorized agent of the landowner. An easement holder may also apply for development approval for such development as is authorized by the easement.

A. *Step I - Master land use plan*.
   1. *Applicant action*.
      a) The applicant shall submit 10 copies of the master land use plan and supplementary materials to the Zoning Administrator at least 15 days before the regular meeting of the Planning Board at which the master land use plan is to be considered. The Zoning Administrator shall place the master land use plan on the agenda of the next regular meeting of the Planning Board and contact the Planning Board Chairperson as to the receipt of the master land use plan, and shall present the Planning Board with copies of the plan and materials.
      b) If rezoning is a prerequisite of Planned Development approval, the Zoning Administrator will advertise for a public hearing and follow the standard zoning ordinance amendment requirements.
   2. *Information required of the applicant*. The information required for presentation by the developer shall include the following:
      a) For all Planned Developments, a master land use plan.
         (1) The master land use plan shall be mapped to 1 inch = l00 feet scale and show the proposed development and how it relates to its surroundings. The map(s) should show where major building types and approximate densities are anticipated. In addition, the following information shall be mapped at this same scale:
            (a) Acreage of tract;
            (b) Major traffic, parking and pedestrian circulation plans within the Planned Development;
            (c) Major physical features including soils, topography, existing structures and use, drainage, flora and fauna and other physical information to help describe the suitability of the site for Planned Development;
            (d) Ownership arrangements for the Planned Development, both present and planned;
            (e) Planned open space, parks and active recreation areas to be preserved or developed either by the developer or by dedication to the town of their development as required by the Subdivision Chapter;

(f) Sketch plans for construction of water and sewage disposal systems to comply with town standards, and the appropriate state and county authorizing agency;
(g) Sketch plans for access of firefighting equipment and refuse disposal such as compactors and waste disposal dumpsters;
(h) Sketch plans for underground utilities and lighting to comply with state and town requirements (for additional details, see § 15.01.080); and
(i) Sketch plans for proposed drainage plan which shall be in conformity with the North Carolina Stormwater Site Planning Guidance Manual to show how the land will be used. The use of LID design approaches is preferred and should be implemented to the maximum extent practical given the site's soil characteristics, slope, and other relevant factors. If LID design approaches are not proposed in the stormwater management plan, the applicant shall provide a full justification and demonstrate why the use of LID approaches is not possible before proposing to use conventional structural stormwater management measures which channel stormwater away from the development site.

Amended 06/18/2009

b) For all Planned Developments, a letter of intent. In addition, a letter of intent shall be submitted which describes the following:
(1) Anticipated time frame for starting and completing any and all phases of the Planned Development;
(2) Types of buildings anticipated;
(3) Quantitative data for parcel size, number and types of dwelling units and gross and net residential densities anticipated;
(4) A description (legal) of the total site proposed for development including names and addresses of adjacent property owners;
(5) Planned organizational arrangements, providing for ownership, maintenance and preservation of common open space and other property;
(6) Percentage of land covered by impervious material; and
(7) Number of sewer taps required.
c) In addition, for Planned Development - Residential (PD-R) projects.
(1) Anticipated densities (units per acre);
(2) Anticipated architectural housing style and mixing of types; and
(3) All planned developments shall contain commonly owned land equal in area to 20% of the entire development. In consideration of the purpose served by a Planned Development, the title to the common areas or property shall be preserved to the perpetual benefit of the private properties in the development and shall be restricted against private ownership for any other purpose. If the corporation desires, improvements may be made within the common areas provided that maximum coverage for the improvements shall not exceed 25% of the entire common property. The developer shall submit and, after approval by the Town

Council, record a declaration of the covenants and restrictions that will govern the ownership, management and maintenance of the common areas.

d) In addition, for Planned Development - Business District.
   (1) Approximate percentage (5%) of land to be covered by building and areas;
   (2) Proposed uses; and
   (3) Anticipated architectural style and mixing of types.

3. *River Bend action*.
   a) The Planning Board shall review the master plan to see if it is in accordance with specifications of this chapter and the general intent of the Town of River Bend Subdivision Chapter.
   b) The Planning Board shall compile a report of its present findings to the Town Council.
   c)
      (1) The Planning Board shall convene a public hearing to present the master land use plan.
      (2) The public hearing shall be held jointly with the Town Council. The public hearing shall be conducted under the normal Zoning Chapter amendment procedures.
   d) The Planning Board shall submit all materials and its recommendations for approval to the Town Council.
   e) The Town Council shall approve or disapprove the master land use plan and any requested zoning amendments.
   f) The developer, on approval from the Town Council, may proceed within the year to present the remaining steps, the preliminary step, and on approval of that step, the final step as required in the subdivision regulations.

B. *Step II - Preliminary site plan presentation*.
   1. *Applicant action*.
      a) After the required master land use plan has been approved, the developer shall submit 10 copies of the preliminary site plan to the Zoning Administrator at least 15 days before the regular meeting of the Planning Board at which the preliminary site plan is to be considered. The Zoning Administrator will place the preliminary site plan on the Planning Board agenda and contact the Planning Board Chairperson as to the receipt of the plan and meet with those members involved in the review of the plan.
      b) The developer or his designated representative shall come to the Planning Board meeting to assist the Board in reviewing the preliminary site plan.
      c) On application for preliminary site plan approval the applicant shall pay a fee in accordance with § 15.02.205 of this chapter.
   2. *Information required of the applicant*.
      a) *Preliminary site plan*. The preliminary site plan shall be at a scale of 100 feet equals 1 inch. The preliminary site plan shall show the following:
         (1) Sketch vicinity map showing relationship between subdivision and surrounding area (with graphic scale and north point);

(2) The location of existing and platted property lines, streets, buildings, water courses, railroads, transmission lines, sewers, bridges, culverts, and drain pipes, water mains, city and county lines (if adjoining) and any public utility easements;
(3) Boundaries of tract shown with bearing and distances;
(4) Streams, floodplains, and elevation contours (2 feet) when required by Planning Board, soil classifications, seasonal high water table, and vegetation at the site;
(5) Names of adjoining property owners or subdivisions;
(6) Zoning classifications, if any, both on the land to be subdivided and on adjoining land;
(7) Proposed streets, street names, rights of way, roadway widths and approximate grades;
(8) The location and dimensions of all rights-of-way, utility or other easements, riding trails, natural buffers, pedestrian or bicycle paths, and areas to be dedicated to public use with the purpose of each stated;
(9) The topographic survey for proposed stormwater drainage systems, sedimentation controls as required by the sedimentation control ordinance, if any, and utility layouts (sewer, water, gas, and electricity) showing connections to existing systems or plans for individual water supply;
(10) The proposed specifications and drawings defining the stormwater drainage plans, including the percentage of impervious surfaces, for the new development and for any changes to existing drainage features outside the new area necessary to accommodate the plan. The use of LID design approaches is preferred and should be implemented to the maximum extent practical given the site's soil characteristics, slope, and other relevant factors. If LID design approaches are not proposed in the stormwater management plan, the applicant shall provide a full justification and demonstrate why the use of LID approaches is not possible before proposing to use conventional structural stormwater management measures which channel stormwater away from the development site. The proposed drainage plan shall be in conformity with the North Carolina Stormwater Site Planning Guidance Manual to show how the land will be used. It shall be approved by a registered professional engineer;

Amended 06/18/2009 and 03/18/10

(11) Proposed lot lines, lot and block number, if any, and approximate dimensions;
(12) Proposed minimum building setback lines;
(13) Elevation Certificate (FEMA Form 81-31) showing the elevation of the lowest habitable floor above sea level if the property is located in Zone AE on the FIRM. Elevation requirements are defined in § 15.02.020;
(14) Proposed parks, school sites, or public open spaces, if any;
(15) Site data:
    (a) Acreage in planned development;
    (b) Acreage in park or other land usage;

(c) Average lot size, if any;
(d) Total number of lots, if any;
(e) Lineal feet in streets;
(f) Percentage of land covered by impervious material; and
(g) Number of sewer taps required.

(16) Title, date, north point, and graphic scale;
(17) Name of owner plus the surveyor and land planner, if any;
(18) Number of units and unit density by neighborhoods.
(19) Buffer zone sketch plans per § 15.002.220 et seq.
(20) Submit a plan for the development prepared in accordance with the procedures described in §§ 5, 6, and 7 (pages 25 through 56) of the 2-20-1998 printing of the North Carolina Site Planning Guidance Manual. The plan shall include the following specific information:
(a) Layout of roads, lots, public areas, buffer zones, utilities, ponds, streams, wetlands, filled areas and any special or unusual features;
(b) Proposed finished grading contour lines;
(c) Bottom elevations or profiles of all drainage culverts and pipes along roads;
(d) Location, size and invert elevation of all drainage culverts along or under roads;
(e) Identification of where stormwater will flow when it exits the development and any features included to facilitate the flow and any work which will have to be done to accommodate the flow beyond the subdivision boundaries;
(f) Estimates of all paved or roofed over areas which would prevent stormwater from soaking into the ground;
(g) Identification of best management practices and stormwater control features included in development plans;
(h) Plan for barriers and traps to limit and control the transfer of soil sediments to the town's drainage system during and after construction; and
(i) Certification of plans by a registered professional engineer.

(21) Submit a supporting report, calculations and sketches that include the following:
(a) Calculations determining the amount of stormwater entering and leaving the development during 10, 50 and 100 year storms, taking into account the soil types, topography and planned impervious surface coverage;
(b) Calculations determining the impact of runoff from the development on existing town drainage paths;
(c) Design of and cost estimates for changes to existing town drainage paths outside the development that will have to be made to accommodate the increased flows; and
(d) Calculations showing the impact of best management practices and stormwater control features included in development plans on runoff from the development.

b) *Supplementary materials*.

(1) A copy of the restrictive or protective covenants applicable to the Planned Development, if any, shall be submitted to the Planning Board.
(2) Unless waived by the Planning Board, the developer shall submit the proposed plans for land clearance in the planned development.
(3) Public water supply system plans, including the layout and details of mains, must be approved by a registered engineer licensed to practice in North Carolina.
(4) Method of surveying roads, access map, and parking areas.
(5) A preliminary architectural design sketch of how a typical building will look after completion; plus a preliminary architectural design sketch of how the whole project will look after completion, or a photographic display of a similar completed development that the applicant has already been involved with, or equivalent information as allowed by the Planning Board.
(6) Copies of any declarations to be recorded pursuant to the North Carolina Unit Ownership Act being G.S. §§ 47-A et seq.

c) *Supplementary materials to be provided for*:
(1) Condominium projects or similar cooperative ownership projects. A copy of the proposed declaration of bylaws and covenants and method of changing outdated bylaws and covenants;
(2) Townhouses or rowhouses in condominiums projects. A copy of the proposed easements for the common walls and a copy of the proposed deed for sale of a unit; and
(3) Rental or leased units or buildings. A declaration by the developer or owner of the provisions for maintaining the development.

3. *Town of River Bend actions*.
a) Before recommending the approval of any preliminary site plan, the Planning Board may make reasonable additional requirements in cooperation with the developer, and concerning, but not limited to, the limitations of use, unit densities, landscaping, paving and location of access ways, taking into consideration the character of the surrounding area so as to provide proper transition of land uses that will fit into the town's land development plan.
b) The preliminary site plan shall be checked by the Planning Board for compliance of design standards and other requirements of this chapter and the Town of River Bend Subdivision Chapter.
c) The Planning Board shall submit all materials and its recommendations for approval or disapproval to the Town Council. The Town Council shall review and take action on each preliminary site plan within 45 days after it has been received from the Planning Board. Approvals shall be issued in writing and may contain a provision that the development shall comply with all applicable State and local laws. The Town Council may issue development approvals in print or electronic form. If issued exclusively in electronic form it shall be protected from further editing once issued. If the preliminary site plan is disapproved, the Town Council shall specify the reasons for the action in writing. One

copy of the reasons shall be retained by the Town Council, 1 copy shall be given to the Planning Board, and 1 copy shall be given to the developer. If the preliminary site plan is disapproved, the developer may make necessary changes and submit a revised preliminary site plan or appeal the decision of the Town Council to the Board of Adjustment.

C. Step III - final plat. Shall comply with the Town of River Bend Subdivision Chapter.

Penalty, see § 1.01.999

§ 15.02.140 CONDITIONAL ZONING DISTRICTS

Added 11/16/2023

A. Purpose.

1. Conditional zoning districts are applicable if the regulations and restrictions of a general use zoning district are inadequate to ensure the compatibility of the proposed development with the immediately surrounding neighborhood in accordance with the principles of the Town's Code of Ordinances. In these circumstances, a general zoning district designation allowing a use by right would not be appropriate for a particular property even though the use itself could, if properly planned, be appropriate for the property consistent with the objectives of the Code of Ordinances and adopted land development plan, comprehensive plan, transportation and corridor plans, and other land use and transportation policy documents.

2. The rezoning process established in this section provides for the accommodation of the uses by a reclassification of property into a conditional zoning district, subject to additional conditions which ensure compatibility of the proposed use with the use and enjoyment of neighboring properties. A conditional zoning district bears the same designation as a general use zoning district but is a conditional zoning district subject to additional conditions in which limited uses are permitted and that are contained in the ordinance approving the conditional zoning district. A conditional zoning district allows a particular use or uses to be established only in accordance with specified standards and conditions tailored to each individual development project. This is a voluntary rezoning procedure that is intended for firm development proposals. It is not intended or suited for securing early zoning for tentative proposals that may not be undertaken for some time.

3. Conditional zoning districts parallel general use zoning districts. Only those land uses (including uses by right and special uses as identified as in the Schedule of District Use Regulations) permitted in a general use zoning district to which a conditional zoning district corresponds shall be allowed. All requirements of any corresponding general use district and all other requirements of the Code of Ordinances apply to a conditional zoning district except to the extent that the approved rules, regulations and conditions included in the petition for rezoning are more restrictive than the general use district requirements.

B. Process required.

1. A person petitioning for rezoning of a tract of land may elect to request a conditional zoning district for that tract. The conditional zoning district application must specify the actual use or uses, and all other development regulations authorized by state law, which are intended for the property identified in the petition. The intended use or uses and development regulations must be permitted in the corresponding general use district.

2. The Town Council is to approve or disapprove the application on the basis of the specific use or uses and development regulations requested. Development in a conditional zoning district requires approval of a single application similar to a general use district rezoning application.

3. Property may be placed in a conditional zoning district only in response to a petition signed by the owners of all the property to be included or by an agent authorized by all of the owners to file the application. A petition for conditional zoning shall include:

    a) A master site plan prepared in accordance with § 15.02.137 of the Code of Ordinances for a Master Land Use Plan for a Planned Development;

    b) Written supporting documentation that specifies the actual use or uses proposed for the property;

    c) Proposed rules, regulations, and conditions that, in addition to all predetermined requirements of this Code of Ordinances, will govern the development and use of the property; and

    d) A statement analyzing the reasonableness of the proposed rezoning.

4. During its initial review of a conditional zoning petition, which will follow the process as prescribed in §15.02.190-15.02.194 of the Code of Ordinances for traditional rezoning, the Planning Board shall consider whether or not a community informational meeting, to be organized, advertised, conducted and documented by the petitioner, would be beneficial to making project information available to those most likely to be impacted by the proposed zoning change. If the Planning Board concludes that a community informational meeting should be held, the petitioner shall conduct such meeting in accordance with the following provisions.

    a) The community informational meeting shall be held prior to the date of the next Planning Board meeting at which the petition will be reviewed. The meeting shall be held within seven miles of the Town of River Bend.

    b) Written notice of such a meeting shall be given by the petitioner in the same schedule and manner as prescribed in §15.02.191 (D) and §15.02.193 (A) of the Code of Ordinances for a zoning amendment and public hearing respectively.

    c) Within 10 days following the meeting, but prior to any further consideration by the town, the petitioner shall file a written report of the community informational meeting with the Zoning Administrator. The petitioner's report shall include, among other things, a listing of those persons and organizations contacted about the meeting and the manner and date of contact; the date; time and location of the meeting; a summary of issues discussed at the meeting; and a description of any changes to the rezoning petition made by the petitioner as a result of the meeting. Additionally, the petitioner shall make available at the meeting a roster for all attendees to voluntarily sign so that a record of attendees may be created. The

roster shall include a location for attendees to provide their name, mailing addresses, and telephone number. A copy of the roster of attendees shall be included in the report of the meeting.

d) The purpose of the community informational meeting is for the petitioner to:

(1) Provide specific information and maps regarding the proposed development including but not limited to a description of the proposed zoning change, proposed use(s) of the property, the proposed density and intensity of land uses, the location and arrangement of the proposed land use(s) on the property, the proposed development schedule, and proposed regulations or conditions, in addition to those required by this Ordinance, that will govern the development and use of the property; and

(2) To receive comments and input from citizens likely to be impacted by the proposed zoning change and subsequent development of the property.

e) In the event the petitioner has not held at least one meeting pursuant to this section with 45 days of being notified that a meeting is required, the petitioner shall file a report with the Zoning Administrator documenting efforts that were made to arrange such a meeting and stating the reasons such a meeting was not held. The petitioner shall also notify the Zoning Administrator efforts to schedule a meeting. No further Planning Board action may be taken until the meeting has been conducted.

f) The adequacy of a meeting held or report filed pursuant to this section shall be considered by the Town Council but shall not be subject to judicial review.

5. Review and approval process. The review and approval process for conditional zoning district petitions involves a legislative hearing and legislative decision by the Town Council, following a recommendation by the Planning Board. The review of conditional zoning district petitions shall be undertaken in accordance with the provisions of this section.

a) In the course of evaluating the proposed use, the Town Council may request additional information deemed appropriate to provide a complete analysis of the proposal.

b) Conditional zoning district decisions are subject to judicial review using the same procedures and standard of review applicable to legislative zoning decisions.

c) Conditional zoning district decisions shall be made in consideration of identified relevant adopted land use plans for the area, including, but not limited to, land development plans, comprehensive plans, strategic plans, district plans, transportation and corridor plans and other land development policy documents.

d) If the conditional zoning district application is approved, the Town Council shall authorize the requested use with reasonable conditions as mutually agreed to in writing by the applicant and Town Council and determined to be desirable in promoting public health, safety and general welfare.

6. Specific conditions applicable to the conditional zoning districts may be proposed by the petitioner or the town or its agents, but only those conditions mutually agreed to in writing by

the town and the petitioner may be incorporated into the zoning regulations or permit requirements.

a) The conditional district rezoning application shall specify the use or uses that are intended for the property, as well as any additional conditions on the use of the property that the applicant may propose be conditions of the rezoning. Conditions and site-specific standards imposed in a conditional zoning district shall be limited to:

   (1) Those that address conformance of the development and use of the site to ordinances and officially adopted plans and

   (2) Those that address the impacts reasonably expected to be generated by the development or use of the site.

b) Any such conditions should relate to the relationship of the proposed use to surrounding property, proposed support facilities such as parking areas and driveways, pedestrian and vehicular circulation systems, screening and buffer areas, the timing of development, street and right-of-way improvements, water and sewer improvements, stormwater drainage, the provision of open space, the mitigation of environmental impacts, and other matters that the Town Council may find appropriate or the petitioner may propose.

c) Such conditions to approval of the petition may include dedication to the town or state, as appropriate, of any rights-of-way or easements for streets, water, sewer or other public utilities necessary to serve the proposed development.

d) No condition shall be less restrictive than the standards of the general use district or the standards of any overlay district that applies to the property.

e) No condition shall be made part of the application, or shall be attached to approval of the conditional zoning district, which specifies the ownership status, race, religion or character of the occupants of housing units, the minimum value of improvements, or any illegal exclusionary device; or which states that the use of the property will not be subject to regulations or restrictions set forth in the Code of Ordinances which would apply to the property in any event, such as the regulations for an overlay district which covers the property.

f) If for any reason any condition for approval is found to be illegal or invalid or if the petitioner should fail to carry out any condition in the written and signed agreement, the approval of the site plan for the district shall be null and void and of no effect and proceedings shall be instituted by the town to rezone the property to its previous zoning classification or to another zoning district.

g) The conditions shall be agreed upon, put in writing, and signed by both the petitioner and Town upon final approval of the rezoning by the Town Council.

h) After the town has delivered to the newspaper the notice of public hearing for the application, the applicant shall make no changes in the conditions stated in the application~~,~~

7. If a petition for conditional zoning is approved, the development and use of the property shall be governed by the predetermined ordinance requirements applicable to the district's classification, the approved site plan or master plan for the district, and any additional approved rules, regulations and conditions, all of which shall constitute the zoning regulations for the approved district and are binding on the property as an amendment to this Ordinance and to the zoning map.

   a) If a petition is approved, only those uses and structures indicated in the approved petition and site plan shall be allowed on the subject property. A change of location of the structures may be authorized pursuant to division (B)(8) below provided that the change in building layout does not result in an increase in the number of structures.

   b) Following the approval of the petition for a conditional zoning district, the subject property shall be identified on the zoning map by the appropriate district designation. A conditional zoning district shall be identified by the same designation as the underlying general district followed by the letters "CD" (for example, "R-20 (CD)").

   c) No permit shall be issued for any development activity within a conditional zoning district except in accordance with the approved petition and site plan for the district.

   d) Any violation of the approved site plan or any rules, regulations and conditions for the district shall be treated the same as any other violation of the Code of Ordinances and shall be subject to the same remedies and penalties as any such violation.

8. Alterations to approval. Except as provided in division (B)(8)(a) below, changes to an approved petition or to the conditions attached to the approved petition shall be considered a change to the conditional zoning district and shall be processed as a new conditional zoning application in accordance with the procedures set forth in this section.

   a) The Zoning Administrator shall have the delegated authority to approve administrative minor modifications – limited to no more than 5% total changes to the originally approved site plan. The Zoning Administrator shall have no authority to amend the conditions of approval of a petition. Any decision by the Zoning Administrator must be in writing stating the grounds for approval or denial. Minor modifications shall be limited to changes that the Zoning Administrator determines would not:

      (1) Change the gross square footage of nonresidential development by more than 5%;

      (2) Change the lot coverage by more than 5%;

      (3) Change any use or density;

      (4) Adjust the landscaping requirements by more than 5%; or

      (5) Adjust the required parking more than 5%.

   b) The Zoning Administrator, however, shall always have the discretion to decline to exercise the delegated authority either because he or she is uncertain about approval of the change pursuant to the standard or because a rezoning petition for a legislative hearing and Town Council consideration is deemed appropriate under the circumstances. If the Zoning Administrator declines to exercise this authority, the applicant may file a rezoning petition

for a legislative hearing and Town Council decision in accordance with the provisions delineated in this ordinance.

c) Any request for an administrative modification shall be pursuant to a written letter, signed by the owners of all of the property affected by the proposed change, detailing the requested change. Upon request, the applicant shall provide any additional information as deemed necessary by the Zoning Administrator. Upon an approval of an administrative modification, the applicant shall file a sufficient number of copies of the revised site plan as deemed necessary by the Zoning Administrator.

d) If the Zoning Administrator denies approval of the requested administrative modification, the applicant may file a rezoning petition for a legislative hearing and Town Council decision in accordance with the provisions delineated in this ordinance.

9. Review of approved Conditional Zoning Districts. It is intended that property shall be reclassified to a conditional zoning district only in the event of firm plans to develop the property. Therefore, no sooner than two years after the date of approval of the petition, the Zoning Administrator shall examine and report to the Planning Board the progress made toward developing the property in accordance with the approved petition and any conditions attached to the approval.

a) If, following such examination and report of progress, the Planning Board determines that substantial progress has not been made in accordance with the approved petition and conditions, the Planning Board shall forward to the Town Council a report which may recommend that the property be rezoned to its previous zoning classification or to another zoning district. If the Town Council concurs with the Planning Board's recommendation, the Town Council may initiate the rezoning of the property in accordance with the procedures delineated in this ordinance.

b) If, upon written request of the developer or petitioner, the Planning Board determines that substantial progress has been made to develop the property, the Planning Board may recommend that an extension of time be granted. The Town Council, after reviewing the recommendation of the Planning Board, may approve an extension of time not to exceed an additional 12 months. Approval of such a time extension by the Town Council may be made without conducting a formal public hearing.

c) If, after the expiration of the original or extended time period, the Planning Board determines that no substantial progress has been made and the Town Council concurs with that determination, the Town Council shall proceed to: conduct a legislative hearing on the matter to evaluate whether or not another extension of time is warranted; or initiate the rezoning of the property to its previous zoning classification or to another zoning classification using the procedures delineated in this ordinance.

d) 15For purposes of this section, examples of substantial progress may include: the approval of construction plans for streets, utilities and other infrastructure; the initiation of land preparation activities such as clearing and grading; the initiation of the construction of the principal building(s); and the initiation of the construction of streets, utilities, other infrastructure or required site amenities.

MANUFACTURED HOMES

§ 15.02.150 NEED AND PURPOSE.

The River Bend Town Council recognizes that manufactured homes provide affordable housing for many residents. The purpose of this subchapter is to allow the placement of manufactured homes in designated residential districts, provided that the homes meet appearance and dimensional criteria which will protect the character and property values of those single-family residential areas.

§ 15.02.151 LOCATION.

A manufactured home may be located only in a Manufactured Home Overlay Area.

Penalty, see § 1.01.999

§ 15.02.152 PERMITS.

Before a manufactured home may be placed on a lot, an initial zoning permit shall be secured from the Town Zoning Administrator, a building permit shall be secured from the Craven County Building Inspector and a certificate attesting to the suitability of the lot to accommodate proposed water and sewer facilities shall be secured from the Craven County Health Department. Prior to the movement of manufactured home units along municipality owned streets, a permit for the movement shall be secured from the Town Zoning Administrator. Upon completion of the installation of a manufactured home on a lot, the Zoning Administrator shall inspect the property and, when approved, shall issue a certificate of zoning compliance. The applicant shall then apply to Craven County for a final electrical permit and/or certificate of occupancy.

Penalty, see § 1.01.999

§ 15.02.153 ADDITIONAL REQUIREMENTS FOR MANUFACTURED HOMES.

A. A manufactured home must meet the following additional requirements:
    1. The manufactured home is a multi-section home which has a length not exceeding 4 times its width measured along the longest axis and width measured at the narrowest part of the other axis;
    2. Contains a minimum of 1,450 square feet of enclosed and heated living area;

3. The pitch of the roof has a minimum vertical rise of 3 feet for each 12 feet of horizontal run (3:12) and the roof is finished with a type of shingle that is commonly used in standard residential construction;
4. All roof structures shall provide an eave projection of no less than 6 inches, which may include a gutter;
5. The exterior siding consists of material comparable in composition, appearance and durability to the exterior siding commonly used in standard residential construction;
6. The manufactured home is setup in accordance with the standards set by the North Carolina Department of Insurance and a continuous masonry foundation or masonry curtain wall, un-pierced except for required ventilation and access, is installed under the perimeter of the manufactured home;
7. Stairs, porches, entrance platforms, ramps and other means of entrance and exit to and from the home shall be installed or constructed in accordance with the standards set by the North Carolina Department of Insurance, attached firmly to the primary structure and anchored to the ground; and
8. The moving hitch, wheels and axles and transporting lights have been removed.

B. It is the intent of these criteria to insure that a manufactured home, when installed, shall have substantially the appearance of an on-site, conventionally built, single family dwelling.

Penalty, see § 1.01.999

ADMINISTRATION OF THE ZONING CHAPTER

§ 15.02.160 CONFLICTS OF INTEREST

A. *Governing board.* A governing board member shall not vote on any legislative decision regarding a development regulation adopted pursuant to this Chapter where the outcome of the matter being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member. A governing board member shall not vote on any zoning amendment if the landowner of the property subject to a rezoning petition or the applicant for a text amendment is a person with whom the member has a close familial, business, or other associational relationship.

B. *Appointed boards*. Members of appointed boards shall not vote on advisory or legislative decisions regarding a development regulation adopted pursuant to this Chapter where the outcome of the matter being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member. An appointed board member shall not vote on any zoning amendment if the landowner of the property subject to a rezoning petition or the applicant for a text amendment is a person with whom the member has a close familial, business, or other associational relationship.

C. *Administrative staff*. No staff member shall make a final decision on an administrative decision required by this Chapter where the outcome of the matter being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the staff member or if the applicant or other person subject to that decision is a person with whom the staff member has a close familial, business, or other associational relationship.
    1. If a staff member has a conflict of interest under this section, the decision shall be assigned to the supervisor of the staff person or such other staff person as may be designated by the development regulation or other ordinance.
    2. No staff member shall be financially interested or employed by a business that is financially interested in a development subject to regulation under this Chapter unless the staff member is the owner of the land or building involved. No staff member or other individual or an employee of a company contracting with a local government to provide staff support shall engage in any work that is inconsistent with his or her duties or with the interest of the local government, as determined by the local government.

D. *Quasi-judicial decisions.* A member of any board exercising quasi-judicial functions pursuant to this Chapter shall not participate in or vote on any quasi-judicial matter in a manner that would violate affected persons' constitutional rights to an impartial decision maker. Impermissible violations of due process include, but are not limited to, a member having a fixed opinion prior to hearing the matter that is not susceptible to change, undisclosed ex parte communications, a close familial, business, or other associational relationship with an affected person, or a financial interest in the outcome of the matter.

E. *Resolution of Objection.* If an objection is raised to a board member's participation at or prior to the hearing or vote on that matter and that member does not recuse himself or herself, the remaining members of the board shall by majority vote rule on the objection.

F. *Familial relationship.* For purposes of this section, a close familial relationship means a spouse, parent, child, brother, sister, grandparent, or grandchild. The term includes the step, half, and in-law relationships.

§ 15.02.164 ZONING ADMINISTRATOR.

A Zoning Administrator shall be appointed in accordance with § 3.01.078 of this Ordinance, to administer and enforce this chapter. He may be provided with the assistance of other persons as the Town Council may approve. If he finds that any of the provisions of this chapter are being violated, he shall notify in writing the person or persons responsible for the violation, indicating the nature of the violation and ordering the action necessary to correct it. In reviewing a permit, the Zoning Administrator shall consult a registered professional engineer, licensed to practice in North Carolina, when necessary.

Amended 09/17/2009

§ 15.02.165 DUTIES OF ZONING ADMINISTRATOR.

Duties of the Zoning Administrator relative to this chapter shall include but not be limited to:

A.
   1. Reviewing and approving permit to assure the proposed subdivision, lot, or construction meet all zoning and subdivision requirements, and Flood Damage Prevention Ordinance.
   2. Where there will be an adverse impact on existing drainage facilities, the Zoning Administrator shall obtain approval from the Town Council of mitigation plans and impact fees relative to changes to drainage features outside the project boundaries. Impact fees shall be paid by the owner/subdivider.

B. Reviewing and approving construction permit to assure that the plans for new buildings or subdivisions in the area will comply with the requirements of the North Carolina Stormwater Management Site Planning Manual. The issued permit shall note all conditions relating to stormwater drainage which apply to the particular building; such as grading requirements and the proposed minimum elevation of the lowest habitable floor above mean sea level.

C. Changes to established drainage features, such as size or elevation of driveway culverts, of swales and of ditches on town property or easements shall not be made without the written approval of the Zoning Administrator indicating that the change will not significantly impact stormwater drainage in the area. Grade changes on private property shall be considered drainage feature changes, and require written approval of the Zoning Administrator.

D. Monitoring the implementation of the proposed project to assure that all requirements are met, including setbacks, sedimentation control and stormwater drainage.

E. Maintaining records of:
   1. Proposed plans;
   2. Completed plans;
   3. Certificates;
   4. Inspections made;
   5. Actions taken as result of inspection;
   6. Final inspection check sheet;
   7. Permits issued;
   8. Notice of violations;
   9. Order to take corrective action;
   10. Existing drainage feature change letter; and
   11. Appeals.

F. These records shall be public records and may be inspected at the office of the Zoning Administrator during normal business hours.

G. Ensuring compliance with this subchapter shall be afforded the Zoning Administrator or his designated representative by granting access to premises and structure during reasonable hours.

H. It is the responsibility of the property owner to contact the Zoning Administrator to arrange for an inspection when the foundation is ready.

I. Serving notice to owner of any non-compliance with approved plans, issuing stop-work orders for work in progress until corrective actions are initiated or revoking the permits where satisfactory resolution of a dispute cannot be reached.
J. Monitoring the construction of buildings/projects to assure that grading and drainage features are built as planned and that as built survey data is taken to verify the elevation of the lowest habitable floor of buildings located in Zone A on the flood insurance rate map where data is not already on file.
K. Conducting hearings and taking other prescribed actions related to violations.

§ 15.02.166 ENFORCEMENT.

A. *Notices of violation*. When staff determines work or activity has been undertaken in violation of a development regulation adopted pursuant to this Chapter or other local development regulation or any State law delegated to the local government for enforcement purposes in lieu of the State or in violation of the terms of a development approval, a written notice of violation may be issued. The notice of violation shall be delivered to the holder of the development approval and to the landowner of the property involved, if the landowner is not the holder of the development approval, by personal deliver, electronic delivery, or first class mail and may be provided by similar means to the occupant of the property or the person undertaking the work or activity. The notice of violation may be posted on the property. The person providing the notice of violation shall certify to the local government that the notice was provided and the certificate shall be deemed conclusive in the absence of fraud. Except as provided by G.S. 160D-11-23, 160D-12-6, or otherwise provided by law, a notice of violation may be appealed to the board of adjustment pursuant to G.S. 160D-4-5.

B. *Inspection of work*. The Zoning Administrator shall make as many inspections as he determines are necessary to ensure the work is being done according to the provisions of any permit. The Zoning Administrator has a right to enter on any premises at any reasonable hour for the purposes of inspection or other enforcement action, upon presentation of proper credentials, provided the appropriate consent has been given for inspection of areas not open to the public or that an appropriate inspection warrant has been secured.

C. *Stop-work orders*. When an area is being developed or a building is being constructed, renovated or added to in violation of this chapter, the Zoning Administrator may order the work to be stopped immediately. The stop order shall be in writing and directed to the owner. It shall state the specific work to be stopped, the specific reason for the stoppage and the conditions under which the work may be resumed.

D. *Revocation of permits*. The Zoning Administrator may revoke and require the return of any permit issued in accordance with this chapter by notifying the permit holder in writing stating the reason for the revocation. Permits may be revoked for substantial departure from the approved permit plans or specifications, for refusal or failure to comply with the requirements of state or local laws or for false statements or misrepresentations made in securing the permit. The local government shall follow the same development review and approval process required

for issuance of the development approval, including any required notice or hearing, in the review and approval of any revocation of that approval.

E. *Failure to take corrective action*. If the owner of a building or property fails to take prompt corrective action, the Zoning Administrator shall give written notice by certified or registered mail to the owner's last known address or by personal services:
   1. That the building or property is in violation of this chapter;
   2. That a hearing will be held before the Zoning Administrator at a designated place and time, not later than 30 days after the date of the notice, at which time the owner shall be entitled to be heard in person or by counsel and to present arguments and evidence pertaining to the matter; and
   3. That following the hearing, the Zoning Administrator may issue an order to alter, vacate or demolish the building or property or to take other corrective action as appears appropriate.

F. *Order to take corrective action*. If a hearing is held pursuant to the notice prescribed above, and the Zoning Administrator finds the building or property is in violation of this chapter, he shall issue an order in writing to the owner requiring the owner to remedy the violation within a period of up to 60 days. Where the Zoning Administrator finds there is imminent danger to life or other property, he is authorized to order that corrective action be taken in a shorter time.

G. *Appeal*. An owner who has received an order to take corrective action may appeal the order to the Town Council by giving notice of appeal in writing to the Zoning Administrator and the Town Clerk within 10 days following issuance of the order. The Town Council shall hear the appeal within a reasonable time and may affirm, modify or revoke the order, as long as the ruling is in compliance with the State of North Carolina Statutes.

H. *Changes to established drainage features*. The Zoning Administrator may issue a letter to any property owner who changes an established drainage feature stating that an unauthorized change has been made to drainage features on or abutting the property and that the feature must be restored within 30 days or the town could do so and bill the owner for the costs involved. Failure of the owner to pay the town for the work could result in a lien being placed on the property.

§ 15.02.167 PLANNING

A. *Preparation of plans and studies.* As a condition of adopting and applying zoning regulations under this Chapter, a local government shall adopt and reasonably maintain a comprehensive plan that sets forth goals, policies, and programs intended to guide the present and future physical, social, and economic development of the jurisdiction.

B. *Adoption and effect of plans*. Plans shall be adopted by the governing board with the advice and consultation of the planning board. Adoption and amendment of a comprehensive plan is a legislative decision and shall follow the process mandated for zoning text amendments set by G.S. 160D-6-1. Plans adopted under this Chapter may be undertaken and adopted as part of or in conjunction with plans required under other statutes, including but not limited to the plans required by G.S. 113A-110. Plans adopted under this Chapter shall be advisory in nature without

independent regulatory effect. Plans adopted under this Chapter do not expand, diminish, or alter the scope of authority for development regulations adopted under this Chapter. Plans adopted under this section shall be considered by the planning board and governing board when considering proposed amendments to zoning regulations as required by G.S. 160D-6-4 and 160D-6-5.

If a plan is deemed amended by G.S. 160D-6-5 by virtue of adoption of a zoning amendment that is inconsistent with the plan, that amendment shall be noted in the plan. However, if the plan is one that requires review and approval subject to G.S. 113A-110, the plan amendment shall not be effective until that review and approval is completed.

§ 15.02.168 INITIAL ZONING PERMIT.

A. *Generally*.

1. Before the erection, construction or alteration of any building or structure, or part of same, or modification of or addition to a driveway or parking area, there shall be submitted to the Zoning Administrator by the owner or authorized agent an application for a zoning permit on appropriate forms to be furnished by the Zoning Administrator. Each application for a zoning permit shall be accompanied with a plat signed and sealed by a licensed surveyor drawn to scale showing accurate dimensions of the lot, applicable easements, elevations of site including driveways and drainage features, relationship to adjoining lots and accurate dimensions of the building to be so erected, constructed or altered, including its location on the lot, and the percentage of impervious surface. It shall be determined that the plan will be in conformance with the North Carolina Stormwater Site Planning Guidance Manual and will not adversely impact the flow of stormwater in areas outside the new project. This plan shall be signed and sealed by a professional engineer, licensed to practice in North Carolina.

Amended 03/18/2010 and 07/18/2013

2. Projects that involve modification of existing structures and, construction cost is estimated to be less than $10,000, the Zoning Administrator shall review the proposed construction site and advise the applicant within 3 working days if a certified drainage plan will be required for the proposed project.
    a) For additions to a developed property the percentage of impervious surface, before and after the project shall be listed.

    Added 03/18/10

    b) On property improved before 02/28/2010, the impervious surface amount may be exceeded by 10 percent of the existing percentage if the following conditions apply:
        (1) The increase was caused by implementation of changes to the Town's Ordinances.
        (2) Other approved stormwater BMP's (Best Management Practices) are in place.
        (3) Creates a significant hardship to the owner.
        (4) Is approved in writing by the Town's Zoning Administrator.

    Added 07/15/2010

3. The site-grading plan shall reflect both the existing site grade lines and the proposed finished grade lines. If there are any wetland areas on the proposed site, those areas shall be clearly shown. This plan shall show the natural drainage course(s) that run onto and from the site. The plan shall clearly show drainage pipe size and direction of flow of buried drainpipes and any structure that will connect to the pipes. All drainage pipes and structures shall be designed to accommodate the 100-year storm of record. The site drainage plan must certify that "the development of this site is in compliance with this grading plan which will not adversely impact adjoining property or wetland sensitive areas elsewhere in the drainage course. Further, structures shown on this plan will be adequate for drainage during the 100-year storm of record."
4. A silt fence and erosion control structures must be erected prior to grading operations and shall be maintained not only during the construction period but long enough for the land to re-stabilize, and thereafter can be removed after a follow up visit by the Zoning Administrator.
5. It shall be within the discretion of the Zoning Administrator to issue permits for minor construction work without plans and specifications. Plats/plots and plans submitted to the Zoning Administrator shall be kept in files in the town offices for future reference.

B. *Check lists*. Check lists which summarize requirements to obtain building permits are as follows:

1. Plats/plot plan showing the following:
   a) Building location and outline;
   b) Size and location of any driveways, walks, patios or other paved areas; and
   c) Location of all underground electric and telephone service and cable TV installations.
   d) Distance between principal dwelling and all accessory buildings. Any patio, deck, porch, stairs, and/or ramps, roofed or unroofed (attached or immediately proximate thereto), shall be considered a part of a building in the determination of distance between accessory building and all other buildings located on the same lot.

   Added 01/15/2009
2. Site drainage plan showing the following:

   Amended 03/18/2010
   a) Existing site grade lines and proposed finished grading with contour lines to nearest foot showing elevation above sea level;
   b) Any wetland areas on the proposed site;
   c) Natural drainage course that runs onto and from site;
   d) Pipe size and direction of flow of buried drainpipes and any structure that will connect to the pipe. Bottom elevation of any drainage ditches and swales on town property along roads;
   e) Size and invert (bottom) elevation of any drainage culverts; and
   f) Plantings plan; and
   g) Percentage of impervious surfaces.
3. Elevation Certificate (FEMA Form 81-31) showing the elevation of the lowest habitable floor above sea level if the property is located in Zone AE on the FIRM.

C. *Note*. Brief descriptions of the best management practices to be employed on the property (see page 79 of the 2-20-1998 printing of the North Carolina Site Planning Guidance Manual).

Penalty, see § 1.01.999

§ 15.02.169 CERTIFICATE OF ZONING COMPLIANCE.

A. The Zoning Administrator shall inspect the project or structure at appropriate times during construction. Before Craven County issues an order for a final electrical inspection, and/or certificate of occupancy for the building, the owner or authorized agent shall contact the Zoning Administrator for a final zoning inspection.
B. Application shall be accompanied by a final "as built" survey plat with site elevations and indicating building location on lot.
C. If it shall appear to the Zoning Administrator that the provisions of this code, including stormwater management, and all requirements of fees, if any, have been paid, he will then issue a certificate of zoning compliance.
D. The applicant then shall apply to Craven County for all necessary permits and/or certificate of occupancy/compliance.

§ 15.02.170 CERTIFICATE OF OCCUPANCY/COMPLIANCE.

A. No building which has been erected, added to, located or structurally altered for which a building permit has been issued shall be used or occupied until a certificate of occupancy/compliance shall have been issued by the Craven County Inspection Department. The Zoning Administrator may not issue a certificate of zoning compliance for an approved site-specific development plan or part thereof, until all required seeding, trees and plant material have been placed in accordance with the approved planting plan.
B. A temporary certificate of zoning compliance may be issued for a period of 180 days under extenuating circumstances that would affect the seeding or planting of the site or until the proper planting season is reached to complete the planting requirements. The Zoning Administrator may require the developer to provide an irrevocable letter of credit to the town to cover the costs of planting prior to the Zoning Administrator's issuance of a certificate of zoning compliance.

§ 15.02.171 RECORDS AND INVALIDATION.

A. A record of all permits issued shall be kept on file in the office of the Zoning Administrator.
B. Any permit issued shall become invalid if the work authorized by it has not been commenced within 6 months of the date of issuance, or if the work authorized by it is not completed for a period of 1 year from the date of issuance. Should the work authorized not be completed within the allotted time, permit holder may submit a request to the Zoning Administrator, in writing,

for an extension of his original permit. Any extension will be for a period not to exceed six (6) months, by which time all work (including applicable site restoration) will be complete.

Amended 09/17/2009

§ 15.02.172 REMEDIES.

If a building or structure is erected, constructed, renovated or maintained, or any building, structure or land is in violation of this part or of any chapter or other regulation, the Zoning Administrator or any other appropriate authority of the Town of River Bend, in addition to other remedies, may institute any appropriate action or proceedings to prevent the unlawful erection, construction, renovation, maintenance or use, to restrain, correct or abate the violation, to prevent occupancy of the building, structure or land, or to prevent any illegal act, conduct, business or use in or about the premises.

BOARDS AND ORGANIZATIONAL ARRANGEMENTS

§ 15.02.173 PLANNING BOARDS

A. *Composition*. A local government may by ordinance provide for the appointment and compensation of a planning board or may designate one or more boards or commissions to perform the duties of a planning board. A planning board established pursuant to this section may include, but shall not be limited to, one or more of the following:
   1. A planning board of any size (with no fewer than three members) or composition deemed appropriate, organized in any manner deemed appropriate;
   2. A joint planning board created by two or more local governments pursuant to Article 20, Part 1, of Chapter 160A.

B. *Duties*. A planning board may be assigned the following powers and duties:
   1. Prepare, review, maintain, monitor, and periodically update and recommend to the governing board a comprehensive plan, and such other plans as deemed appropriate, and conduct ongoing related research, data collection, mapping, and analysis;
   2. Facilitate and coordinate citizen engagement and participation in the planning process;
   3. Develop and recommend policies, ordinances, development regulations, administrative procedures, and other means for carrying out plans in a coordinated and efficient manner;
   4. Advise the governing board concerning the implementation of plans, including, but not limited to, review and comment on all zoning text and map amendments as required by G.S. 160D-6-4.
   5. Exercise any functions in the administration and enforcement of various means for carrying out plans that the governing board may direct;
   6. Provide a preliminary forum for review of quasi-judicial decisions, provided that no part of the forum or recommendation may be used as a basis for the deciding board;

7. Perform any other related duties that the governing board may direct.

§ 15.02.174 BOARDS OF ADJUSTMENT

A. *Composition.* A Board of Adjustment ("Board") is hereby established pursuant to G.S. §160D-302, consisting of six (6) regular members and three (3) alternates. Five (5) regular members and two (2) alternates shall be citizens of the Town, appointed by the Town Council. One (1) regular member and one (1) alternate shall be residents of the Town's extraterritorial jurisdiction, and shall be appointed by the Craven County Board of Commissioners. Alternates shall serve on the Board in the absence or temporary disqualification of any regular member or to fill a vacancy pending appointment of a member; however, vacancies shall be filled for the unexpired term only. All appointments to the Board shall be for a period of three (3) years commencing on July 1 of the year of appointment, and all members of the Board, including alternates, shall have equal rights, privileges and duties with regard to all matters within the Town and area of extraterritorial jurisdiction. Members of the Board may be compensated according to a schedule adopted by the Town Council from time to time. Members of the Board may be removed for cause by the Town Council upon written charges and after public hearing.

B. *Meetings; Officers.* The Board shall elect one (1) of its members as Chair, one (1) of its members as a Vice-Chair, and shall appoint a Secretary and other subordinates as it deems in its best interest. The Board shall adopt any rules of procedure under which it will operate. Meetings of the Board shall be held at the call of the Chair, or in his absence the Vice-Chair, or at least two (2) members of the Board. All meetings of the Board shall be open to the public. The Board shall keep full and accurate minutes of its proceedings.

C. *Powers and Duties.* The Board shall have the following powers and duties:
   1. *Administrative Review*. To hear and decide appeals from and review any order, requirement, decision, or determination made by an administrative official charged with enforcement of this Chapter.
   2. *Interpretation*. To interpret the terms of this Chapter and zoning maps and to pass upon disputed questions of lot lines or district boundary lines and similar questions as they arise in the administration of this Chapter.
   3. *Special Use Permits*. To hear and decide special and conditional zoning permits in accordance with standards and procedures specified in this Chapter. Reasonable and appropriate conditions may be imposed upon these permits.
   4. *Exceptions from the application requirements for Business District Areas zoned BD-PD in heavily trafficked areas*. To hear and decide on requests for exceptions from the design guidelines and performance standards required under §15.02.048.
   5. *Subpoena*. To subpoena witnesses and compel the production of evidence, through the chair, or in the chair's absence anyone acting as the chair, may subpoena witnesses and compel the production of evidence. To request issuance of a subpoena, persons with standing under G.S. §160D-1402(c) may make a written request to the chair explaining why it is necessary for certain witnesses or evidence to be compelled. The chair shall issue

requested subpoenas he or she determines to be relevant, reasonable in nature and scope, and not oppressive. The chair shall rule on any motion to quash or modify a subpoena. Decisions regarding subpoenas made by the chair may be appealed to the full Board. If a person fails or refuses to obey a subpoena issued pursuant to this subsection, the Board or the party seeking the subpoena may apply to the General Court of Justice for an order requiring that its subpoena be obeyed, and the court shall have jurisdiction to issue these orders after notice to all proper parties

6. *Oath*. The chair of the Board, or any member acting as chair, and the clerk to the Board are authorized to administer oaths to witnesses in any matter coming before the Board. Any person who, while under oath during a proceeding before the Board, willfully swears falsely is guilty of a Class 1 misdemeanor.
7. *Variance – In General*. When unnecessary hardships would result from carrying out the strict letter of this Chapter, the Board may vary any of the provisions herein upon a showing of all of the following:
   a) Unnecessary hardship would result from the strict application of this Chapter. It shall not be necessary to demonstrate that, in the absence of the variance, no reasonable use can be made of the property.
   b) The hardship results from conditions that are peculiar to the property, such as location, size, or topography. Hardships resulting from personal circumstances, as well as hardships resulting from conditions that are common to the neighborhood or the general public, may not be the basis for granting a variance.
   c) The hardship did not result from actions taken by the applicant or the property owner. The act of purchasing property with knowledge that circumstances exist that may justify the granting of a variance shall not be regarded as a self-created hardship.
   d) The requested variance is consistent with the spirit, purpose, and intent of this Chapter, such that public safety is secured, and substantial justice is achieved.

   Provided, however, no change in permitted uses may be authorized by variance. Appropriate conditions may be imposed on any variance, provided that the conditions are reasonably related to the variance.

8. *Variance – Federal Fair Housing Act*. Notwithstanding the provisions of subparagraph (g) above, the Board may provide for a variance under the Federal Fair Housing Act upon the following:
   a) *Application Requirements; Determination of Completeness*.
      (1) *Persons Authorized to File Applications*. An application for a reasonable accommodation may be filed only by the owner of the land affected by the reasonable accommodation; an agent, lessee, or contract purchaser specifically authorized by the owner to file such application; or any unit of government that is not the owner of the lot but proposes to acquire the lot by purchase, gift, or condemnation.

(2) *Pre-Application Conference*. Before filing an application for a reasonable accommodation, the applicant may request a pre-application conference with the Zoning Administrator.

(3) *Application Filing*. An application for a reasonable accommodation shall be filed with the Zoning Administrator. No filing fee is required for such application. Once the application is complete, the Zoning Administrator shall schedule the application for consideration at a hearing before the Board, and shall transmit to the Board all applications and other records pertaining to such reasonable accommodation prior to the hearing on the application.

b) *Approval Criteria*. The Board shall grant a reasonable accommodation to any provision of this Chapter if it finds by a greater weight of the evidence that the proposed reasonable accommodation is determined to be both reasonable and necessary, in accordance with the following:

(1) *Reasonable*. An accommodation will be determined to be reasonable if it would not undermine the legitimate purposes and effects of existing planning regulations, and if it will not impose significant financial and administrative burdens upon the Town and/or constitute a substantial or fundamental alteration of this Chapter's provisions; and

(2) *Necessary.* An accommodation will be determined to be necessary if it would provide direct or meaningful therapeutic amelioration of the effects of the particular disability or handicap, and would afford an equal opportunity to enjoy and use housing in residential areas in the Town.

c) *Effect of Approval or Denial*.

(1) After the Board approves a reasonable accommodation, the applicant shall follow the normal procedures set forth in this Chapter, and any other applicable ordinance, for approval of any permits, certificates, and other approvals required in order to proceed with development or use of the property. All orders, decisions, determinations, and interpretations made by administrative officers under those procedures shall be consistent with the reasonable accommodation granted by the Board.

(2) The Board shall refuse to hear a reasonable accommodation request that has been previously denied, unless it finds that there have been substantial changes in the conditions or circumstances relating to the matter.

d) *Lapse*. Failure of an applicant to apply for a building permit or any other required development permit, and commence uninterrupted construction or action with regard to a variance granted hereunder within one (1) year of receiving approval of the reasonable accommodation shall automatically render the variance null and void.

9. *Decision*. As used in this Chapter, the term "decision" includes any final and binding order, requirement, or determination. The Board shall follow quasi-judicial procedures when deciding appeals and requests for variances and special and conditional zoning permits. The

Board shall hear and decide all matters upon which it is required to pass under any statute or this Ordinance.

§15.02.175 EXTRATERRITORIAL REPRESENTATION ON BOARDS

A. *Proportional representation*. When a municipality elects to exercise extraterritorial powers under this Chapter, it shall provide a means of proportional representation based on population for residents of the extraterritorial area to be regulated. The population estimates for the calculation shall be updated no less frequently than after each decennial census. Representation shall be provided by appointing at least one resident of the entire extraterritorial planning and development regulation area to the planning board and board of adjustment.

§15.02.176 QUASI-JUDICIAL PROCEDURE

A. *Notice of Hearing*. Notice of evidentiary hearings conducted pursuant to this Chapter shall be mailed to the person or entity whose appeal, application, or request is the subject of the hearing; to the owner of the property that is the subject of the hearing if the owner did not initiate the hearing; to the owners of all parcels of land abutting the parcel of land that is the subject of the hearing; and to any other persons entitled to receive notice as provided by the zoning or unified development ordinance. In the absence of evidence to the contrary, the Town may rely on the county tax listing to determine owners of property entitled to mailed notice. The notice must be deposited in the mail at least 10 days, but not more than 25 days, prior to the date of the hearing. Within that same time period, the Town shall also prominently post a notice of the hearing on the site that is the subject of the hearing or on an adjacent street or highway right-of-way.

B. *Administrative materials*. The administrator or staff to the board shall transmit to the board all applications, reports, and written materials relevant to the matter being considered. The administrative materials may be distributed to the members of the board prior to the hearing if at the same time they are distributed to the board a copy is also provided to the appellant or applicant and to the landowner if that person is not the appellant or applicant. The administrative materials shall become a part of the hearing record. The administrative materials may be provided in written or electronic form. Objections to inclusion or exclusion of administrative materials may be made before or during the hearing. Rulings on unresolved objections shall be made by the board at the hearing.

C. *Presentation of evidence*. The applicant, the local government, and any person who would have standing to appeal the decision under G.S. 160D-14-2(d) shall have the right to participate as a party at the evidentiary hearing. Other witnesses may present competent, material, and substantial evidence that is not repetitive as allowed by the board. Objections regarding jurisdictional and evidentiary issues, including but not limited to, the timeliness of an appeal or the standing of a party, may be made to the board. The board chair shall rule on any objections

and the chair's rulings may be appealed to the full board. These rulings are also subject to judicial review pursuant to G.S. 160D-14-2. Objections based on jurisdictional issues may be raised for the first time on judicial review.

§15.02.177 VOTING

A. The concurring vote of four-fifths of the board shall be necessary to grant a variance. A majority of the members shall be required to decide any other quasi-judicial matter or to determine an appeal made in the nature of certiorari. For all other matters, a majority of the members shall be required. For the purposes of this Section, vacant positions on the board and members who are disqualified from voting on a quasi-judicial matter shall not be considered members of the board for calculation of the requisite majority if there are no qualified alternates available to take the place of such members. Abstentions by a member not otherwise excused from voting shall be counted as a vote in favor of any motion or action.
B. A member of the Board shall not participate in or vote on any quasi-judicial matter in a manner that would violate affected persons' constitutional rights to an impartial decision maker. Impermissible violations of due process include, but are not limited to, a member having a fixed opinion prior to hearing the matter that is not susceptible to change, undisclosed ex parte communications, a close familial, business, or other associational relationship with an affected person, or a financial interest in the outcome of the matter. If an objection is raised to a member's participation and that member does not recuse himself or herself, the remaining members shall by majority vote rule on the objection.
C. The Board may reverse or affirm, wholly or in part, or may modify the order, requirement, decision, or determination appealed from, and shall make any order, requirement, decision, or determination that in its opinion ought to be made.

§15.02.178 QUASI-JUDICIAL DECISIONS AND JUDICIAL REVIEW

A. The Board shall determine contested facts and make its decision within a reasonable time. Every quasi-judicial decision shall be based upon competent, material, and substantial evidence in the record. Each quasi-judicial decision shall be reduced to writing and reflect the board's determination of contested facts and their application to the applicable standards. The written decision shall be signed by the chair or other duly authorized member of the board. A quasi-judicial decision is effective upon filing the written decision with the clerk to the board or such other office or official as the ordinance specifies. The decision of the board shall be delivered by personal delivery, electronic mail, or by first-class mail to the applicant, property owner, and to any person who has submitted a written request for a copy, prior to the date the decision becomes effective. The person required to provide notice shall certify that proper notice has been made.

B. Every quasi-judicial decision shall be subject to review by the Craven County Superior Court by proceedings in the nature of certiorari pursuant to G.S. §160D-1402. A petition for review shall be filed with the Clerk of Craven County Superior Court by the later of 30 days after the decision is effective or after a written copy thereof is given in accordance with §15.02.178(a). When first-class mail is used to deliver notice, three days shall be added to the time to file the petition.

§15.02.179 APPEALS

The Board shall hear and decide appeals from decisions of administrative officials charged with enforcement of this Ordinance, pursuant to all of the following:

A. Any person who has standing under G.S. §160D-1402(c) or the city may appeal a decision to the Board. An appeal is taken by filing a notice of appeal with the Town Clerk and payment of any applicable fees; provided however, where interpretation of the terms of this Chapter is required specifically by this Chapter to be determined by the Board, the required fee will be waived. The notice of appeal shall state the grounds for the appeal.
B. The official who made the decision shall give written notice to the owner of the property that is the subject of the decision and to the party who sought the decision, if different from the owner. The written notice shall be delivered by personal delivery, electronic mail, or by first-class mail.
C. The owner or other party shall have 30 days from receipt of the written notice within which to file an appeal. Any other person with standing to appeal shall have 30 days from receipt from any source of actual or constructive notice of the decision within which to file an appeal.
D. It shall be conclusively presumed that all persons with standing to appeal have constructive notice of the decision from the date a sign containing the words "Zoning Decision" in letters at least six inches high and identifying the means to contact an official for information about the decision is prominently posted on the property that is the subject of the decision, provided the sign remains on the property for at least 10 days. Posting of signs is not the only form of constructive notice. Any such posting shall be the responsibility of the landowner or applicant. Verification of the posting shall be provided to the official who made the decision. Absent an ordinance provision to the contrary, posting of signs shall not be required.
E. The official who made the decision shall transmit to the Board all documents and exhibits constituting the record upon which the action appealed from is taken. The official shall also provide a copy of the record to the appellant and to the owner of the property that is the subject of the appeal if the appellant is not the owner.
F. An appeal of a notice of violation or other enforcement order stays enforcement of the action appealed from unless the official who made the decision certifies to the Board after notice of appeal has been filed that because of the facts stated in an affidavit, a stay would cause imminent peril to life or property or because the violation is transitory in nature, a stay would seriously interfere with enforcement of this Ordinance. In that case, enforcement proceedings shall not be stayed except by a restraining order, which may be granted by a court. If

enforcement proceedings are not stayed, the appellant may file with the official a request for an expedited hearing of the appeal, and the board of adjustment shall meet to hear the appeal within 15 days after such a request is filed. Notwithstanding the foregoing, appeals of decisions granting a permit or otherwise affirming that a proposed use of property is consistent with the ordinance shall not stay the further review of an application for permits or permissions to use such property; in these situations the appellant may request and the board may grant a stay of a final decision of permit applications or building permits affected by the issue being appealed.

G. Subject to the provisions of subdivision (f) of this section, the Board shall hear and decide the appeal within a reasonable time.
H. The official who made the decision shall be present at the hearing as a witness. The appellant shall not be limited at the hearing to matters stated in the notice of appeal. If any party or the Town would be unduly prejudiced by the presentation of matters not presented in the notice of appeal, the Board shall continue the hearing. The Board may reverse or affirm, wholly or partly, or may modify the decision appealed from and shall make any order, requirement, decision, or determination that ought to be made. The board shall have all the powers of the official who made the decision.
I. When hearing an appeal in the nature of certiorari, the hearing shall be based on the record below and the scope of review shall be as provided in G.S. §160D-1402(j).
J. The parties to an appeal that has been made under this Chapter may agree to mediation or other forms of alternative dispute resolution.

Amended 08/20/2015

§15.02.180 RULES OF PROCEDURE

Rules of procedure that are consistent with the provisions of this Chapter may be adopted by the governing board for any or all boards created under this Article. In the absence of action by the governing board, each board created under this Article is authorized to adopt its own rules of procedure that are consistent with the provisions of this Chapter. A copy of any adopted rules of procedure shall be maintained by the local government clerk or such other official as designated by ordinance and posted on the local government web site if one exists. Each board shall keep minutes of its proceedings.

§15.02.181 OATH OF OFFICE

All members appointed to boards under this Article shall, before entering their duties, qualify by taking an oath of office as required by G.S. 153A-26 and 160A-61.

CHANGES AND AMENDMENTS

§ 15.02.190 GENERALLY.

The Town Council may amend, supplement or change the text of this chapter and/or the zoning map in accordance with the following procedures.

§ 15.02.191 APPLICATION.

A. *Amendment initiation*. Proposed changes to this chapter may be initiated by the Town Council, Planning Board, Board of Adjustment, or by any 1 or more owners of property within the area proposed to be rezoned, changed or affected.

B. *Petition for amendment of this chapter*.
   1. *Amendments*. Petitions to amend this chapter shall be submitted to the Planning Board for review and recommendation at least 15 days prior to the next regularly scheduled meeting of the Planning Board.
   2. *Required information*. The application shall contain a statement of the present regulation or zoning classification, the proposed amendment to it, and the name and address of the party requesting the change.

C. *Petitions*. Petition for change or amendment of a zoning classification shall contain a legal description of the property to be affected by the change or amendment, the names of all owners of parcels of land within the property and of all owners of parcels of land abutting same as shown on the county tax listing, together with last known addresses listed for the owners on the county tax abstract. For the purpose of this section, properties are “abutting” even if separated by a street, railroad, or other transportation corridor.

D. *Notification*.
   1. The person or persons requesting a change or amendment to the zoning classification shall notify all owners listed in division (C) above of the proposed change or amendment by first class mail at their last known addresses.
   2. These mailings will occur not less than 10 days nor more than 25 days before the date fixed for the public hearing for consideration of a rezoning action.
   3. When a zoning map amendment is proposed, the local government shall prominently post a notice of the hearing on the site proposed for the amendment or on an adjacent public street or highway right-of-way. The notice shall be posted within the same time period specified for mailed notices of the hearing. When multiple parcels are included within a proposed zoning map amendment, a posting on each individual parcel is not required, but the local government shall post sufficient notices to provide reasonable notice to interested persons.
   4. *Actual notice*. Except for a government-initiated zoning map amendment, when an application is filed to request a zoning map amendment and that application is not made by

the landowner or authorized agent, the applicant shall certify to the local government that the owner of the parcel of land as shown on the county tax listing has received actual notice of the proposed amendment and a copy of the notice of the hearing.

E. *Fee*. With each application for a change or amendment to this ordinance, a fee of $35 shall accompany the application and made payable to the Town of River Bend, North Carolina, to cover the costs of advertising and administrative expenses.

Penalty, see § 1.01.999

§ 15.02.192 PLANNING BOARD REVIEW AND RECOMMENDATION.

A. The Planning Board may call for a public hearing on any proposed amendments and shall be held jointly with the Town Council. A notice of public hearing shall be given once a week for 2 successive weeks in a newspaper distributed in the Town of River Bend, the notice to be published the first time not less than 10 days nor more than 25 days prior to the day fixed for the public hearing. If the amendment is for re-zoning, the advertisement shall not be less than a one-half page advertisement.

B. The Planning Board may have 45 days from the date of receipt of the petition within which to submit its recommendation. Failure of the Board to submit its recommendation within this time period shall constitute a favorable recommendation. The Planning Board's report shall be submitted in writing to the Town Council. Pursuant to G.S. §160D-1402, zoning regulations shall be made in accordance with the town's comprehensive plan. Prior to adopting or rejecting any zoning amendment, the governing board shall adopt a statement describing whether its action is consistent with an adopted comprehensive plan and explaining why the Board considers the action taken to be reasonable and in the public interest. That statement is not subject to judicial review.

C. Pursuant to G.S. §160D-109(a), members of appointed boards providing advice to the Town Council shall not vote on recommendations regarding any zoning map or text amendment where the outcome of the matter being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member.

D. Notwithstanding the authority to assign duties of the planning board to the governing board as provided by this Chapter, the review and comment required by this section shall not be assigned to the governing board and must be performed by a separate board.

§ 15.02.193 PUBLIC HEARING BY TOWN COUNCIL.

A. *Advertisement*. Before adopting, amending, or repealing any ordinance or development regulation authorized by this Chapter, the governing board shall hold a legislative hearing. A notice of public hearing shall be given once a week for 2 successive calendar weeks in a newspaper distributed in the Town of River Bend, North Carolina, the notice to be published for the first time not less than 10 days nor more than 25 days prior to the date fixed for the hearing.

In computing the period, the day of publication is not to be included but the day of the hearing shall be included. Notice of public hearing by the Town Council need not be made if a joint public hearing with the Planning Board is to be held as noted in § 15.02.192.

B. *Vote of the Board*. A simple majority of the Town Council shall be required to reject a recommendation of the Planning Board.

C. A development regulation adopted pursuant to this Chapter shall be adopted by ordinance.

§ 15.02.194 GOVERNING BOARD STATEMENT.

A. *Plan consistency.* When adopting or rejecting any zoning text or map amendment, the governing board shall also approve a brief statement describing whether its action is consistent or inconsistent with an adopted comprehensive plan. The requirement for a plan consistency statement may also be met by a clear indication in the minutes of the governing board that at the time of action on the amendment the governing board was aware of and considered the planning board's recommendations and any relevant portions of an adopted comprehensive plan. If the amendment is adopted and the action was deemed inconsistent with the adopted plan, the zoning amendment shall have the effect of also amending any future land use map in the approved plan and no additional request or application for a plan amendment shall be required. A plan amendment and a zoning amendment may be considered concurrently. The plan consistency statement is not subject to judicial review. If a zoning map amendment qualifies as a "large-scale rezoning" under G.S. 160D-6-2(b), the governing board statement describing plan consistency may address the overall rezoning and describe how the analysis and polices in the relevant adopted plans were considered in the action taken.

B. *Statement of reasonableness***.** When adopting or rejecting any petition for a zoning text or map amendment, a brief statement explaining the reasonableness of the proposed rezoning shall be approved by the governing board. The statement of reasonableness may consider, among other factors: (i) the size, physical conditions, and other attributes of any area proposed to be rezoned; (ii) the benefits and detriments to the landowners, the neighbors, and the surrounding community; (iii) the relationship between the current actual and permissible development and the development permissible under the proposed amendment; (iv) why the action taken is in the public interest; and (v) any changed conditions warranting the amendment. If a zoning map amendment qualifies as a "large-scale rezoning" under G.S. 160D-6-2(b), the governing board statement on reasonableness may address the overall rezoning.

C. *Single statement permissible*. The statement of reasonableness and the plan consistency statement required by this section may be approved as a single statement.

SCHEDULE OF FEES

§ 15.02.205 SCHEDULE.

A.

1. There shall be levied and collected fees as are specified in the schedule of fees established (and as modified from time to time) by the Town Council.

Amended 02/16/2012

2. The schedule of fees shall be kept on file in the office of the Town Clerk where it shall be available for public inspection during the normal office hours of the Town Clerk.

Schedule of Fees Subdivision and Zoning		
Subdivision Application		
10 or fewer lots	$300	
11 or more lots	$300 plus $25/lot over 10	
Subdivision Preliminary Plat	$100	
Stormwater Review (if engineering review needed)	$350	
Amendments/Modifications or Additions	$150	
Planned Developments		
Planned Development – Residential	$400 plus $5/unit and cost of required legal advertisement and postage to notify abutting land owners	
Planned Development – Commercial	$400 plus $20/acre over 5 acres and cost of required legal advertisement and postage to notify abutting land owners	
Stormwater Review (if engineering review needed)	$350	
Amendments/Modification or Additions	$200	
Zoning Application		
Special Use Permit	$200 plus cost of required legal advertisement and postage to notify abutting land owners	
Variance	$200 plus cost of required legal advertisement and postage to notify abutting land owners	
Appeal to Board of Adjustment	$200 plus cost of required legal advertisement and postage to notify abutting land owners	
Residential Application	Based on amount of project as follows:	
	Base Fee	$30
	$2 for every $1,000 of project value between $1,000 and $100,000	

Schedule of Fees Subdivision and Zoning		
	$1 for every $1,000 above $100,000 (all values rounded to nearest $1,000)	
Residential Flood Plain Application w/ Zoning Permit	40% of the fee for the Town's residential zoning permit; in addition to the zoning permit fee	
Commercial Application	Based on amount of project as follows:	
	Base Fee	$50
	$4 for every $1,000 of project value between $1,000 and $100,000	
	$2 for every $1,000 above $100,000 (all values rounded to nearest $1,000)	
Commercial Flood Plain Application w/ Zoning Permit	40% of the fee for the Town's commercial zoning permit; in addition to the zoning permit fee	
Residential Flood Plain Application w/o Zoning Permit	Based on amount of project as follows:	
	Base Fee	$30
	$2 for every $1,000 of project value between $1,000 and $100,000	
	$1 for every $1,000 above $100,000 (all values rounded to nearest $1,000)	
Commercial Flood Plain Application w/o Zoning Permit	Based on amount of project as follows:	
	Base Fee	$50
	$4 for every $1,000 of project value between $1,000 and $100,000	
	$2 for every $1,000 above $100,000 (all values rounded to nearest $1,000)	
Engineering Review (if needed)	$100	
Zoning Amendment Request (Map or Text)	$200 plus cost of required legal advertising and postage for required notification to land owners	
Miscellaneous Other Fees		
Sign Permit	$30	
Tree Harvest Permit	$50	
Zoning and Subdivision Ordinances	$25 per set	
Late Permit Fee (where work has commenced prior to applying for a permit and after May 15, 2008)	Double the applicable permit fee	

Penalty, see §1.01.999 *Amended 05/15/2008 and 04/16/2009*

BUFFERING ADJOINING PROPERTIES HAVING DISSIMILAR USES

§ 15.02.220 GENERALLY.

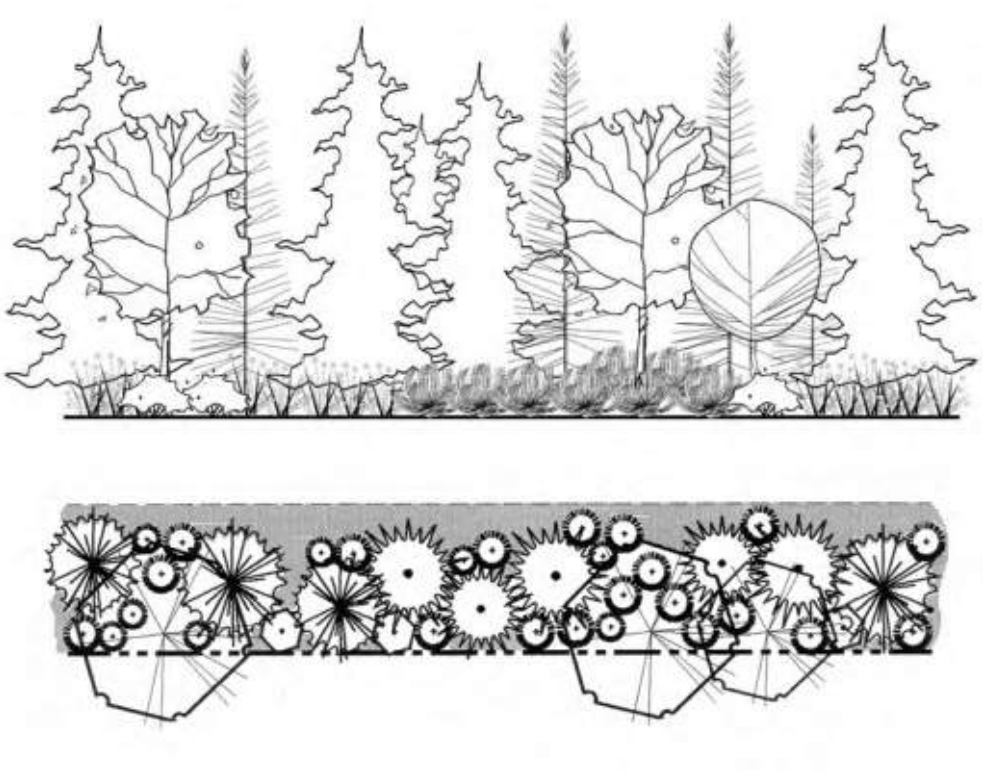
A. It is the intent of this subchapter to provide for the use of landscaping and/or other architectural measures to screen structures, parking and loading facilities from adjoining properties having dissimilar uses and residential developments adjacent to major streets in a manner that they blend with the natural surroundings and residential character of the Town of River Bend. The intent also is to allow each applicant's situation to be addressed by varied, imaginative and resourceful means so that the aforesaid character and appearance of the town is affected to the minimum degree prudently possible.
B. All developed properties located in Zoning Districts BD, PD-BD, PDR-MF and ID shall be buffered from adjoining properties.
C. Nothing in this subchapter shall be interpreted to change or reduce the requirement for visibility at intersections as prescribed by § 15.02.062.
D. All buffer areas shall be outside the public right-of-way and shall be perpetually maintained by the property owner.

Penalty, see § 1.01.999

§ 15.02.221 DESCRIPTION OF BUFFERS.

The following three basic types of buffers are hereby established and are used as the basis for the table of buffering requirements as set forth in § 15.02.222.

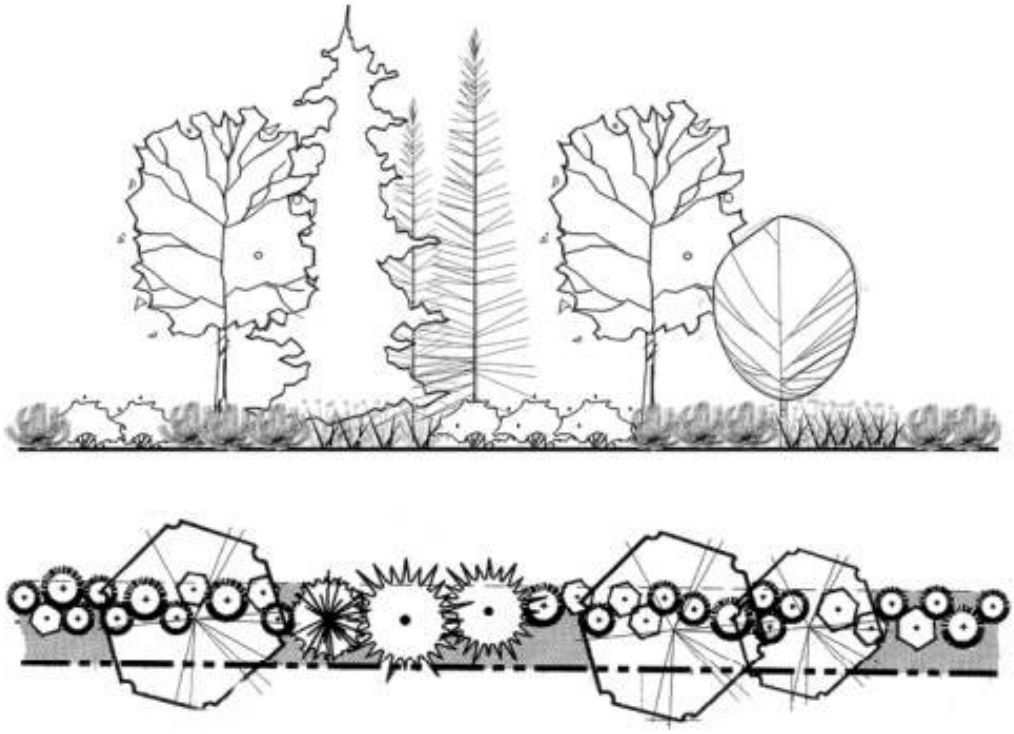
A. *Opaque buffer, type A*.
    1. A buffer that is opaque from the ground to a height of at least 6 feet, with intermittent visual obstructions from the opaque portion to a height of at least 20 feet. An opaque buffer is intended to exclude completely all visual contact between uses and to create a strong impression of special separation. The opaque buffer may be composed of a wall, fence, planted earth berm, planted vegetation, existing vegetation or any combination thereof.
    2. For every linear 100 feet, or fraction thereof, the buffer shall consist of an average of three canopy type trees, each with a minimum caliper of 2 inches. The trees in 5 years shall reach a height of at least 20 feet and shall have an average canopy spread of 15 feet.
    3. The opaque portion of the buffer must be opaque in all seasons of the year. If shrubbery is used, the shrubbery shall be evergreen plant materials and be spaced to provide a solid buffer in 2 years.
    4. If fences or walls are used, the fences or walls shall be masonry, wood, metal or other suitable materials (not to include chain-link fencing) and shall have architectural character and be of substantial materials.



OPAQUE BUFFER – TYPE A

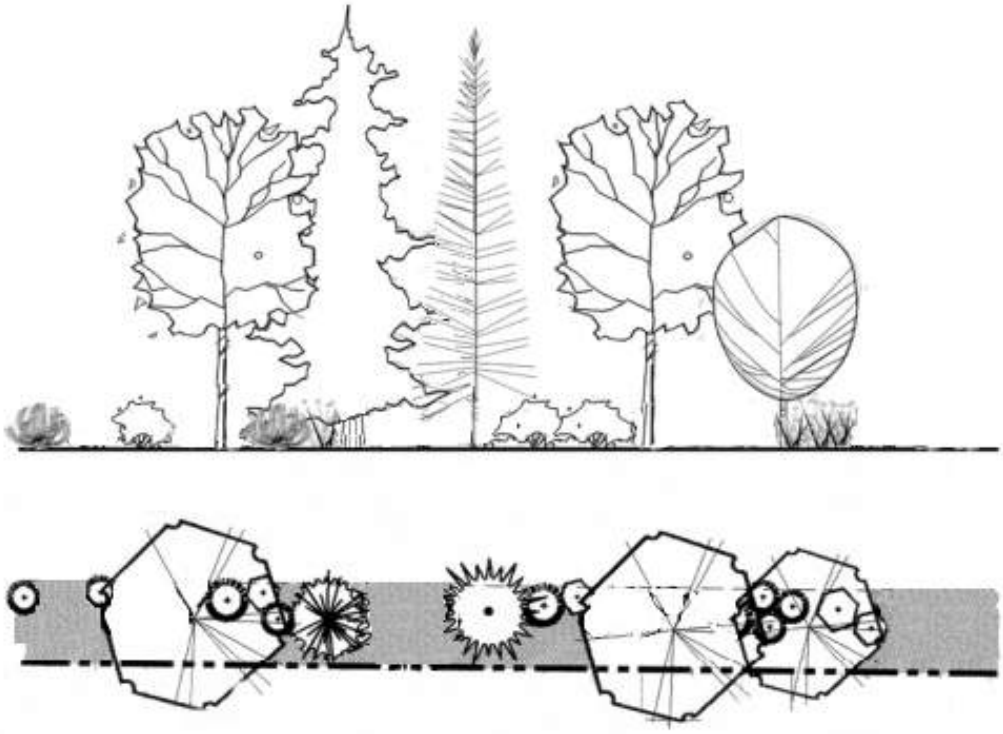
B. *Semi-opaque buffer, type B*.

1. A buffer that is opaque from the ground to a height of 3 feet, with intermittent visual obstruction from above the opaque portion to a height of at least 20 feet. The semi-opaque buffer is intended to partially block visual contact between uses and to create a strong impression of the separation of spaces.
2. The semi-opaque buffer may be composed of a wall, fence, planted earth berm, planted vegetation, existing vegetation, or any combination thereof. For every linear 100 feet, or fraction thereof, the buffer shall consist of an average of 2 canopy type trees, each with a minimum caliper of 2 inches.
3. The trees in 5 years shall reach a height of at least 20 feet and shall have an average canopy spread of 15 feet.
4. The opaque portion of the buffer must be opaque in all seasons of the year. If shrubbery is used, the shrubbery shall be evergreen plant materials and be spaced to provide a solid buffer in 2 years. If fences or walls are used, the fences or walls shall be masonry, wood, metal or other suitable materials (not to include chain-link fencing) and shall have architectural character and be of substantial materials.



SEMI-OPAQUE BUFFER – TYPE B

C. *Broken buffer, type C*.
   1. A buffer composed of intermittent visual obstructions from the ground to a height of at least 20 feet.
   2. The broken buffer is intended to create an impression of a separation of spaces without necessarily eliminating visual contact between the spaces.
   3. It may be composed of a wall, fence, planted earth berm, planted vegetation, existing vegetation or any combination thereof.
   4. For every linear 100 feet, or fraction thereof, the buffer may consist of a combination of at least 2 canopy or ornamental type trees, each having a minimum caliper of at least 2 inches, and shrubbery 3 feet in height that covers an average of 20% of the buffer area, or 5 canopy or ornamental type trees, each having a minimum caliper of 2 inches.



BROKEN BUFFER – TYPE C

Penalty, see § 1.01.999

§ 15.02.222 TABLE OF BUFFERING REQUIREMENTS.

Site Feature to be Buffered	Buffer Type*	Buffer Width	Location
Commercial building/parking area/service area	A, C	10 feet minimum	Property line with building/optional with other site features
Multi-family building/parking area/service area 25 feet to 50 feet, or greater, from property line	B, C	10 feet minimum/length to equal building length plus 5 feet when dealing with building	Property line with building/optional with other site features
Multi-family building/parking area/service area less than 25 feet from property line	A, C	10 feet minimum/length to equal building length plus 5 feet when dealing with building	Property line with building/optional with other site features
Separation zone between commercial developments located along 50 feet of	B	10 feet minimum	Property line

Site Feature to be Buffered	Buffer Type*	Buffer Width	Location
property line perpendicular to street right-of-way			
Separation zone between nonresidential developments and street right-of-way	C	10 feet minimum	Property line

***Buffer Type:**
A – Opaque Buffer
B – Semi-opaque Buffer
C – Broken Buffer

A, C – Opaque buffer must be used when the land use abuts a residential land use; broken buffer must be used when the land use abuts any other land use (i.e., commercial, multi-family)
B, C – Semi-opaque buffer must be used when the land use abuts a residential land use; broken buffer must be used when the land use abuts any other land use

In the case of multifamily, only a semi-opaque buffer may be used when adjacent to commercial uses.

For Guide to Planting Shrubs, see appendix.

Penalty, see § 1.01.999

§ 15.02.223 PROCEDURE.

A. *Submittal of sketch plan*. The applicant for an initial zoning permit shall submit a buffer area sketch plan prepared by a North Carolina registered landscape architect or licensed landscape contractor for all required buffer areas. This plan shall include sufficient detailing of the landscaping and/or architectural buffering features that compliance with the intent of this subchapter can be shown.

B. *Availability to CAC*. The buffer area sketch plan shall be made available at once to the Community Appearance Commission (CAC). The CAC shall review the plan and make written recommendations for approval or revision within 30 days to the Town Zoning Administrator, together with the reasons therefor.

C. *Performance guarantee*.

1. It is recognized that land development occurs continuously and that vegetation used in landscaping or screening should be planted at certain times to insure the best chance of survival. In lieu of completion of the improvements required by this subchapter, the Town of River Bend may, for the purpose of issuing a certificate of zoning compliance, accept a guarantee from the applicant that the improvements will be carried out according to the specifications of the Town of River Bend at his expense. The guarantee may be in the form of a surety bond made by a surety company licensed to do business in North Carolina, certified check drawn in favor of the Town of River Bend, cash deposited with the Town of River Bend, letter of credit in favor of the Town of River Bend from a bank or other financial

institution satisfactory to the Town Council or other form of security as the Town Council may approve. The guarantee shall be in the amount of not less than 100% nor more than 125% of the estimated cost of the construction of the required improvements.

2. Performance guarantees shall run for a period of 6 months and may be renewed thereafter for periods of time as the Town Council may approve.

Penalty, see § 1.01.999

TREE PRESERVATION

§ 15.02.235 GENERALLY.

Preservation of trees is in the public interest and is necessary to conserve energy, retard stormwater runoff, aid in noise, glare and heat abatement, safeguard and enhance property values, protect public and private investment, contribute to the preservation of an area or a site's unique sense of place, provide visual buffering and enhance town beautification efforts which contribute to the quality of life of a given area, and to prevent the indiscriminate removal of significant trees and facilitate their replacement in certain developments and areas within the town.

§ 15.02.236 TREE PRESERVATION AND REPLACEMENT IN NEW NON-RESIDENTIAL DEVELOPMENTS AND RESIDENTIAL SUBDIVISIONS.

A. No person shall engage in Timber Harvesting within the planning jurisdiction of the town, without first obtaining a zoning permit from the Zoning Administrator who will see to it that there is no wholesale removal of trees from a site in an effort solely to market or make the property available for development without providing an opportunity to incorporate existing vegetation in the development.

Added 09/19/2007, Amended 04/16/2009

B. The Town of River Bend shall require all non-residential developments or residential subdivisions in excess of 1 acre, or individual non-developed lots, approved and/or developed after the effective date of §§ 15.02.235 et seq., to provide for the preservation or replacement of Regulated Trees on the subject site.

C. The following minimum standards shall be applied in determining the required extent of tree preservation or replacement. If required, replacement trees shall be designated and listed as suitable for the area by the N.C. Cooperative Extension.

Amended 04/16/2009

1. The total number of Regulated Trees to be retained shall be at least 30 trees per acre.
2. If there are less than 30 Regulated Trees per acre on the site, then the owner shall be responsible for planting a number of trees equal to the difference on the site. All

replacement trees must equal at least 6.25 inches in circumference, measured at 24 inches above the ground which are distributed throughout the individual lots within that acre.

Amended 04/16/2009

3. In the event a lot or tract is developed prior to the owner having obtained site plan approval by the Zoning Administrator and Planning Board, then the owner shall be required to plant 30 new trees per acre, each with a minimum of 6.25 inches in circumference, measured 24 inches above ground.

Amended 04/16/2009

D. Regulated Trees that are retained may be used to fulfill some of the planting requirements of street, yard, parking facilities or buffering, provided they are not damaged by construction activities or the intended use of the property.

Penalty, see § 1.01.999

§ 15.02.237 SITE PLANS.

A. *Site plans generally*.
   1. All non-residential developments shall be required to submit to the Zoning Administrator a site plan as part of the development approval process.
   2. The site plan shall include the following information.
      a) Name, address, and telephone number of the owner, address of development site; name address and telephone number of the applicant if contractor or agent of the property owner.
      b) The existing site conditions and location of trees to be removed.
      c) The dimensions of the parcel to be developed, together with the existing and/or proposed locations of structures and improvements, existing and/or proposed utility services, roadways, bikeways, walkways and parking areas.
      d) The location, caliper and species of all Regulated Trees to be retained, or new trees to be planted in accordance with the provisions of this subchapter.
      e) Any proposed grade changes which might adversely affect or endanger any Regulated Trees to be retained with a statement of how the tree is to be protected and maintained.

B. *Death or removal of new, retained or regulated trees*.
   1. If any new, retained, or Regulated Tree shown on the approved site plan dies or is removed by the developer, within 1 year after the issuance of the certificate of zoning compliance or the granting of the final plat approval, it shall be replaced by planting a new tree having a minimum of 6.25 inches in circumference, measured at 24 inches above ground.

Amended 04/16/2009

   2. In residential subdivisions, replacement of dead trees within the established 1 year period shall be the responsibility of the owner, regardless of whether or not the new, retained, or Regulated Trees are on public or private property. However, the planting of the replacement

tree by the owner shall be restricted to those areas in the development reserved for usable open space. In the event the property in a residential subdivision is sold and a subsequent owner removes a regulated or required tree or the tree dies the owner who initially planted the tree shall not be required to replace the tree.

3. No certificate of occupancy/compliance for any non-residential development shall be issued, and no final plat approval for any residential subdivision in excess of 1 acre shall be granted until the property owner or developer has complied with the minimum standards.

Penalty, see § 1.01.999

§ 15.02.238 PROCEDURE FOR TREE REMOVAL PERMIT.

A. This section does not apply to Timber Harvesting, which is covered in § 15.02.239 of this subchapter. Permits granted under this section shall expire after a period of 180 days.

Amended 09/17/2007 and 04/16/2009

B. No person, directly or indirectly, shall remove any Regulated Tree from public property or individual non-developed lots, without first obtaining a tree removal permit.

C. Applications for tree removal shall include the following information:
   1. Name and address of the owner of the site, address of development site; name, address and telephone number of applicant if contractor or agent of the property owner;
   2. Description of Regulated Tree(s), including species, size and reason for removal; and
   3. If required, a site plan showing existing site conditions and location of tree(s) to be removed.

D. No tree removal permit shall be issued unless 1 or more of the following criteria are met:
   1. The Regulated Tree is dead, severely diseased, injured or in danger of falling close to existing or proposed structures;
   2. The Regulated Tree is causing disruption to existing utility service or causing drainage or passage problems upon the right-of-way;
   3. The Regulated Tree is posing an identifiable threat to pedestrian or vehicular safety;
   4. The Regulated Tree violates state or local safety standards;
   5. Removal of the Regulated Tree is necessary to enhance or benefit the health or condition of adjacent trees or property; and
   6. The Regulated Tree restricts the allowable use of the property.

E. Prior to removal, all Regulated Trees which are to be removed shall be marked by the Zoning Administrator at 54 inches and at the base of the tree. A pre-removal assessment shall be documented by the Zoning Administrator.

Amended 04/16/2009

F. Within thirty (30) days of removing Regulated Trees pursuant to a permit granted under this section, the permittee shall contact the Zoning Administrator to schedule a follow up inspection. The Zoning Administrator shall document the follow up assessment.

Amended 04/16/2009

Penalty, see § 1.01.999

§ 15.02.239 THINNING OR CLEARCUTTING.

A. No person shall engage in the Timber Harvesting of any site within the planning jurisdiction of the town without first obtaining a Timber Harvesting Zoning Permit from the Zoning Administrator.

B. Timber Harvesting Zoning Permits shall be subjected to the following requirements:

Amended 09/19/2007 and 04/16/2009

1.

a) For tracts of land that are 5 acres or less in size, the owner shall retain a minimum 25-foot tree/vegetation buffer along all property lines, except those adjoining other lands devoted to recognized timber management as evidenced by a "Forest Management Plan" which was prepared by a forester registered in the State of North Carolina and on file with the Tax Office of Craven County, North Carolina.

Amended 09/19/2007 and 04/16/2009

b) For tracts of land that are greater than 5 acres in size, the owner/developer shall retain a minimum 50-foot tree/vegetation buffer along all property lines that abut a residential use or residential zoning district. A 25-foot tree/vegetation buffer shall be retained along all other property lines, except those adjoining other lands devoted to recognized timber management as evidenced by a "Forest Management Plan" which was prepared by a forester registered in the state of North Carolina and on file with the Tax Office of Craven County, North Carolina.

Amended 04/16/2009

c) To the extent practicable, retained trees shall be evenly distributed throughout the buffer area. The buffer area shall also consist of naturally growing understory (underbrush) vegetation that has the effect of providing additional buffering. To the extent practicable, the understory (underbrush) vegetation shall remain in an undisturbed state, to allow for the removal of selected trees in the designated buffer area.

Amended 04/16/2009

d) Prior to harvest, the boundary buffer area must be delineated and marked with flagging or paint and observed by the Zoning Administrator prior to harvest. Trees that are to be harvested from the buffer area should be painted at a height of 54 inches and at the base of the tree. In the event that the basal area (total area of trees calculated using the diameter at breast height, 54 inches above the ground on the uphill side of the tree

including the bark) within a proposed property buffer area is less than 60 square feet per acre in trees greater than 5.6 inches dbh (17.59 inches circumference breast height) (a standard size for a marketable tree) prior to harvest, then no trees may be removed from the buffer area. A pre-harvest assessment shall be documented by the Zoning Administrator.

Amended 04/16/2009

e) After harvest, the buffer area shall contain a minimum of 60 square feet of basal area (total area of trees calculated using the diameter at breast height – 54 inches above the ground on the uphill side of the tree – including the bark) per acre in trees greater than 5.6 inches dbh (17.59 circumference breast height), that are well distributed throughout the buffer area. If no trees are harvested from the property buffer area, then no collection of post-harvest data will be required.

Amended 04/16/2009

f) In order to ensure compliance with this section, the stocking in the buffer shall be determined by establishing sample plot systematically (every 300 feet of buffer lineal distance). Each plot will be rectangular in shape being 25 feet wide for tracts less than 5 acres and 50 feet wide for tracts greater than 5 acres(perpendicular from the property boundary to the edge of the buffer area), and 100 feet in length. All trees at least 17.59 inches in circumference, measured at 54 inches above ground within the plot will be measured. The sum of the basal areas of the measured trees will be expanded to per acre basis and should exceed 60 square feet per acre in 90% of the plots. If a plot falls within a non-stocked area such as a roadway leaving the property or in a stream, the plot should be moved to eliminate inclusion of areas void of trees. Plot installation and measurement are the responsibility of the permittee and must meet the approval of the Zoning Administrator.

Amended 04/16/2009

g) The permittee shall be responsible for the collection and documentation of any post-harvest data necessary to evaluate compliance with this section. The permittee shall submit to the Zoning Administrator a written certification signed by a registered forester that the timber harvest complied with this section.

Amended 04/16/2009

h)

Sample Calculation – 25 foot buffer				
Number of Residual Basal Trees	DBH Class (Inches)	CBH Class (Inches)	Basal Area per Tree* (Sq. Feet)	Total Basal Area (Sq. Feet)
3	6	18.85	0.1963	0.5890
3	7	21.99	0.2673	0.8018
2	8	25.13	0.3491	0.6981
1	11	34.56	0.6600	0.6600
1	14	43.98	1.0690	1.0690

Total in Plot	**10**		**3.8179**
Total per Acre	**174**		**66.52**

Amended 04/16/2009

How to calculate Basal Area in the 25 foot buffer:

Amended 04/16/2009

- In the example shown in this chart, there are three (3) six (6) inch (dbh) trees in the 25 foot by 100 foot buffer sample plot. The total basal areas of these trees is determined by multiplying the square of the radius (half the diameter) by π (3.14159) and dividing this result by 144 (to convert square inches to square feet).
- 3 squared = 9, and 9 times 3.14159 = 28.274. Converting this to square feet (28.274/144) = .1963 square feet per tree.
- Next multiply the total number of 6 inch trees (3) by .1963 to determine the total basal area of 6 inch trees in the sample plot.
- Perform this same series of calculations for each tree size in the sample plot and add the total basal areas to determine the total number of square feet of basal areas in the sample plot. In this example, there are a total of 3.8179 square feet.
- Next, divide the total basal area of the trees measured (3.8179) by the total number of square feet in the plot (2,500) to get the basal area per square foot.
- The last calculation is multiplying this number by the number of square feet in an acre (43,560) to reveal the total basal area per acre in the same plot.
- If using the CBH (Caliber Breast Height), you will need to determine the diameter (divide the circumference by π) before beginning the calculation.
- Note: This data will be gathered and summarized by the Timber Harvest Permit Holder, certified by a registered forester, and presented to the Zoning Administrator, when the harvest is complete.

Sample Calculation – 50 foot buffer

	Number of Residual Basal Trees	DBH Class (Inches)	CBH Class (Inches)	Basal Area per Tree* (Sq. Feet)	Total Basal Area (Sq. Feet)
	4	6	18.85	0.1963	0.7854
	6	7	21.99	0.2673	1.6035
	4	8	25.13	0.3491	1.3963
	3	11	34.56	0.6600	1.9799
	1	14	43.98	1.0690	1.0690
Total in Plot	**18**				**6.8340**

Total per Acre	**157**	**59.54**

Amended 04/16/2009

How to calculate Basal Area in the 50 foot buffer:

Amended 04/16/2009

- In the example shown in this chart, there are three (3) six (6) inch (dbh) trees in the 25 foot by 100 foot buffer sample plot. The total basal areas of these trees is determined by multiplying the square of the radius (half the diameter) by π (3.14159) and dividing this result by 144 (to convert square inches to square feet).
- So 3 squared = 9, and 9 times 3.14159 = 28.274. Converting this to square feet (28.274/144) = .1963 square feet per tree.
- Next multiply the total number of 6 inch trees (3) by .1963 to determine the total basal area of 6 inch trees in the sample plot.
- Perform this same series of calculations for each tree size in the sample plot and add the total basal areas to determine the total number of square feet of basal areas in the sample plot. In this example, there are a total of 3.8179 square feet.
- Next, divide the total basal area of the trees measured (3.8179) by the total number of square feet in the plot (2,500) to get the basal area per square foot.
- The last calculation is multiplying this number by the number of square feet in an acre (43,560) to reveal the total basal area per acre in the same plot.
- If using the CBH (Caliber Breast Height), you will need to determine the diameter (divide the circumference by π) before beginning the calculation.
- Note: This data will be gathered and summarized by the Timber Harvest Permit Holder, certified by a registered forester, and presented to the Zoning Administrator, when the harvest is complete.

2. The following procedure must be followed when applying for a Timber Harvest Zoning Permit:
   a) The application must be accompanied by a Timber Harvest Plan that contains the following information at a minimum:
   b) A map of the property showing property boundaries and the timber harvest boundaries, the planned location of log decks and loading areas, haul roads, any streams or bodies of water subject to protection under the Forest Practice Guidelines Related to Water Quality or the Neuse River Basin Protection Rules, special management zones (25 foot buffer zones, streamside buffers, etc.)
   c) A brief statement outlining the silvicultural objectives of the harvesting operation.

d) The property owners name, address, and phone number, the timber buyer's name, address, and phone number, and the timber buyer's supervising representative's name, address, and phone number.
e) Post-harvest reforestation plans (if applicable).
f) The planned dates of the harvest.
g) A certificate of General Liability Insurance covering all harvesting and hauling operations.
h) A refundable performance deposit in the amount of $30.00 per harvest acre.

3. Pre-Permit Inspection - The Zoning Administrator or an authorized representative will accompany the party responsible for supervising the harvest on an inspection of the harvest area and note and document the following preparations prior to the issuance of a permit:
   a) Using the Timber Harvest Plan - Ensure that all property lines within the harvest area are clearly marked and delineated with flagging or paint.
   b) All buffer zones including boundary buffers and stream side buffers are clearly marked and delineated with flagging or paint.
   c) Log deck and loading areas are reviewed and agreed upon to minimize the visual impact along public roads and adjacent properties.
   d) Trees selected for harvest in boundary buffer areas are marked with paint at 4.5 feet and at ground level. Paint marks should face the buffer boundary.
   e) Review the plan to ensure log trucks can safely enter and exit the property from public roads. Ensure that the plan calls for reasonable fire prevention readiness, removal of trash and waste petroleum products on a daily basis, and reasonable security to minimize trespass and vandalism. Entry points for log trucks have adequate site distance and warning signs are posted, equipment is equipped with fire extinguishers and is cleaned of accumulated forest litter daily, logging personnel should remain at the site at least 30 minutes after equipment is shut down, a trash barrel is available on the log deck and is emptied daily, parked equipment is secured with locks and all hydraulic energy is relieved prior to leaving the job site.
   f) Accumulated natural debris (limbs, tops, and butts) in the deck area will be re-deposited and thinly spread across the harvest area prior to the completion of the harvest. (No deck piles or debris.)
4. Active Harvest Inspection: During the period of actual harvest, the Zoning Administrator or designated representative should frequently monitor the operation and insure that all the terms agreed upon during the Pre-Permit Inspection are being implemented. If violations are discovered and not corrected, the Timber Harvest Permit may be suspended until the infraction is corrected.
5. Post-Harvest Inspection: At the end of the harvest operation, the Zoning Administrator or designated representative should accompany the buyer's supervising representative on a final inspection of the site to ensure compliance with all of the terms agreed upon in the Pre-Permit Inspection and to review the property buffer plot data for compliance. If infractions are noted, the buyer should have a period of 30 days to correct these infractions

to the satisfaction of the Zoning Administrator. If the infractions are not corrected, the Town of River Bend will retain the performance deposit and use this money for mitigation as they deem appropriate. If the harvest was conducted in compliance with the Pre-Harvest Inspection, then the performance deposit will be refunded to the permittee.

C. In the event a tract of land proposed for timber harvesting is located adjacent to a developed tract of land that already has a buffer in place that meets the standards for buffering, the Zoning Administrator may waive all or part of the buffering requirement along the property line abutting the development if he finds that:

Amended 09/19/2007

1. The adjoining property buffer is established to a degree that it completely excludes all visual contact between uses and creates a strong impression of spatial separation; and
2. Adequate legal mechanisms are in place to ensure the preservation of the buffer for the life of the development. If, however, an owner of timberland which abuts a developed tract of land decides to develop his property after timber harvesting the same, but before new growth forms a suitable buffer between the 2 tracts of land, the forest owner/developer must provide an acceptable buffer, along the line of his property adjoining the developed tract of land.

§ 15.02.240 PROTECTION OF REGULATED TREES.

A.

1. The Town of River Bend recognizes the importance of adequately protecting trees during the construction phase of developments. To this end, no excavation or other subsurface disturbances may be undertaken within the critical root zone of a Regulated Tree. The critical root zone is defined as the ground area around a tree trunk with a radius (in feet) that is twice the diameter of the Regulated Tree (in inches) measured at breast height (e.g., a 10 inch diameter tree requires a 20 foot radius of protection). The critical root zone shall be marked by a barrier fence.

2. In cases, such as utility extension, sidewalk installation, or other site improvements, where it is neither prudent nor possible to avoid land disturbance activity in the critical root zone area, the developer shall, upon consultation with the Zoning Administrator, be responsible for providing the town with a root disturbance mitigation plan which shall outline a specific course of action for minimizing damage to a Regulated Tree's root system.

B. If space that would otherwise be devoted to parking cannot be so used because of the requirements of division (A) above and, as a result, the parking requirements set forth in §§ 15.02.080 et seq. cannot be satisfied, the number of required spaces may be reduced by the number of spaces lost up to a maximum of 15% of the required spaces.

Penalty, see § 1.01.999

§ 15.02.241 REQUIRED TREES ALONG DEDICATED RESIDENTIAL STREETS.

A. Along both sides of all newly created residential streets with respect to which an offer of dedication is required to be made by this subchapter the developer shall either plant or retain sufficient trees so that, between the paved portion of the street and a line running parallel to and 20 feet from the right of way, there is for every 30 feet of street frontage at least an average of 1 canopy tree that has or will have when fully mature a trunk at least 12 inches in diameter.

B. When trees are planted by the developer pursuant to this subchapter, the developer shall choose trees that have a minimum 6.25 inch circumference at 24 inches off the ground at the time of planting and meet the standards set forth in § 15.02.235 et seq.

Amend 04/16/2009

Penalty, see § 1.01.999

§ 15.02.242 PLANTINGS.

For purposes of this subchapter, the term ***PLANTING*** shall mean any live plant material such as trees, shrubs, ground cover and grass used in spaces void of any impervious material or building structure, areas left in their natural state, or areas where mulch is used as ground cover. Planting has an important impact on better control of flood problems, soil erosion, air and noise pollution and making the town a healthier, safer and more aesthetically pleasing place in which to live and work.

§ 15.02.243 COMPLIANCE WITH PLANTING REQUIREMENTS.

A. A planting plan on all commercial, office and institutional, industrial, multi-family, planned unit developments, and non-residential uses in a residential district shall be required. A minimum of 20% of the total area shall be planted.

B. Planting plans shall be prepared by a landscape architect licensed in the State of North Carolina. Planting plans shall be drawn at the same scale as the site plan or larger. The planting plan may be found on the site plan.

C. All areas that call for grass planting on a planting plan shall be planted in accordance with generally accepted practices.

D. All planting plans shall provide the following general information:
   1. Approximate locations of all required plant material to be planted on the site; and
   2. Information on the quantity, species, and caliper of all trees to be planted or retained on the site.

Amended 04/16/2009

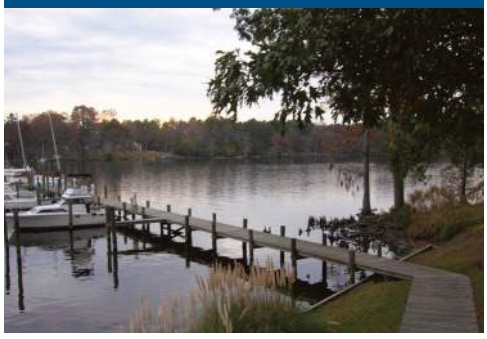
E. Regarding certificate of zoning compliance, see § 15.02.170. Amended 04/16/2009

Penalty, see § 1.01.999

APPENDIX G-6

EXCERPT FROM REGIONAL LAND USE PLAN (CAMA)

Regional Land Use Plan



New Bern
River Bend
Trent Woods

Adopted
New Bern – January 11, 2011
River Bend – October 21, 2010
Trent Woods – October 7, 2010

CRC Certification Date
February 24, 2011

Prepared by
AECOM
Raleigh, NC

AECOM

New Bern, River Bend, and Trent Woods

Regional Land Use Plan

December 2010

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Tim Thompson
Cheryl Smith (appointed, but unable to serve)
Natasha (Ta Ta) Chapman (appointed, but unable to serve)
Tom Braaten
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Acronyms used in the CAMA Land Use Plan

AEC	Areas of Environmental Concern
CAMA	Coastal Area Management Act of 1974
CCEDC	Craven County Economic Development Commission
CIP	Capital Improvement Plan
CRAC	Coastal Resource Advisory Committee
CRC	Coastal Resource Commission
CRS	Community Rating System
CZMA	Coastal Zone Management Act of 1972
DENR	Department of Environment and Natural Resources
DOT	Department of Transportation
DCM	Division of Coastal Management
DEH	Division of Environmental Health
DWR	Division of Water Resources
DWQ	Division of Water Quality
EMC	Environmental Management Commission
EMS	Emergency Medical Service
ERAC	Eastern Regional Advisory Committee
ETJ	Extraterritorial Jurisdiction
FAR	Floor Area Ratio
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
GIS	Geographic Information System
HQW	High Quality Waters
ICW	Intracoastal Waterway
ISO	Insurance Service Office
LPO	Local Permit Officer
LSA	Land Suitability Analysis
LUP	Land Use Plan
MCAS	Marine Corp Air Station, Cherry Point
MGD	Million Gallons per Day
MHWL	Mean High Water Line
MLWL	Mean Low Water Line
MODMON	Neuse River Modeling and Monitoring Project
NHP	Natural Heritage Program
N.C.	North Carolina
NCAC	North Carolina Administrative Code
NCEM	North Carolina Emergency Management
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSW	Nutrient Sensitive Waters
ORW	Outstanding Resource Water
OSDS	Onsite Sewage Disposal System
PL	Public Law
TMDL	Total Maximum Daily Load
U.S.	United States
USACE	United States Army Corp of Engineers
USGS	United States Geological Survey
WHP	Well Head Protection
WRC	Wildlife Resources Commission
WWTP	Waste Water Treatment Plant

Definitions of the terms used that indicate the municipalities' commitment to the policies follow:

Adequate:	sufficient to achieve intended purpose
Allow/permit:	authorize, let something happen
Control:	to regulate or direct
Discourage:	to not favor; to dissuade
Encourage:	to favor or foster
Endorse:	to approve of an action
Floating home/floating structure	these terms are used interchangeably and are synonymous
Limit:	to bound, maintain or reduce
May:	provides the option, but not required
Preferred:	among alternatives, the favored course
Prohibit:	not allowed; period
Promote:	to proactively encourage, positive steps
Protect:	to guard against a deterioration of a desired state
Require:	to mandate something
Shall:	mandatory, not optional
Should:	ought to, if no valid reason not to
Significant:	important, as determined by impact
Support:	to shore up; may imply financial support
Will:	may be expected or supposed to

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Acknowledgements

The creation of the Land Use Plan began in November, 2006 with a decision by the municipalities of New Bern, Trent Woods and River Bend to update the Regional Land Use Plan and to commit community resources and funding toward this project. Funding and technical assistance for the planning project was obtained from the N.C. Division of Coastal Management (DCM) and the above mentioned municipalities. Additional technical assistance was provided by AECOM in Raleigh, North Carolina. Special acknowledgement and recognition go to the following individuals who assisted in the development of this report:

Ms. Annette Stone, AICP for managing the project; and her staff, Alice Wilson Leigh Anne Friesen for their assistance with data collection, reviews, participation and coordination of Steering Committee meetings, and knowledge of the region; Steering Committee whose members donated their time and expertise to the development of the Land Use Plan Update and facilitation of the Town Meeting; New Bern Planning Director Mike Avery, and elected officials who devoted time and expertise to participate in Steering Committee Meetings; and the members of the public who participated in the January 28, 2008 Public Meeting.

I INTRODUCTION TO THE PLAN

The municipalities of New Bern, River Bend, and Trent Woods are preparing a New Bern Regional Land Use Plan (LUP). This is the second joint regional planning effort between New Bern, River Bend, and Trent Woods.

The City of New Bern has received grants from the North Carolina Division of Coastal Management (DCM) for the two-phase planning project. The DCM requires coastal communities to adopt a local land use plan in accordance with guidelines established by the Coastal Resources Commission (CRC). The North Carolina Coastal Area Management Act (CAMA) 15A NCAC 07B and 07 L and the DCM guidance document entitled "Technical Manual for Land Use Planning" sets forth the requirements for Land Use Plans. These guidelines provide a set of standards and requirements that must be addressed during the planning process. Each land use plan includes local policies that address protection of productive resources, desired types of economic development, community development, natural resource protection, and reduction of storm hazards.

The municipalities of New Bern, River Bend and Trent Woods are located in Craven County in the central coastal plain of North Carolina (See Figure 1). The County is bordered by Beaufort, Carteret, Pitt, Lenoir, Pamlico, and Jones Counties. The Neuse River bisects the county, and flows into the Pamlico Sound just east of New Bern. The major highways serving the region include US 17 (north-south route) and US 70 (east-west). Southeast of New Bern is the United States Marine Corps Air Station Cherry Point and the Croatan National Forest.

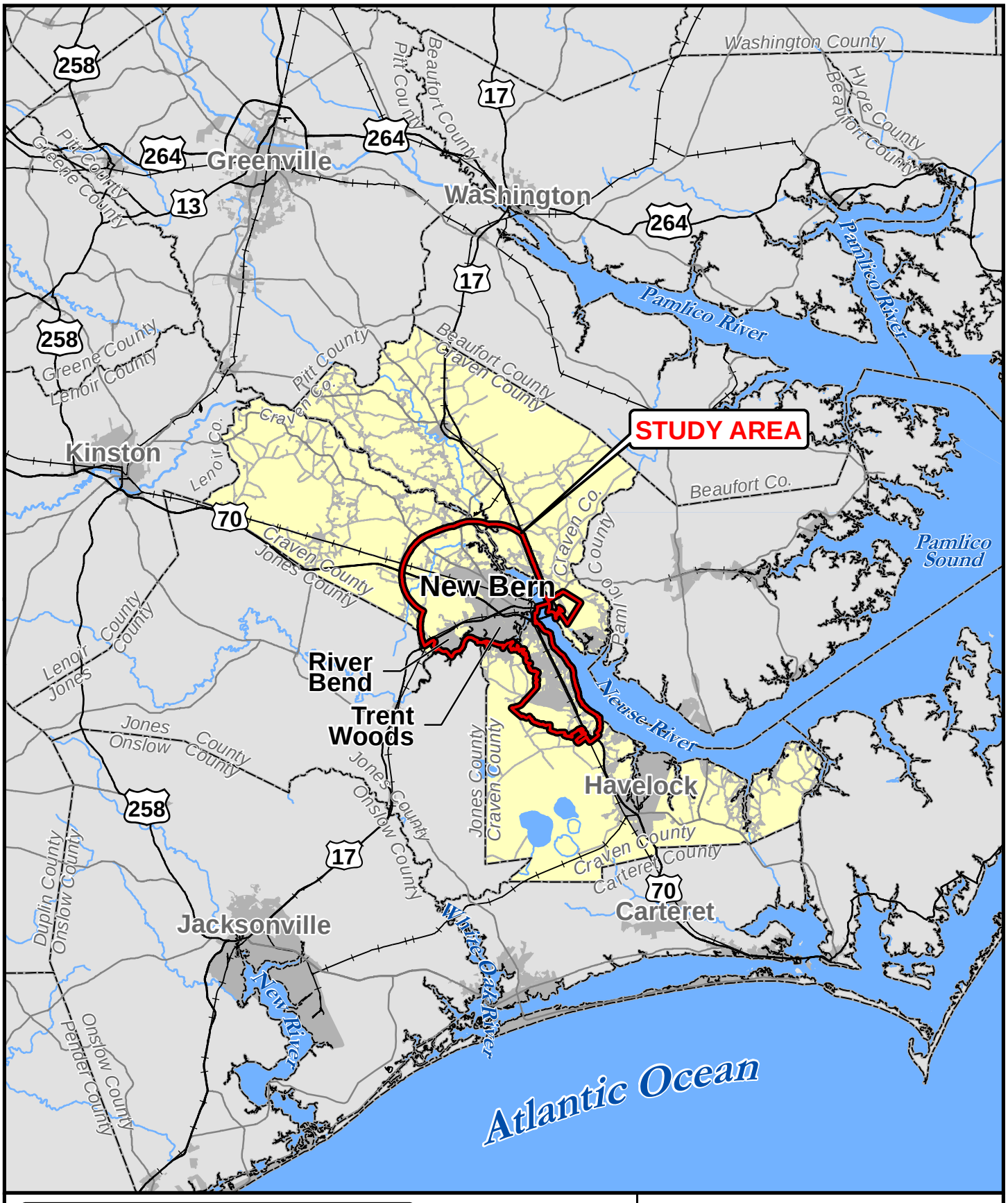
Background and History

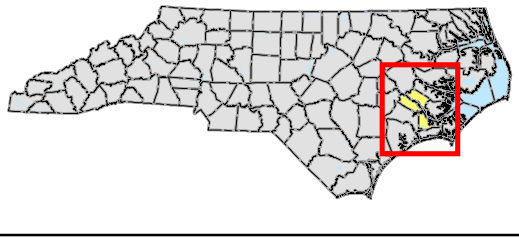
The U.S. Congress passed the Coastal Zone Management Act (CZMA) in 1972 in recognition of the need for a federal policy that addresses the conservation of coastal lands, shorelines and beaches. The CZMA established a partnership between the federal government through the National Oceanic and Atmospheric Administration (NOAA) and coastal states to develop a program to ensure the wise use of coastal resources. States developed management programs for their coastal zones, and when approved, NOAA provided financial support to assist states in administering these programs.

The N.C. Coastal Area Management Act of 1974 created the Coastal Resources Commission that is responsible for implementing an integrated program of planning, permitting, education and research to protect, conserve and manage the state's coastal resources. The Division of Coastal Management is staff to the CRC and implements the coastal program in the 20 coastal counties. The Division is part of the Department of Environment and Natural Resources (DENR), which is responsible for managing and protecting the state's environmental resources.

The CRC establishes policies for the N.C. Coastal Management Program and adopts implementing rules for both CAMA and the N.C. Dredge and Fill Act. The Commission designates areas of environmental concern (AECs), adopts rules and policies for coastal development within those areas, and certifies local land use plans. The CRC adopted revisions in 2002 to the land use planning guidelines that are intended to improve the quality of the local land use plans by requiring land suitability analysis and creating management topics to guide the development of land use policies.

The CRC certified the current New Bern, River Bend, and Trent Woods Regional Land Use Plan in March 2000. The Regional Plan was the first Regional CAMA Plan Update for these three municipalities. Previous plans certified by the CRC include the following:





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CAMA Land Use Plan Update
New Bern, River Bend, Trent Woods

Date 07-10	Craven County, North Carolina	Figure 1
Project No. 100242	AECOM	

- 1992 CAMA Land Use Plan, New Bern
- 1998 Land Use Plan Update, New Bern
- 2000 New Bern, River Bend, Trent Woods Regional Land Use Plan

The New Bern, River Bend, and Trent Woods Regional Land Use Plan will be the second regional land use plan. The CAMA Land Use Plan establishes policies that help guide local governments in land use and zoning decisions. The revised CAMA guidelines require more in-depth analysis of natural systems and land suitability through the use of GIS modeling and mapping. The land use plan addresses issues such as the protection of coastal resources (i.e., coastal water quality, wetlands, and fisheries), desired types of economic development, and the reduction of storm hazards, as well as local issues of concern. Land use plans provide guidance for both individual projects and a broad range of policy issues, such as the development of regulatory ordinances and public investment programs. The land use plan can also help a community in obtaining grant funds for priority projects.

Recent amendments to state statutes require that both city and county planning boards comment in writing on any proposed zoning map or text amendment. The comment must address whether the proposed amendment "is consistent with any comprehensive plan that has been adopted and any other officially adopted plan that is applicable." When adopting or rejecting any proposed amendment, the city council must also adopt a statement to address this issue. (G.S. 160A-383; 153A-341).

The Division of Coastal Management also uses the land use plan in making CAMA permit decisions and federal consistency determinations. Proposed projects and activities must be consistent with the policies of a local land-use plan, or DCM cannot permit a project.

This plan update addresses a study area that includes the area of southwestern Craven County, the municipal limits of New Bern, the New Bern ETJ, River Bend and its ETJ, and Trent Woods and extends outward to include an area approximately two miles beyond the existing municipal boundaries, see Figure 1, Vicinity Map and Figure 2 Study Area.

It is important to note that the plan update began in April 2007. Phase I tasks included data collection and assemblage of information related to existing and emerging conditions and public involvement activities necessary to update the CAMA Regional Plan. These Phase I activities were completed by the end of 2007, and Phase II work was initiated. By the fall of 2008 it was evident that the US economy, especially the banking and real estate markets were in a serious downturn. The economic recession and subsequent decline in employment has significantly altered the original narrative of trends and data provided by the US Census prior to the recession. The effects of the recession are also not reflected in the results of the public meeting held in January 2008. Updates to various sections of the plan have been made in 2010 to include new unemployment and economic data statistics to more accurately depict the downturn in the economy.

Comments on the Draft Regional Plan were not received from either Craven County, or the Town of Bridgeton during the required 45-day comment period.

II. COMMUNITY CONCERNS AND ASPIRATIONS

The Coastal Resources Commission places great emphasis on involving citizens and property owners in the development and implementation of the Land Use Plan. The goal is to involve as many citizens as possible in the development of the plan, and to enhance the likelihood that the plan will be implemented.

The City Board of Aldermen adopted a Citizen Participation Plan that designated a Steering Committee as the lead group responsible for preparation of the Land Use Plan. The Steering Committee is composed of citizens that represent a cross-section of the population of the region, including representatives from New Bern, River Bend, and Trent Woods.

The purpose of the Citizen Participation Plan is to ensure that all interested citizens have an opportunity to participate in the development of the plan. The Citizen Participation Plan describes the public participation tools that are used to inform the public of the planning progress and to solicit public participation. The Citizen Participation Plan also provides a general outline of the Steering Committee's meeting schedule for discussion and development of the Land Use Plan (see Appendix C).

Significant Existing and Emerging Conditions

The economic recession and associated loss of jobs has significantly impacted many families in the region, state and country. According to recent forecasts prepared by Dr. Michael Walden, Economics Department at North Carolina State University, income and consumer spending declined significantly in 2008, and the downward trend continued throughout 2010.

A key driver of the current recession is the housing market. The "housing bubble" built up earlier this decade ultimately led to the housing bust of plummeting sales and weak prices over the past two years. According to the U.S. Foreclosure Market Report, North Carolina's 2008 foreclosure rate of 0.84 percent ranked 27th nationally. Recently released data from the North Carolina Association of Realtors shows home sales in January 2009 were down 36 percent from 2008.

The impacts of the current recession are still undetermined and significant economic challenges confront the region, as well as the state as a whole. Existing economic development efforts and programs designed to help address recession related issues, such as the accelerating unemployment rate, job losses in key state industries, and business closings and layoffs are increasingly important. The military bases in eastern North Carolina and associated growth are expected to continue to help the local economy, as well as serve as a buffer to unemployment.

Prior to the recession, New Bern experienced significant redevelopment during the last census decade (1990-2000), and new residential development in the downtown; new single-family and apartments in fringe areas over the past decade. Other factors contributing to development within New Bern include continued building within subdivisions and building on existing vacant lots. Based upon a review of recent development projects, development proposals within the City, the nearby vicinity, and region, these trends are expected to continue.

Emerging trends in New Bern include redevelopment of downtown buildings, new single-family and multi-family development. The downtown area has a large concentration of government and institutional uses and professional offices. Pedestrian oriented retail is concentrated in the downtown

area. The relocation of the jail facility and associated court rooms is expected to have a negative impact on retail sales in the downtown, particularly for the restaurants.

Trent Woods, River Bend and residential areas located south of US 70 are major regional residential areas of suburban lower density residential development. Newly developing areas include incorporated areas and land in incorporated areas of Township 7 south of the Trent River that contain Carolina Colours, with 2000 planned housing units, Longleaf Pines, Brice's Crossing, Villas at Creekside and Stillwater Harbor. Development within the incorporated areas includes development of vacant parcels while land in Township 7 has been primarily Greenfield development. River Bend is also a significant area of primarily residential development.

Since 2000, New Bern has voluntarily annexed 1,178 acres (1.84 sq. miles). Most of these areas were undeveloped lands that were seeking infrastructure before being developed. A majority of this annexed area has been developed since 2000.

The economies of New Bern, River Bend, and Trent Woods and Craven County are based primarily on services, wholesale and retail trade, manufacturing, finance/insurance/real estate and public administration employment sectors. Coastal military installations including Cherry Point Marine Corp Air Station (MCAS) at Havelock are a very significant part of the regional economy, and many times that of the tourist sector. The New Bern area is the retail and commercial services center and the county seat for Craven County. Travel and tourism are substantial elements of the economy of New Bern and Craven County.

A significant amount of regional growth is anticipated by the expansion of military bases. The NC Military Growth Task Force prepared a study entitled "Regional Growth Management Plan" in October 2009. This plan projects that between the years 2006 and 2011, the Marine Corps will add 11,477 jobs at its eastern NC installations. These service members will bring with them an estimated 13,500 dependents. The plan concludes that the direct impact growth will induce the influx of an approximately 15,000 new residents that arrive to reinforce the regional service industry in response to the increased military population and activity. This growth of approximately 40,000 new residents represents a 160% increase in the normal regional population growth of 25,157 in the same period. According to the plan by July 2009, all but 170 of the 11,477 new service members and civilian employees had already arrived in the region. This expansion will offer economic opportunities and present growth challenges to the region.

Key Issues Important to the Planning Area

During Phase I, the Steering Committee held a Town Meeting to receive public input from citizens on issues, concerns, and opportunities available to the Region and the municipalities. The assets, problems, and key planning issues identified by the public comments provided at the Town Meeting were used by the Steering Committee to develop the Community Vision.

A Town Meeting, "Plan a Better Future" was held on January 28, 2008 in order to provide an opportunity for citizen involvement and input into the update of the CAMA Land Use Plan for the area. The purpose of the meeting was to receive public input (Appendix B) from citizens on issues, concerns, and opportunities, and to help develop a vision statement for the plan. The workshop utilized a technique of public participation that allowed identification of community issues and concerns through a brainstorming process based upon the following principles:

- All ideas and visions are welcome
- No ideas or visions will be criticized
- Participation from all is encouraged
- Visions should generate new and bold ideas for the future

The meeting participants were divided into small groups and, with the help of volunteer facilitators (Steering Committee Members), they generated lists of community aspirations and emerging issues which were used to develop a vision statement for the plan. The six management topics used to help generate lists of issues by the small groups included the following:

1. **Public Access** - strategies for addressing access to shorelines and public trust areas.
2. **Land Use Compatibility** – use of land and development, including residential and commercial development, and issues to minimize its primary and secondary impacts on coastal resources.
3. **Infrastructure Carrying Capacity** – strategies to ensure that infrastructure is available to support planned development and protect areas of environmental concern (AECs) and fragile areas.
4. **Natural Hazard Areas** - policies that reduce community vulnerability to natural hazards.
5. **Water Quality** - land use and development issues that address strategies to protect and restore water quality.
6. **Local Areas of Concern** – Issues of local concern to the community.

After the issues were identified at the Town Meeting each of the participants were given a sheet of dots and asked to prioritize the issues posted on the walls. Several overarching themes emerged from the input provided at the Town Meeting. The dominant growth-related conditions that are likely to influence land use and development, as well as other important environmental concerns are listed below.

Public Access

- Water access points are needed in Trent Woods, and River Bend, and the Riverwalk, in New Bern, to tie together the waterfront.
- Non-motorized (canoe/kayak) and small boat access is needed as well as boat ramps in all jurisdictions.
- The identification of important regional access sites needs to be coordinated by the County and municipalities.
- A fund should be established to buy public waterfront properties.

Land Use and Development

- Development encroaching on wetland areas needs to be addressed.
- There is need for a County Master Plan and County-wide Zoning.
- Density limits are needed for condominium development.
- Connectivity policies are needed for developments to improve the road network and reduce traffic congestion.
- Design and Aesthetics standards are needed for the region.

Infrastructure

- The Regional Plan should be enforceable and proactive.

- Repair and maintenance plans are needed to keep infrastructure in line with current and anticipated needs Updated costs need to be included in these plans.
- A regional water and wastewater authority is needed to consolidate services and improve service throughout the county.
- A City/County Regional Drainage and Stormwater Plan are needed to curb pollution.
- Hwy 70 needs better planning.
- Downtown New Bern Parking needs better planning.
- Interconnectivity policies needed, for Hwy 70 and James City, and between developments and to by-pass major highways and Highway 17.

Natural Hazards

- Wetlands should not be traded off to other places.
- More training needed for emergency responders.
- Government is doing a good job in hazard planning.

Water Quality

- Stormwater regulations are needed statewide, not just CAMA counties.
- Pollution upstream needs to be addressed.
- Local pollution is being addressed, and needs continued monitoring.

Local Concerns

- Drainage issues in downtown need to be addressed, including 5 Points and the historic areas.
- Building heights near waterfront need to be addressed, also in New Bern, especially riverside
- More walkways (sidewalks) are needed.
- View sheds and views need to be addressed in downtown New Bern.

Community Vision

The City of New Bern, River Bend, and Trent Woods seek to work together to plan for the future, while each maintains its unique character, cultural, and historic heritage, while ensuring a high quality of life for its residents and visitors. The communities support growth and development that is environmentally and economically sustainable, and appropriately designed and sited.

- Building Code Regulations. The City has an active building inspections program that enforces the N.C. State Building Code. A building inspection program is performed to ensure all structures comply with the Building Code.

Town of River Bend

- CAMA Regional Land Use Plan 2000. This is the current land use plan prepared under the CAMA regulations.
- Zoning Ordinance. The zoning ordinance is the primary means of regulating land use. It establishes four zoning districts, two business districts, and a wildlife district.
- Building Code Regulations. River Bend has an active building inspections program that enforces the N.C. State Building Code. A building inspection program is performed for River Bend by Craven County to ensure all structures comply with the Building Code.
- Subdivision Ordinance, 1981. Subdivision regulations address the platting of lots into building sites. These regulations establish standards for the provision of streets, and platting of lots.
- Flood Damage Prevention Ordinance, 1985. This provides development and construction criteria that are designed to mitigate and prevent potential flood losses. Provisions of this ordinance meet or exceed current FEMA standards.
- Urban Thoroughfare Plan, 1993. This plan recommends transportation improvements for the location of bridges and roads to improve traffic, safety and access.
- Tree Preservation Ordinance. This ordinance preserves trees in both residential and nonresidential development.

Town of Trent Woods

- CAMA Regional Land Use Plan 2000. This is the current land use plan prepared under the CAMA regulations.
- Zoning Ordinance, 1973, and update of 1998. The zoning ordinance is the primary means of regulating land use. It establishes eight zoning districts, and an overlay district for wetlands.
- Building Code Regulations. The Town of Trent Woods has an active building inspections program that enforces the N.C. State Building Code. A building inspection program is performed to ensure all structures comply with the Building Code.
- Subdivision Ordinance, 1981. Subdivision regulations address the platting of lots into building sites. These regulations establish standards for the provision of streets, and platting of lots.
- Flood Damage Prevention Ordinance, 1987. This provides development and construction criteria that are designed to mitigate and prevent potential flood losses. Provisions of this ordinance meet or exceed current FEMA standards.
- Urban Thoroughfare Plan, 1993. This plan recommends transportation improvements for the location of bridges and roads to improve traffic, safety and access.

CAMA Permitting

The Coastal Area Management Act requires permits for development projects within the twenty coastal counties and their municipalities. The CAMA permit system is divided into major and minor permits, based on the size and possible impacts of the development project. There are three types of CAMA permits:

- Major Permits – for projects that involve development in an Area of Environmental Concern (AEC), or require another state or federal permit, license or authorization, such as for dredging and filling, wetlands fill, stormwater management, sedimentation control,

wastewater discharge or mining; construction of one or more buildings that cover more than 60,000 square feet on a single parcel of land; alteration of more than 20 acres of land or water; or if there is any dredging or filling of water or marsh; excavation or drilling for natural resources on land or under water (which 10 state and four federal agencies must review before a decision is made). Each project is reviewed for compliance with local regulations and for consistency with the local Land Use Plan.

- General Permits – used for projects that usually pose little or no threat to the environment. Examples of projects that would require a general permit include piers, docks, and wooden groins in the estuarine shoreline, construction and maintenance of boat ramps.

- Minor Permits – used for projects, such as single-family houses, that does not require major permits or general permits. They are reviewed, issued and administered to CRC standards by local governments under contract with the Division of Coastal Management. These projects are reviewed for compliance with use standards for AEC's and for consistency with local Land Use Plans. The minor permit program is administered by a local permit officer (LPO) that works for the local government but has the power to issue minor CAMA permits and approve permit exemptions.

If a development project will modify an existing structure or increase its size, or a new development is proposed the following permits may be required:

- Zoning Permit – Site plans, description of work to accompany a zoning permit application.
- Conditional Use Permits – For any development designated as a Conditional Use in the Municipal Zoning Ordinance or any commercial development. These applications are reviewed and approved by the Planning Board and Board of Aldermen or Town Council.
- CAMA Permit – If the development is located within the 75 foot Estuarine Shoreline AEC, a CAMA permit will be required.
- Building Permit for all construction activities.
- Flood Zone Determination – If development is proposed in any flood zone, the lowest habitable floor must be elevated a minimum of one (1) foot above the Flood Insurance Rate Map (FIRM) base flood elevation (BFE).

The Land Use Plan is used in the consistency review of CAMA major permit applications and inconsistency with the LUP policies and Future Land Use Plan Map could result in the denial of State Permits, or require an amendment to the Land Use Plan.

Effective January 1, 2006 state statutes require that all (not just CAMA) city and county planning boards comment in writing on any proposed zoning map or text amendment. The comment must address whether the proposed amendment "is consistent with any comprehensive plan that has been adopted and any other officially adopted plan that is applicable" When adopting or rejecting any proposed amendment, the city council or board of commissioners must also adopt a statement to address this issue (and also address why the board believes the action taken is reasonable and in the public interest). G.S. 160A-382 and 153A-341. It is also important to note that other state statutes G.S. 160A-382 and 153A-342 specifically requires that a statement be prepared analyzing the reasonableness of all CUPs, conditionally zoning, or other small-scale rezoning. The statutes allow substantial flexibility as to how these statements are prepared. Many jurisdictions have a staff analysis on this issue, often including a draft statement, prepared for planning board and governing board consideration, amendment, and adoption.

Division of Water Quality Permitting

Development within the twenty coastal counties must comply with (NCAC) 02H. Permitted projects are classified as low or high density, and impervious surfaces are established. For low density sites, developed areas are limited to 30 percent or less (twenty-five percent or less within one-half mile of

APPENDIX G-7

USACE PRE-CONSTRUCTION NOTIFICATION & NATIONWIDE PERMIT 58

Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.4 January 2009

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☐ Section 404 Permit	☐ Section 10 Permit
1b. Specify Nationwide Permit (NWP) number:	or General Permit (GP) number:	
1c. Has the NWP or GP number been verified by the Corps?	☐ Yes	☐ No
1d. Type(s) of approval sought from the DWQ (check all that apply): ☐ 401 Water Quality Certification – Regular ☐ 401 Water Quality Certification – Express ☐ Non-404 Jurisdictional General Permit ☐ Riparian Buffer Authorization		
1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☐ Yes ☐ No	For the record only for Corps Permit: ☐ Yes ☐ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.	☐ Yes	☐ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.	☐ Yes	☐ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?	☐ Yes	☐ No

2. Project Information

2a. Name of project:	
2b. County:	
2c. Nearest municipality / town:	
2d. Subdivision name:	
2e. NCDOT only, T.I.P. or state project no:	

3. Owner Information

3a. Name(s) on Recorded Deed:	
3b. Deed Book and Page No.	
3c. Responsible Party (for LLC if applicable):	
3d. Street address:	
3e. City, state, zip:	
3f. Telephone no.:	
3g. Fax no.:	
3h. Email address:	

4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☐ Other, specify:
4b. Name:	
4c. Business name (if applicable):	
4d. Street address:	
4e. City, state, zip:	
4f. Telephone no.:	
4g. Fax no.:	
4h. Email address:	
5. Agent/Consultant Information (if applicable)	
5a. Name:	
5b. Business name (if applicable):	
5c. Street address:	
5d. City, state, zip:	
5e. Telephone no.:	
5f. Fax no.:	
5g. Email address:	

B. Project Information and Prior Project History		
1. Property Identification		
1a. Property identification no. (tax PIN or parcel ID):		
1b. Site coordinates (in decimal degrees):	Latitude:	Longitude:
1c. Property size:		acres
2. Surface Waters		
2a. Name of nearest body of water to proposed project:		
2b. Water Quality Classification of nearest receiving water:		
2c. River basin:		
3. Project Description		
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application:		
3b. List the total estimated acreage of all existing wetlands on the property:		
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property:		
3d. Explain the purpose of the proposed project:		
3e. Describe the overall project in detail, including the type of equipment to be used:		
4. Jurisdictional Determinations		
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past?	☐ Yes ☐ No ☐ Unknown Comments:	
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☐ Preliminary ☐ Final	
4c. If yes, who delineated the jurisdictional areas? Name (if known):	Agency/Consultant Company: Other:	
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation.		
5. Project History		
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes ☐ No ☐ Unknown	
5b. If yes, explain in detail according to “help file” instructions.		
6. Future Project Plans		
6a. Is this a phased project?	☐ Yes ☐ No	
6b. If yes, explain.		

C. Proposed Impacts Inventory

1. Impacts Summary

1a. Which sections were completed below for your project (check all that apply):

☐ Wetlands ☐ Streams – tributaries ☐ Buffers ☐ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

2a. Wetland impact number Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland	2d. Forested	2e. Type of jurisdiction Corps (404,10) or DWQ (401, other)	2f. Area of impact (acres)
W1 -	Choose one	Choose one	Yes/No	-	
W2 -	Choose one	Choose one	Yes/No	-	
W3 -	Choose one	Choose one	Yes/No	-	
W4 -	Choose one	Choose one	Yes/No	-	
W5 -	Choose one	Choose one	Yes/No	-	
W6 -	Choose one	Choose one	Yes/No	-	
				2g. **Total Wetland Impacts:**	

2h. Comments:

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

3a. Stream impact number Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction	3f. Average stream width (feet)	3g. Impact length (linear feet)
S1 -	Choose one		-	-		
S2 -	Choose one		-	-		
S3 -	Choose one		-	-		
S4 -	Choose one		-	-		
S5 -	Choose one		-	-		
S6 -	Choose one		-	-		
					3h. **Total stream and tributary impacts**	

3i. Comments:

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 -		Choose one	Choose	
O2 -		Choose one	Choose	
O3 -		Choose one	Choose	
O4 -		Choose one	Choose	
		4f. **Total open water impacts**		

4g. Comments:

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	
P1	Choose one							
P2	Choose one							
	5f. **Total:**							

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

6a. Project is in which protected basin?	☐ Neuse ☐ Tar-Pamlico ☐ Catawba ☐ Randleman ☐ Other:

6b. Buffer Impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 -			Yes/No		
B2 -			Yes/No		
B3 -			Yes/No		
B4 -			Yes/No		
B5 -			Yes/No		
B6 -			Yes/No		
		6h. **Total Buffer Impacts:**			

6i. Comments:

D. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☐ Yes ☐ No
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☐ Corps
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☐ Payment to in-lieu fee program ☐ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank:

3b. Credits Purchased (attach receipt and letter)	Type: Choose one Type: Choose one Type: Choose one	Quantity: Quantity: Quantity:

3c. Comments:

4. Complete if Making a Payment to In-lieu Fee Program

4a. Approval letter from in-lieu fee program is attached.	☐ Yes
4b. Stream mitigation requested:	linear feet
4c. If using stream mitigation, stream temperature:	Choose one
4d. Buffer mitigation requested (DWQ only):	square feet
4e. Riparian wetland mitigation requested:	acres
4f. Non-riparian wetland mitigation requested:	acres
4g. Coastal (tidal) wetland mitigation requested:	acres

4h. Comments:

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.

6. Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ

6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?	☐ Yes ☐ No

6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.

Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			

6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).

6h. Comments:

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☐ Yes ☐ No
1b. If yes, then is a diffuse flow plan included? If no, explain why.	☐ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	%
2b. Does this project require a Stormwater Management Plan?	☐ Yes ☐ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why:	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan:	
2e. Who will be responsible for the review of the Stormwater Management Plan?	
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☐ Coastal counties ☐ HQW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☐ Yes ☐ No
5b. Have all of the 401 Unit submittal requirements been met?	☐ Yes ☐ No

F. Supplementary Information	
1. Environmental Documentation (DWQ Requirement)	
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☐ Yes ☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☐ Yes ☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments:	☐ Yes ☐ No
2. Violations (DWQ Requirement)	
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes ☐ No
2b. Is this an after-the-fact permit application?	☐ Yes ☐ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):	
3. Cumulative Impacts (DWQ Requirement)	
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes ☐ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description.	
4. Sewage Disposal (DWQ Requirement)	
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.	

5. Endangered Species and Designated Critical Habitat (Corps Requirement)		
5a. Will this project occur in or near an area with federally protected species or habitat?	☐ Yes ☐ No	
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☐ Yes ☐ No	
5c. If yes, indicate the USFWS Field Office you have contacted.	-	
5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat?		
6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes ☐ No	
6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat?		
7. Historic or Prehistoric Cultural Resources (Corps Requirement)		
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes ☐ No	
7b. What data sources did you use to determine whether your site would impact historic or archeological resources?		
8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☐ Yes ☐ No	
8b. If yes, explain how project meets FEMA requirements:		
8c. What source(s) did you use to make the floodplain determination?		

Applicant/Agent's Printed Name	_____ Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	Date

Nationwide Permit 58 - Utility Line Activities for Water and Other Substances
Effective Date: March 15, 2021; Expiration Date: March 14, 2026
(NWP Final Notice, 86 FR 2744)

Nationwide Permit 58 - Utility Line Activities for Water and Other Substances. Activities required for the construction, maintenance, repair, and removal of utility lines for water and other substances, excluding oil, natural gas, products derived from oil or natural gas, and electricity. Oil or natural gas pipeline activities or electric utility line and telecommunications activities may be authorized by NWPs 12 or 57, respectively. This NWP also authorizes associated utility line facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2-acre of waters of the United States for each single and complete project.

Utility lines: This NWP authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters for crossings of those waters associated with the construction, maintenance, or repair of utility lines for water and other substances, including outfall and intake structures. There must be no change in pre-construction contours of waters of the United States. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose that is not oil, natural gas, or petrochemicals. Examples of activities authorized by this NWP include utility lines that convey water, sewage, stormwater, wastewater, brine, irrigation water, and industrial products that are not petrochemicals. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area.

Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

Utility line substations: This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2-acre of waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

Foundations for above-ground utility lines: This NWP authorizes the construction or maintenance of foundations for above-ground utility lines in all waters of the United States, provided the foundations are the minimum size necessary.

Access roads: This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including utility line substations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (see 33 CFR part 322). Overhead utility lines constructed over section 10 waters and utility lines that are routed in or under section 10 waters without a discharge of dredged or fill material require a section 10 permit.

This NWP authorizes, to the extent that Department of the Army authorization is required, temporary structures, fills, and work necessary for the remediation of inadvertent returns of drilling fluids to waters of the United States through sub-soil fissures or fractures that might occur during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. These remediation activities must be done as soon as practicable, to restore the affected waterbody. District engineers may add special conditions to this NWP to require a remediation plan for addressing inadvertent returns of drilling fluids to waters of the United States during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) a section 10 permit is required; or (2) the discharge will result in the loss of greater than 1/10-acre of waters of the United States. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: Where the utility line is constructed, installed, or maintained in navigable waters of the United States (i.e., section 10 waters) within the coastal United States, the Great Lakes, and United States territories, a copy of the NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

Note 2: For utility line activities crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Utility line activities must comply with 33 CFR 330.6(d).

Note 3: Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the utility line must be removed upon completion of the work, in accordance with the requirements for temporary fills.

Note 4: Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to the General Bridge Act of 1946. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a section 404 permit (see NWP 15).

Note 5: This NWP authorizes utility line maintenance and repair activities that do not qualify for the Clean Water Act section 404(f) exemption for maintenance of currently serviceable fills or fill structures.

Note 6: For activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b)(4) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

2021 Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific

conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. **Navigation.** (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. **Aquatic Life Movements.** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. **Spawning Areas.** Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. **Migratory Bird Breeding Areas.** Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. **Shellfish Beds.** No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. **Suitable Material.** No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. **Water Supply Intakes.** No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. **Adverse Effects From Impoundments.** If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. **Management of Water Flows.** To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. **Fills Within 100-Year Floodplains.** The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. **Equipment.** Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. **Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. **Removal of Temporary Structures and Fills.** Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. **Proper Maintenance.** Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. **Single and Complete Project.** The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. **Wild and Scenic Rivers.** (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. Permittees shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. **Tribal Rights.** No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. **Endangered Species.** (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR 402.02 for the definition of "effects of the action" for the purposes of ESA section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA

section 7 regarding "activities that are reasonably certain to occur" and "consequences caused by the proposed action."

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat or critical habitat proposed for such designation, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation), the pre-construction notification must include the name(s) of the endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or that utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. For activities where the non-Federal applicant has identified listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species (or species proposed for listing or designated critical habitat (or critical habitat proposed for such designation), or until ESA section 7 consultation or conference has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where

"take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. **Migratory Birds and Bald and Golden Eagles.** The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. **Historic Properties.** (a) No activity is authorized under any NWP which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)(1)). If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate

documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts commensurate with potential impacts, which may include background research, consultation, oral history interviews, sample field investigation, and/or field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect.

(d) Where the non-Federal applicant has identified historic properties on which the proposed NWP activity might have the potential to cause effects and has so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. **Discovery of Previously Unknown Remains and Artifacts.** Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. **Designated Critical Resource Waters.** Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after she or he determines that the impacts to the critical resource waters will be no more than minimal.

23. **Mitigation.** The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) Compensatory mitigation at a minimum one-for-one ratio will be required for all losses of stream bed that exceed 3/100-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. This compensatory mitigation requirement may be satisfied through the restoration or enhancement of riparian areas next to streams in accordance with paragraph (e) of this general condition. For losses of stream bed of 3/100-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. If restoring riparian areas involves planting vegetation, only native species should be planted. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address

documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f).)

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). If permittee-responsible mitigation is the proposed option, and the proposed compensatory mitigation site is located on land in which another federal agency holds an easement, the district engineer will coordinate with that federal agency to determine if proposed compensatory mitigation project is compatible with the terms of the easement.

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. **Safety of Impoundment Structures.** To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state or federal, dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. **Water Quality.** (a) Where the certifying authority (state, authorized tribe, or EPA, as appropriate) has not previously certified compliance of an NWP with CWA section 401,

a CWA section 401 water quality certification for the proposed discharge must be obtained or waived (see 33 CFR 330.4(c)). If the permittee cannot comply with all of the conditions of a water quality certification previously issued by certifying authority for the issuance of the NWP, then the permittee must obtain a water quality certification or waiver for the proposed discharge in order for the activity to be authorized by an NWP.

(b) If the NWP activity requires pre-construction notification and the certifying authority has not previously certified compliance of an NWP with CWA section 401, the proposed discharge is not authorized by an NWP until water quality certification is obtained or waived. If the certifying authority issues a water quality certification for the proposed discharge, the permittee must submit a copy of the certification to the district engineer. The discharge is not authorized by an NWP until the district engineer has notified the permittee that the water quality certification requirement has been satisfied by the issuance of a water quality certification or a waiver.

(c) The district engineer or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. **Coastal Zone Management.** In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). If the permittee cannot comply with all of the conditions of a coastal zone management consistency concurrence previously issued by the state, then the permittee must obtain an individual coastal zone management consistency concurrence or presumption of concurrence in order for the activity to be authorized by an NWP. The district engineer or a state may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. **Regional and Case-By-Case Conditions.** The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its CWA section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. **Use of Multiple Nationwide Permits.** The use of more than one NWP for a single and complete project is authorized, subject to the following restrictions:

(a) If only one of the NWPs used to authorize the single and complete project has a specified acreage limit, the acreage loss of waters of the United States cannot exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

(b) If one or more of the NWPs used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those NWPs cannot exceed their respective specified acreage limits. For example, if a commercial development is constructed under NWP 39, and the single and complete project includes the filling of an upland ditch authorized by NWP 46, the maximum acreage loss of waters of the United States for the commercial development under NWP 39 cannot exceed 1/2-acre, and the total acreage loss of waters of United States due to the NWP 39 and 46 activities cannot exceed 1 acre.

29. **Transfer of Nationwide Permit Verifications.** If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

30. **Compliance Certification.** Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the

certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. **Activities Affecting Structures or Works Built by the United States.** If an NWP activity also requires review by, or permission from, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission and/or review is not authorized by an NWP until the appropriate Corps office issues the section 408 permission or completes its review to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. **Pre-Construction Notification.** (a) *Timing*. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33

CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification*: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) (i) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures.

(ii) For linear projects where one or more single and complete crossings require pre-construction notification, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters (including those single and complete crossings authorized by an NWP but do not require PCNs). This information will be used by the district engineer to evaluate the cumulative adverse environmental effects of the proposed linear project, and does not change those non-PCN NWP activities into NWP PCNs.

(iii) Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided

results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial and intermittent streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-federal permittees, if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat (or critical habitat proposed for such designation), the PCN must include the name(s) of those endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the “study river” (see general condition 16); and

(10) For an NWP activity that requires permission from, or review by, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from, or review by, the Corps office having jurisdiction over that USACE project.

(c) *Form of Pre-Construction Notification*: The nationwide permit pre-construction notification form (Form ENG 6082) should be used for NWP PCNs. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) *Agency Coordination*: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iii) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure that the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will

consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

2021 District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the single and complete crossings of waters of the United States that require PCNs to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings of waters of the United States authorized by an NWP. If an applicant requests a waiver of an applicable limit, as provided for in NWPs 13, 36, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by an NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district

engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters. The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure that the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant

submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

2021 Further Information

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

2021 Nationwide Permit Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term "discharge" means any discharge of dredged or fill material into waters of the United States.

Ecological reference: A model used to plan and design an aquatic habitat and riparian area restoration, enhancement, or establishment activity under NWP 27. An ecological reference may be based on the structure, functions, and dynamics of an aquatic habitat

type or a riparian area type that currently exists in the region where the proposed NWP 27 activity is located. Alternatively, an ecological reference may be based on a conceptual model for the aquatic habitat type or riparian area type to be restored, enhanced, or established as a result of the proposed NWP 27 activity. An ecological reference takes into account the range of variation of the aquatic habitat type or riparian area type in the region.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. The loss of stream bed includes the acres of stream bed that are permanently adversely affected by filling or excavation because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters or wetlands for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the United States.

Navigable waters: Waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR part 329.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of flowing or standing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of “open waters” include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Perennial stream: A perennial stream has surface water flowing continuously year-round during a typical year.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The

request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands next to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable

substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized jurisdictional stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef,

permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line.

Tribal lands: Any lands title to which is either: 1) held in trust by the United States for the benefit of any Indian tribe or individual; or 2) held by any Indian tribe or individual subject to restrictions by the United States against alienation.

Tribal rights: Those rights legally accruing to a tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, and that give rise to legally enforceable remedies.

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a "water of the United States." If a wetland is adjacent to a waterbody determined to be a water of the United States, that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)).

ADDITIONAL INFORMATION

Information about the U.S. Army Corps of Engineers Regulatory Program, including nationwide permits, may also be accessed at http://www.swt.usace.army.mil/Missions/Regulatory.aspx or http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx

APPENDIX G-8

NCDEQ STORMWATER DESIGN MANUAL E-1 LOW DENSITY PROJECTS

E-1. Low Density Projects

Design Objective

Low density projects are not required to be equipped with Stormwater Control Measures (SCMs) in exchange for limiting their built-upon area, maximizing dispersed flow and ensuring that stormwater conveyances are vegetated. These strategies protect the hydrology of the receiving steam, prevent erosion, and remove pollutants through infiltration.

The general requirements for low density projects are covered in in **Rule 15A NCAC 02H .1003(2)**, and the specific built-upon area limit for low density are set forth in the stormwater program to which they are subject. For example, a project subject to NPDES MS4 and Urbanizing Areas Rule 15A NCAC 02H .1017 would need to meet the requirements for dispersed flow, vegetated conveyances, curb outlet systems, AND contain no more than 24% built-upon area or 2 dwelling units/acre in order to be considered a low density project. The built-upon area limits vary by stormwater program.

Important Links

15A NCAC 2H .1002 – Definitions
15A NCAC 2H .1003(2) – Design Requirements for Low Density Projects
15A NCAC 2H .1040(4)(a) – Permit Administration

15A NCAC 2H .1003(1): CALCULATION OF PROJECT DENSITY. The following requirements shall apply to the calculation of project density:

(a) Project density shall be calculated as the total built-upon area divided by the total project area;

(b) A project with existing development may use the calculation method in Sub-Item (1)(a) or shall have the option of calculating project density as the difference of total built-upon area minus existing built-upon area divided by the difference of total project area minus existing built-upon area;

(c) Total project area shall exclude the following:

(i) areas below the Normal High Water Line (NHWL); and

(ii) areas defined as "coastal wetlands" pursuant to 15A NCAC 07H .0205, herein incorporated by reference, including any subsequent amendments and editions, and may be accessed at no cost at http://reports.oah.state.nc.us/ncac.asp as measured landward from the Normal High Water (NHW) line; and

(d) On a case-by-case basis as determined by the Division during application review, projects may be considered to have both high and low density areas based on one or more of the following criteria:

(i) natural drainage area boundaries;

(ii) variations in land use throughout the project; and

(iii) construction phasing.

> "***Project****" means the proposed development activity for which an applicant is seeking a stormwater permit from the state or other entity in accordance with this Section. "Project" shall exclude any land adjacent to the area disturbed by the project that has been counted as pervious by any other development regulated under a federal, State, or local stormwater regulation. Owners and developers of large developments consisting of many linked projects may consider developing a master plan that illustrates how each project fits into the design of the large development.* [15A NCAC 2H .1002(38)]

It is up to the applicant to determine what the project boundary shall be for a given application. However, when a project is part of a larger "**common plan of development"** will be permitted per the density of the larger common plan of development. It is also possible, on a case-by-case basis, for the state to permit a project that is partially high and partially low density. It is up to the applicant to propose how such a project will be designed and maintained.

> *"**Common plan of development**" means a site where multiple and distinct development activities may be taking place at different times on different schedules but governed by a single development plan regardless of ownership of the parcels. Information that may be used to determine a "common plan of development" include plats, blueprints, marketing plans, contracts, building permits, public notices of hearings, zoning requests, and infrastructure development plans.* [15A NCAC 2H .1002(8)]

15A NCAC 2H .1003(2)(a): DENSITY THRESHOLDS. Low density projects shall not exceed the low-density development thresholds set forth in the stormwater programs to which they are subject pursuant to Rules .1017, .1019, and .1021 of this Section. For projects subject to the requirements for Non-Coastal High Quality Waters and Outstanding Resource Waters, dwelling unit per acre may be used instead of density to establish low density status for single-family detached residential development as set forth in Rule .1021 in this Section.

Table 1: Thresholds for Low Density Projects

Stormwater Program	Maximum Percent BUA for Low Density
MS4 Stormwater	24%
Coastal County – SA	12%
Coastal County – Freshwater ORW	12%
Coastal County – Other	24%
Non-Coastal County – ORW and HQW	12%
Water Supply Watershed	Varies based on WS classification; see 15A NCAC 02H Rules.

If a low-density project is modified such that the low-density threshold is exceeded, then the entire project may become subject to high density stormwater management requirements.

15A NCAC 2H .1003(2)(b): DISPERSED FLOW. Projects shall be designed to maximize dispersed flow through vegetated areas and minimize channelization of flow.

> *"**Dispersed flow**" means uniform shallow flow that is conveyed to a vegetated filter strip as defined in Rule .1059 of this Section, another vegetated area, or stormwater control measure. The purpose of "dispersed flow" is to remove pollutants through infiltration and settling, as well as to reduce erosion prior to stormwater reaching surface waters.* [15A NCAC 2H .1002(13)]

This Sub-item speaks to the objective of low density development; that is, to replicate the pre-development hydrology and water quality as much as possible by sending stormwater from the BUA on the site to vegetated areas where it will be infiltrated and evapo-transpired rather than being discharged to adjacent waters as surface runoff. It is also recommended that roof drains terminate at the landward edge of the vegetated setback.

15A NCAC 2H .1003(2)(c): VEGETATED CONVEYANCES. Stormwater that cannot be released as dispersed flow shall be transported by vegetated conveyances. A minimal amount of non-vegetated conveyances for erosion protection or piping for driveways or culverts under a road shall be allowed by the permitting authority when it cannot be avoided. Vegetated conveyances shall meet the following requirements:

(i) Side slopes shall be no steeper than 3:1 (horizontal to vertical) unless it is demonstrated to the permitting authority that the soils and vegetation will remain stable in perpetuity based on engineering calculations and on-site soil investigation; and

(ii) The conveyance shall be designed so that it does not erode during the peak flow from the 10-year storm as demonstrated by engineering calculations.

> *"**Vegetated conveyance**" means a permanent, designed waterway lined with vegetation that is used to convey stormwater runoff at a non-erosive velocity within or away from a developed area.* [15A NCAC 2H .1002(52)]

Piping of stormwater is not allowed except the minimum necessary to direct runoff beneath a short run of pavement such as an access road or driveway. Filling in vegetated conveyances (ditches, swales, etc.) after the project is built is strictly prohibited. If a low-density development project is later modified such that stormwater is no longer transported by vegetated conveyances, the entire site may become subject to high density stormwater management requirements.

It is recommended that an operation and maintenance (O&M) plan be provided for vegetated conveyances. The O&M plan should include the following:

- inspection schedule;
- maintenance schedule that includes mowing and maintenance of side slopes in accordance with approved plans; and
- maintenance procedures that shall be taken to return the vegetated conveyance to design specifications if a failure occurs such as for sediment removal, revegetation of side slopes, repair of eroded areas.

O&M plans should be signed by the owner and notarized. It is also recommended that O&M plans be referenced on the project plat.

15A NCAC 2H .1003(2)(d): CURB OUTLET SYSTEMS. Low density projects may use curb and gutter with outlets to convey stormwater to grassed swales or vegetated areas. Requirements for these curb outlet systems [are] shall be as follows:

(i) The curb outlets shall be designed such that the swale or vegetated area can carry the peak flow from the 10-year storm at a non-erosive velocity;

(ii) The longitudinal slope of the swale or vegetated area shall not exceed five percent, except where not practical due to physical constraints. In these cases, devices to slow the rate of runoff and encourage infiltration to reduce pollutant delivery shall be provided;

(iii) The swale's cross-section shall be trapezoidal with a minimum bottom width of two feet;

(iv) The side slopes of the swale or vegetated area shall be no steeper than 3:1 (horizontal to vertical);

(v) The minimum length of the swale or vegetated area shall be 100 feet; and

(vi) Low density projects may use treatment swales designed pursuant to Rule .1061 of this Section in lieu of the requirements specified in Sub-Item (i) through (v) of this Rule.

*"**Curb outlet system**" means curb and gutter with breaks or other outlets used to convey stormwater runoff to vegetated conveyances or other vegetated areas.* [15A NCAC 2H .1002(9)]

Figure 2: Curb break that allows stormwater to run into the vegetated area before it reaches the sewer

REQUIREMENT 15A NCAC 2H .1003(4): VEGETATED SETBACKS. Vegetated setbacks shall be required adjacent to waters as specified in the stormwater rules to which the project is subject pursuant to this Section, in addition to the following requirements applicable to all vegetated setbacks:

(a) The width of a vegetated setback shall be measured horizontally from the normal pool elevation of impounded structures, from the top of bank of each side of streams or rivers, and from the mean high waterline of tidal waters, perpendicular to the shoreline;

(b) Vegetated setbacks may be cleared or graded, but shall be replanted and maintained in grass or other vegetation;

(c) Built-upon area that meets the requirements of G.S. 143-214.7(b2)(2) shall be allowed within the vegetated setback.

(d) Built-upon area that does not meet the requirements of G.S. 143-214.7(b2)(2) shall be allowed within a vegetated setback when it is not practical to locate the built-upon area elsewhere, the built-upon area within the vegetated setback is minimized, and channelizing runoff from the built-upon area is avoided. Built-upon area within the vegetated setback shall be limited to:

  (i) Publicly-funded linear projects such as roads, greenways, and sidewalks;

  (ii) Water Dependent Structures; and

  (iii) Minimal footprint uses such as poles, signs, utility appurtenances, and security lights.

(e) Stormwater that has not been treated in an SCM shall not be discharged through a vegetated setback; instead it shall be released at the edge of the vegetated setback and allowed to flow through the setback as dispersed flow.

(f) Artificial streambank and shoreline stabilization shall not be subject to the requirements of this Item.

*"**Vegetated setback**" means an area of natural or established vegetation adjacent to surface waters, through which stormwater runoff flows in a diffuse manner to protect surface waters from degradation due to development activities.* [15A NCAC 2H .1002(51)]

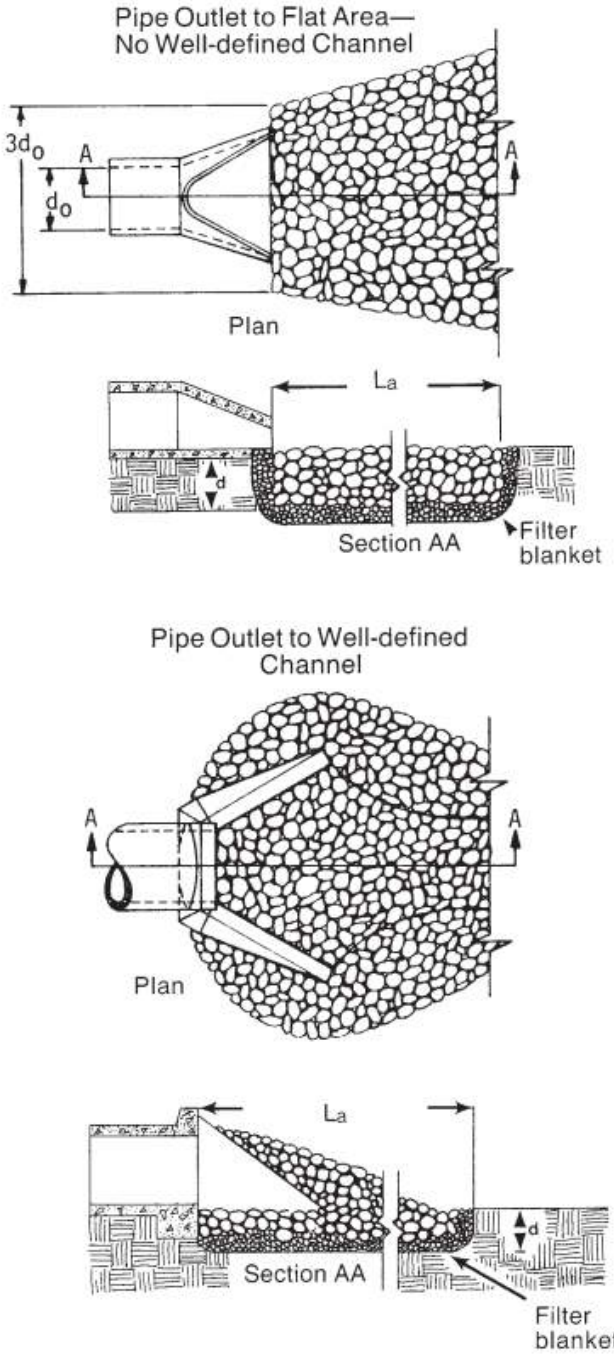
*"**Public linear transportation project**" means a project consisting of a road, bridge, sidewalk, greenway, or railway that is on a public thoroughfare plan or provides improved access for existing development and that is owned and maintained by a public entity.* [15A NCAC 2H .1002(39)]

Per .1003(4)(e), stormwater that has not been treated in an SCM shall not be discharged through a vegetated setback; instead it shall be released at the edge of the vegetated setback and allowed to flow through the setback as dispersed flow.

REQUIREMENT 15A NCAC 2H .1003(5): STORMWATER OUTLETS. Stormwater outlets shall be designed so that they do not cause erosion downslope of the discharge point during the peak flow from the 10-year storm event as shown by engineering calculations.

One resource for designing stormwater outlets that do not cause erosion is Chapter 6 of the NC Erosion and Sediment Control Planning and Design Manual. Some of the relevant information is excerpted below.

Figure 3: Outlet Protection Guidance from the NC Sediment and Erosion Control Manual, 2006, page 6.41.3



Notes

1. L_a is the length of the riprap apron.
2. d = 1.5 times the maximum stone diameter but not less than 6″.
3. In a well-defined channel extend the apron up the channel banks to an elevation of 6″ above the maximum tailwater depth or to the top of the bank, whichever is less.
4. A filter blanket or filter fabric should be installed between the riprap and soil foundation.

Additional guidance on outlet protection from the NC Erosion and Sediment Control Planning and Design Manual is as follows:

1. Ensure that the subgrade for the filter and riprap follows the required lines and grades shown in the plan. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the riprap thickness.
2. The riprap and gravel filter must conform to the specified grading limits shown on the plans.
3. Filter cloth, when used, must meet design requirements and be properly protected from punching or tearing during installation. Repair any damage by removing the riprap and placing another piece of filter cloth over the damaged area. All connecting joints should overlap so the top layer is above the downstream layer a minimum of 1 foot. If the damage is extensive, replace the entire filter cloth.
4. Riprap may be placed by equipment, but take care to avoid damaging the filter.
5. The minimum thickness of the riprap should be 1.5 times the maximum stone diameter.
6. Riprap may be field stone or rough quarry stone. It should be hard, angular, highly weather-resistant and well graded.
7. Construct the apron on zero grade with no overfill at the end. Make the top of the riprap at the downstream end level with the receiving area or slightly below it.
8. Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron.
9. Immediately after construction, stabilize all disturbed areas with vegetation

REQUIREMENT 15A NCAC 2H .1003(7): DEED RESTRICTIONS AND PROTECTIVE COVENANTS. The permittee shall record deed restrictions and protective covenants prior to the issuance of a certificate of occupancy to ensure that projects will be maintained in perpetuity consistent with the plans and specifications approved by the permitting authority. For projects owned by public entities, the permittee shall have the option to incorporate specific restrictions and conditions into a facility management plan or another instrument in lieu of deed restrictions and protective covenants.

Sample deed restriction forms can be found on the Stormwater Post-Construction Forms web page.

REQUIREMENT 15A NCAC 2H .1003(8): COMPLIANCE WITH OTHER REGULATORY PROGRAMS. Project designs shall comply with all other applicable requirements pursuant to G.S. 143-214.1, 143-214.5, 143-214.7, and 143-215.3(a)(1).

The information in this chapter is not an exhaustive summary of the environmental requirements that might apply to a low density development project. Always check applicable local government ordinances as well as other federal and state environmental regulations that might apply such as 404 Permit/401 Water Quality Certification, Riparian Buffer Programs, NPDES Wastewater, Water Supply Watershed Protection Program, etc.

REQUIREMENT 15A NCAC 2H .1040(4)(a): PERMIT ISSUANCE. Stormwater management permits issued for low density projects shall not require permit renewal.

Even though low-density permits issued by DEQ do not require renewal, low density projects may still be subject to inspection to ensure that they continually comply with the approved plans and specifications.

APPENDIX G-9

FISH AND WILDLIFE SERVICE LIST OF THREATENED AND ENDANGERED SPECIES

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Ecological Services Field Office
3916 Sunset Ridge Rd
Raleigh, NC 27607
Phone: (919) 856-4520 Fax: (919) 856-4556

In Reply Refer To: 08/07/2025 20:32:04 UTC
Project Code: 2025-0133044
Project Name: Water Treatment Improvements - Town of River Bend

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). If your project area contains suitable habitat for any of the federally-listed species on this species list, the proposed action has the potential to adversely affect those species. If suitable habitat is present, surveys should be conducted to determine the species' presence or absence within the project area. The use of this species list and/or North Carolina Natural Heritage program data should not be substituted for actual field surveys.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered

species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- Marine Mammals

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Raleigh Ecological Services Field Office
3916 Sunset Ridge Rd
Raleigh, NC 27607
(919) 856-4520

PROJECT SUMMARY

Project Code: 2025-0133044
Project Name: Water Treatment Improvements - Town of River Bend
Project Type: Water Supply Facility - New Constr
Project Description: Construction of a 0.95 MGD WTP, new wells, minor distribution system upgrades, and waste force main.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.08304235,-77.05094896381635,14z

Counties: Craven and Jones counties, North Carolina

ENDANGERED SPECIES ACT SPECIES

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered
West Indian Manatee *Trichechus manatus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. ***This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.*** Species profile: https://ecos.fws.gov/ecp/species/4469	Threatened

BIRDS

NAME	STATUS
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477	Threatened
Red-cockaded Woodpecker *Dryobates borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Threatened
Rufa Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

REPTILES

NAME	STATUS
American Alligator *Alligator mississippiensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/776	Similarity of Appearance (Threatened)
Green Sea Turtle *Chelonia mydas* Population: North Atlantic DPS There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened

AMPHIBIANS

NAME	STATUS
Neuse River Waterdog *Necturus lewisi*	Threatened

NAME	STATUS
There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6772	

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Rough-leaved Loosestrife *Lysimachia asperulaefolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2747	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

MARINE MAMMALS

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

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1. The Endangered Species Act (ESA) of 1973.

2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

NAME

West Indian Manatee *Trichechus manatus*
Species profile: https://ecos.fws.gov/ecp/species/4469

IPAC USER CONTACT INFORMATION

Agency: River Bend town
Name: Kevin Cooper
Address: 107 E. 2nd Street
City: Greenville
State: NC
Zip: 27858
Email kcooper@riversandassociates.com
Phone: 2527524135

LEAD AGENCY CONTACT INFORMATION

Lead Agency: North Carolina Division of Water Infrastructure

APPENDIX G-10

NC MARINE FISHERIES RULE AREAS

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APPENDIX G-11

TOWN OF RIVER BEND GENERAL OFFENSES ORDINANCE (NOISE)

TITLE XIII: GENERAL OFFENSES

Chapter

13.01. GENERAL OFFENSES

CHAPTER 13.01: GENERAL OFFENSES

Section

General Provisions

Curfew

GENERAL PROVISIONS

§ 13.01.001 DISORDERLY CONDUCT.

Any person who shall do or engage in any of the following shall be guilty of disorderly conduct:

(A) Behave in a boisterous or indecent manner or utter obscene language so as to create a disturbance or interfere with the conducting of any public entertainment or meeting;

(B) Be upon the streets or in any public place within the corporate limits of the town in a state of intoxication;

(C) The uttering of loud, boisterous, vulgar or profane language or obscene words or epithets in any public place or any private place open to the public;

(D) Interference with another person's pursuit of a lawful occupation;

(E) Assemble or congregate with another person or persons to cause, provoke or engage in any fight or brawl;

(F) Operation of a motor vehicle, boat or other vehicle so as to create unnecessary and unusually loud disturbing noise such as sounding of the horn, screeching of tires, racing the engine or in any other manner;

(G) Act in a violent or tumultuous manner toward another person, placing that person's life, limb or health in danger;

(H) Act in a violent or tumultuous manner toward another person causing the property of that person to be in danger of being destroyed or damaged; or

(I) Congregate with another person or persons in or on any public way so as to halt the flow of vehicular or pedestrian traffic and refuse to clear the public way when order to do so by a peace officer or other person having authority.
(Prior Code, Ch. 11, § 1) Penalty, see § 1.01.999

§ 13.01.002 DISCHARGE OF FIREARMS AND OTHER WEAPONS.

(A) Within the corporate limits of the town it shall be unlawful for any person to discharge any firearm, pellet or air gun, or activate any other device capable of launching a projectile which is likely to cause injury or damage to persons or property.

(B) This section shall not be applicable to police officers or other law enforcement officials or other persons acting under the direction of law enforcement officials, while discharging their official duties.

(C) This section shall not be applicable to private citizens in justifiable self-defense or their person or property.
(Prior Code, Ch. 11, § 2) Penalty, see § 1.01.999

§ 13.01.003 DAMAGE TO PRIVATE AND TOWN PROPERTY.

It shall be unlawful to damage private or town property.
(Prior Code, Ch. 11, § 3) Penalty, see § 1.01.999

§ 13.01.004 UNNECESSARY NOISE PROHIBITED. *Amended 9/16/2010*

(A) **AUTHORITY.** G.S. § 160A-184 provides: "A city may by ordinance regulate, restrict, or prohibit the production or emission of noises or amplified speech, music or other sounds that tend to annoy, disturb or frighten its citizens."

(B) **DEFINITIONS.** The following words, terms and phrases, when used in this § 13.01.004, shall have the meanings ascribed to them in this Paragraph (B), except where the context clearly indicates a different meaning:

(1) **A-weighted sound level** means the sound pressure level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated dB(A).

(2) **C-weighting sound level** means the electronic filtering in sound level meters that models a flat response (output equals input) over the range of maximum human hearing frequency sensitivity. The level so read is designated dB(C).

(3) **Commercially Provided** means services provided to an owner or occupant of real property by a third party and/or an independent contractor.

(4) **Decibel (dB)** means a unit for describing the amplitude of sound, equal to 20 times the logarithm to the base ten of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micronewtons per square meter.

(5) **Manager** means the Town Manager or his designee.

(6) **Real Property Line** means either (a) the imaginary line, including its vertical extension, that separates one parcel of real property from another, or (b) the vertical and horizontal boundaries of a dwelling unit that is one in a multi-dwelling unit building.

(7) **Sound level** means the weighted sound pressure level obtained by the use of a sound level meter and frequency weighting network, such as A, B, or C as specified in American National Standards Institute Specifications for sound level meters (ANSI s1.4-1971, or the latest approved version thereof). If the frequency weighting employed is not indicated, the A-weighting shall apply.

(8) **Sound level meter** means an instrument which includes a microphone, amplifier, RMS detector, integrator or time average, output meter, and weighing network used to measure sound pressure levels.

(9) **Sound pressure level** means 20 times the logarithm to the base ten of the ratio of the RMS sound pressure to the reference pressure of 20 micronewtons per square meter.

(10) **Standards** means the standard, instrumentation, personnel, measurement procedures and reporting procedures used in the measurement of sound as provided in the section shall be those specified herein:

(C) **LIMITATION ON SOUND LEVELS; MEASUREMENT.** The following maximum levels of sound, and methodology for measuring the same, shall apply:

(1) Sound level measurement shall be made with a sound level meter set on "slow" response.

(2) Measurements shall be taken at or within the real property line of the complainant.

(3) Sound level meters shall be of at least type three meeting American National Standard Institute Incorporated (ANSI) s1.4-1971 requirements. The sound measurement system shall be serviced and calibrated and operated as recommended by the manufacturer.

(4) The Manager shall issue a general order adopting standards and procedures for sound level measurements and shall designate the person responsible for enforcement.

(5) Maximum permitted sound levels shall be as follows:

(A) No person shall operate or cause to be operated any source of sound in such a manner as to create a sound level which, at its peaks, exceeds the limits set forth in subsection (B) and (C) of this section when measured beyond the property line from which the sound originates.

(B) The following are established as maximum sound levels:

(i) Nighttime sound levels, after 9:30 p.m. Sunday through Thursday until 7:00 a.m. the following day, and after 10:30 p.m. Friday and Saturday until 7:00 a.m. the following day, may not exceed 50 dB(A) or 65 dB(C).

(ii)Daytime/evening sound levels, between 7:00 a.m. and 9:30 p.m. Sunday through Thursday and between 7:00 a.m. and 10:30 p.m. Friday and Saturday, may not exceed 65 dB(A) or 75 dB(C).

(C) The following noise limits are established as maximum sound levels for all sources of sound emitting from one multi-family unit into another, such as through common (shared) walls or doors in apartments, condominiums, or duplexes.

(i) Nighttime sound levels, 9:30 p.m. Sunday through Thursday until 7:00 a.m. the following day, and after 10:30 p.m. Friday and Saturday until 7:00 a.m. the following day, may not exceed 40 dB(A) or 55 dB(C).

(ii)Daytime/evening sound levels between 7:00 a.m. and 9:30 p.m. Sunday through Thursday and between 7:00 a.m. and 10:30 p.m. Friday and Saturday, may not exceed 40 dB(A) or 55 dB(C).

(6) Exceptions: The following are excepted from the provisions of Paragraph (C)(5):

(A) Sound coming from scheduled outdoor athletic events, community concerts, theatrical events, practice sessions or performances of bands and community

fairs that are sponsored or sanctioned by the town or permitted by the Manager.

(B) Noise from noisemakers or fireworks as allowed under a permit issued by the Manager.

(C) Noises emitted from emergency vehicles.

(D) Noise resulting from parades, lawful picketing, or other public demonstrations protected by the U.S. Constitution or federal law, or for which a local permit has been issued by the Manager.

(E) Construction operations from 7:00 a.m. to 9:00 p.m. on weekdays and Saturday, and 9:00 a.m. to 9:00 p.m. on Sunday for which building permits have been issued or construction operations not requiring permits due to ownership of the project by an agency of government; providing all equipment is operated in accord with manufacturer's specifications and with all standard equipment manufacturer's mufflers and noise-reducing equipment in use and in properly operating condition. No commercially provided construction operation, the sounds from which are audible at the property line, shall be conducted on Sunday or Holidays.

(F) Lawn mowers, agricultural equipment, and landscape maintenance equipment used between the hours of 7:00 a.m. and 8:00 p.m. on properties of primarily residential use and 6:00 a.m. and 8:00 p.m. on properties of primarily non-residential use when operated with all the manufacturer's standard mufflers and noise-reducing equipment in use and properly operating condition, provided they generate less than 85 dB(A) or 90 dB(C) beyond ten feet of any real property line. No commercially provided lawn or landscape maintenance or construction operation, the sounds from which are audible at the real property line, shall be conducted on Sunday or Holidays.

(G) Emergency work necessary to restore property to a safe condition following a fire, accident or natural disaster, or to restore public utilities, or to protect persons or property from an imminent danger.

(H) Noises resulting from the provision of government services.

(I) Noises resulting from the provision of sanitation services.

(J) Noises related to an activity or event for which a permit has been issued under the provisions of Paragraph (E) below.

(K) Noises from household mechanical equipment such as heat pumps, air conditioning compressors, and similar equipment provided that they are in proper working order with all manufacturer supplied containment in place.

(D) **PROHIBITION OF OTHER UNREASONABLE NOISE.** In addition to those noises prohibited by Paragraph (C), there are certain circumstances where it is not possible or practicable to measure the level of sound. In those circumstances, it shall be unlawful to create, cause or allow the continuance of any unreasonably loud, disturbing, unusual, frightening or unnecessary noise, particularly during nighttime, which annoys, disturbs, injures or endangers the comfort, health, peace or safety of reasonable persons of ordinary sensibilities, or interferes with neighboring residents' reasonable use of their property. Consequently, the following acts are specifically declared to be loud and disturbing noises in violation of this Paragraph (D), but such enumeration shall not be deemed to be exclusive:

(1) The playing of any radio, tape player, boombox, phonograph or other musical instrument or other mechanical sound-making device in such a manner or with such volume as to annoy or disturb the quiet, comfort or repose of any reasonable person of ordinary sensibility.

(2) The sounding of any horn or signal device on any motor vehicle, motorcycle, bus, boat or other vehicle while not in motion, except as a danger signal, or if in motion, only as a warning signal as required by law.

(3) The use of any gong or siren other than upon a police, fire or emergency vehicle.

(4) The use of any motor vehicle, motorcycle, boat or other vehicle so out of repair, so loaded, or in such manner as to create unnecessary grating, grinding, rattling, or other noise.

(5) The use of any drum, loudspeaker or other instrument or device for the purpose of attracting attention, by creation of noise, to any performance, show or sale or display of merchandise, except under a permit issued by the Manager.

(6) The use of any mechanical loudspeakers or amplifiers on trucks or other moving vehicles for any purpose, except under a permit issued by the Manager.

(7) The playing of any radio, tape player, boombox, phonograph or other musical instrument or other mechanical sound making device by a pedestrian on the public streets or sidewalks in such a manner or with such volume as to annoy or disturb the quiet, comfort or repose of any reasonable person of ordinary sensibility.

(8) The firing or discharging of squibs, crackers, gunpowder or other combustible substance in the streets, sidewalks or public property, except under a permit issued by the Manager.

(E) **PERMIT TO EXCEED NOISE LEVELS FOR A PLANNED ACTIVITY OR EVENT.**

(1) A person or group of persons may apply to the Manager for a permit specific to the time and place of a planned activity or event in order to produce or cause to be produced sound that otherwise would violate only the time of day provisions of Paragraph (C) or (D).

(2) Any person or group of persons desiring a permit shall apply as provided herein, and shall provide all information required.

(3) In considering and acting on all requests or permits pursuant to this Section, the Manager shall consider, but shall not be limited to, the following in issuing or denying such permit: The timeliness of the application; the nature of the requested activity or event; the time of the event; the duration of the event; other activities in the vicinity of the location proposed; the frequency of the application; the effect of the activity on the residential areas of the Town; previous experience with the applicant; and previous violations, if any, of the applicant.

(4) In addition, in order to issue a permit, the Manager must determine that granting such a permit would have minimum impact on the surrounding area, or that the event is of a community-wide nature.

(5) Permit holders agree to cooperate with town officials in enforcing this Section by having the signer(s) of the permit available at the site of the event during the entire time for which a permit has been issued and capable of assisting town officials in enforcing the provisions of this Section.

(F) **VIOLATIONS.**

(1) When it is reasonable and practicable to do so, a person believed to be violating any portion of this Section may be given a verbal order to cease or abate the noise immediately, or as soon as reasonable or practical, prior to being charged with a violation.

(2) A person or persons responsible for violations of this section may be charged in accordance with the provisions of § 1.01.999. Further, violation of terms of a permit issued under Paragraph (E) may result in the immediate revocation of said permit and may be charged in accordance with the provisions of § 1.01.999.
(Prior Code, Ch. 11, § 4) Penalty, see § 1.01.999

§ 13.01.005 POSTING OF COUNTY BUILDING PERMITS.

All persons issued a building permit by the county for any construction within the town shall display the permit in a conspicuous place at the front of the construction site during the entire period of the project.
(Prior Code, Ch. 11, § 6) Penalty, see § 1.01.999

APPENDIX G-12

CAMA CORRESPONDENCE AND FEDERAL CONSISTENCY LETTER

JOSH STEIN
Governor
D. REID WILSON
Secretary
TANCRED MILLER
Director

NORTH CAROLINA
Environmental Quality

October 3, 2025

Kevin D. Cooper, P.E.
Rivers & Associates Inc.
107 E 2nd St.
Greenville, NC 27858

SUBJECT: Federal Consistency Concurrence; Town of River Bend Water Treatment Plant, (**CD 2025047**)

North Carolina's coastal zone management program consists of, but is not limited to, the Coastal Area Management Act, the State's Dredge and Fill Law, Chapter 7 of Title 15A of North Carolina's Administrative Code, and the land use plan of the County and/or local municipality in which the proposed project is located. It is the objective of the Division of Coastal Management (DCM) to manage the State's coastal resources to ensure that proposed federal actions would be compatible with safeguarding and perpetuating the biological, social, economic, and aesthetic values of the State's coastal waters.

DCM has reviewed the submitted materials pursuant to the management objectives and enforceable policies of Subchapters 7H and 7M of Chapter 7 in Title 15A of the North Carolina Administrative Code and concurs that the proposed action is consistent with North Carolina's approved coastal management program.

Prior to the initiation of the activities described, the applicant should obtain any other required State approvals or authorizations. Should the proposed action be modified further, a revised consistency determination could be necessary. This might take the form of either a supplemental consistency determination pursuant to 15 CFR 930.46, or a new consistency determination pursuant to 15 CFR 930.36. Likewise, if further project assessments reveal environmental effects not previously considered, a supplemental consistency certification may be required. If you have any questions, please contact Cameron Luck at (252) 515-5419 or via email at Cameron.luck@deq.nc.gov.

Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,

Daniel Govoni
Policy Section Chief
N.C. Division of Coastal Management

From: Mahoney, Richard <Richard.Mahoney@deq.nc.gov>
Sent: Monday, September 8, 2025 10:01 AM
To: Kevin Cooper <kcooper@riversandassociates.com>
Subject: RE: [External] River Bend Water System Improvements

Hi Kevin,

From what I am seeing I would think the CAMA permitting option would be a CAMA Major Permit.

Richard Mahoney
Field Representative
Division of Coastal Management
400 Commerce Avenue Morehead City, 28557
Mobile: 252-240-9497
Richard.Mahoney@deq.nc.gov
www.deq.nc.gov
Find a Field Rep (arcgis.com)

From: Kevin Cooper <kcooper@riversandassociates.com>
Sent: Monday, September 8, 2025 9:04 AM
To: Mahoney, Richard <Richard.Mahoney@deq.nc.gov>
Subject: [External] River Bend Water System Improvements

Good Morning, Mr. Mahoney,

I am reaching out in regard to a project we are working on with the Town of River Bend in Craven County. We are still early in design and are working on the ER/EID for DWI. Due to the scope of this project, we are preparing the EID for a Finding of No Significant Impact. In addition to reaching out to Mr. Govoni and Mr. Luck for a Federal Consistency Review, I also wanted to reach out to you to determine, preliminarily, what type of CAMA permit this project would likely require.

The project consists of a new filter/softener water treatment facility, two (2) new wells, minor distribution system improvements, and a proposed waste force main to carry the treatment byproduct

to the Town's existing WWTP. The streams from both treatment plants are proposed to be combined and discharged to the Trent River under a new joint NPDES permit.

I have attached some preliminary plan sheets and a location map. Stream crossings will be via horizontal directional drilling. We are under the assumption that this work will require a General CAMA permit. Can you advise? Please let me know if you require any additional information.

Thank you,

Kevin D. Cooper, P.E.
Project Engineer I
Office: (252) 752-4135
Mobile: (252) 773-8583
Rivers & Associates Inc

APPENDIX H

MEMORANDUM RESPONSE TO DIVISION OF WATER INFRASTRUCTURE INTERNAL REVIEW COMMENTS

MEMORANDUM

TO: Mr. Shane Beeson, NCDEQ-DWI

CC: David Wainwright, NCDEQ-DWR
Louis Murray, NCDEQ-DWR
Delane Jackson, Town of River Bend
Brandon Mills, Town of River Bend
Greg Churchill, P.E., Rivers and Associates, Inc.

FROM: Kevin Cooper, P.E., Rivers and Associates, Inc. KC

DATE: January 13, 2026

SUBJECT: Engineering Report and Environmental Information Document
Town of River Bend – Water Treatment Plant Improvements
Response to Review Comments
DWI Project No.: SRP-D-134-0033 & SRF-D-2070
Rivers File 2024135-F

The Memorandum has been prepared to address the internal review comments forward to Rivers and Associates, Inc. and the Town of River Bend on January 8, 2026. Below are comments from the Division of Water Resources Central Office staff. River's response is immediately below each respective comment and is in red ink.

1. In Table 3.1.2, pg. 14, the total demand of 0.3927 mgd exceeds the 0.3327 reported in the 2024 LWSP. The difference of 0.0600 mgd is equal to that required by NC code for fire protection. Just to distinguish the difference, in the LWSPs, water that is used for fires, hydrant flushing, and station supply is accounted for in the LWSPs under institutional demand.

   Understood. The additional "Fire Demand" line has been removed from the table as it is included in the LWSP institutional demand.

2. In Table 3.1.4, pg 16, it is stated that the "Design demand for service areas is based on the projected demand for 2050 as estimated per the NC OSBM and 2024 Local Water Supply Plan." However, the 2024 LWSP projects a demand of 0.3403 mgd for 2050 and not the 0.4139 mgd shown in the table.

   The values in this table are a combination of the population projections outlined in the NC OSBM and 2024 Local Water Supply Plan. As part of the River Bend Water Supply Study, Rivers determined that River Bend's population would grow by approximately 3% per decade over the next 20-years. This would result in a population of 3,050 by 2050 as outlined in Table 3.1.3. This is more conservative than the 2,796 population projected in

the LWSP. The long-term water demand of 51 gallons per day per capita from the LWSP was then multiplied by 3,050 for a daily residential demand of ~0.1556. Regardless, the proposed WTP will be designed to have a finished water capacity of approximately 0.95 MGD. This is adequate to meet future, max-day water demands and is the same capacity as the Town's existing treatment works.

This table also includes a "Fire Demand" line. This line has been removed from the table as this flow is incorporated into the institutional demand as discussed previously herein.

3. Regarding the two new production wells, River Bend will need to modify their CCPCUA permit to show where the wells will be located and the proposed depths.

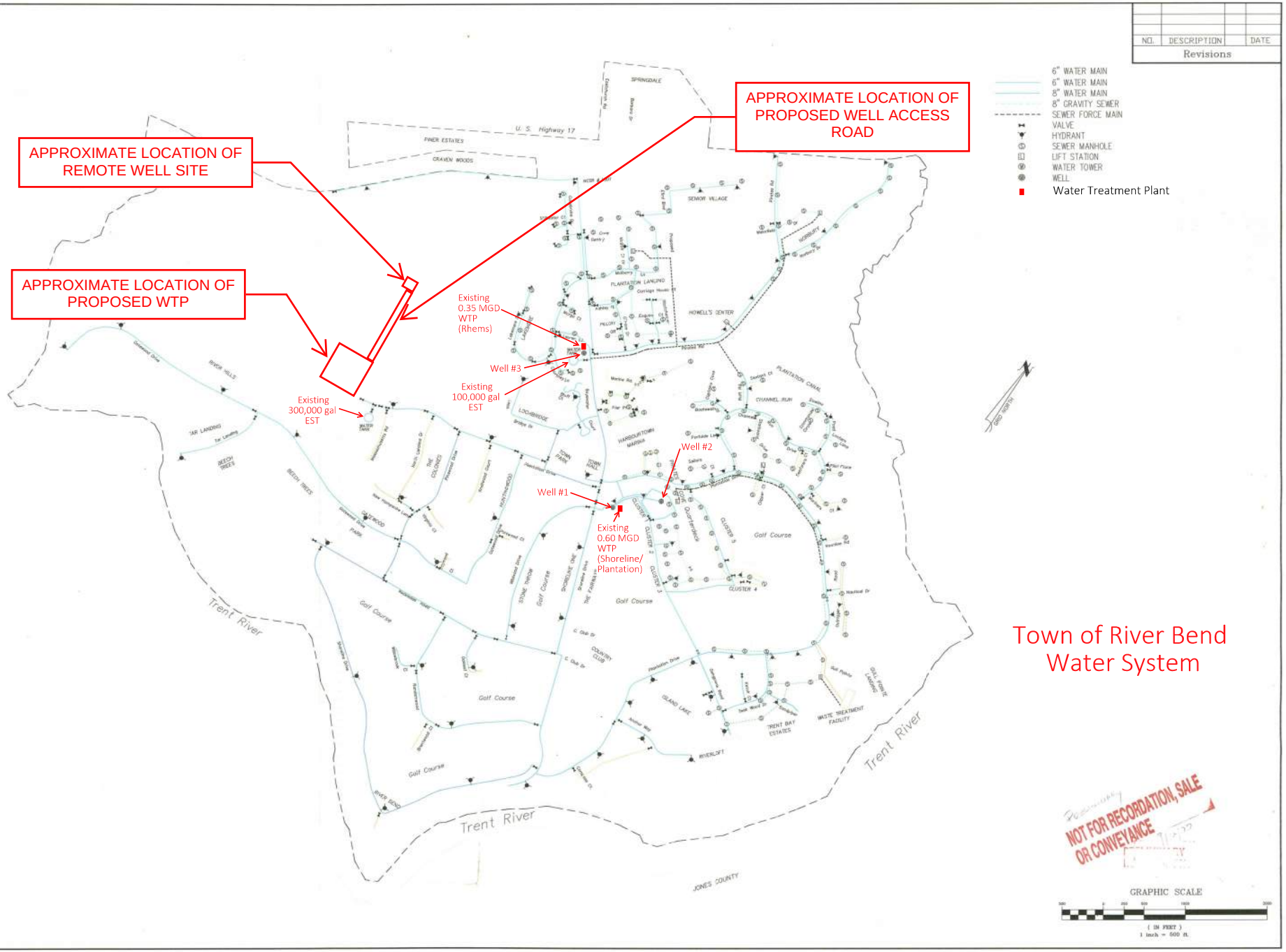
   Understood. Rivers is aware of this requirement and has begun communication with the NCDEQ-DWR Groundwater Resources CCPCUA staff.

The comments outlined above required a direct response and any required revisions to the ER/EID have been incorporated in red ink. This memorandum will also be included as a new appendix to the ER/EID.

Other agencies included in the internal review did not list specific objections to the EID as originally presented. However, they did provide important considerations for both the design, permitting, and construction of the project. Rivers acknowledges the receipt of these additional considerations and will incorporate them into the plans and specifications where appropriate.

FIGURE 1

EXISTING WATER SYSTEM SCHEMATIC



Town of River Bend Water System

NOT FOR RECORDATION, SALE OR CONVEYANCE

NO.	DESCRIPTION	DATE
	Revisions	

PROJECT NO. 05017
SCALE: AS NOTED
DRAWN BY: TDM
CHECKED BY: JKA
DATE:

AVOLIS ENGINEERING, P.A.
Civil and Environmental Engineering
PO BOX 15564, NEW BERN, NC 28561
(252)633-0068, FAX (252)633-6507

AS-BUILT WATER AND SEWER SYSTEM
TOWN OF RIVER BEND
CRAVEN COUNTY, NORTH CAROLINA
OVERALL EXISTING CONDITIONS

C1

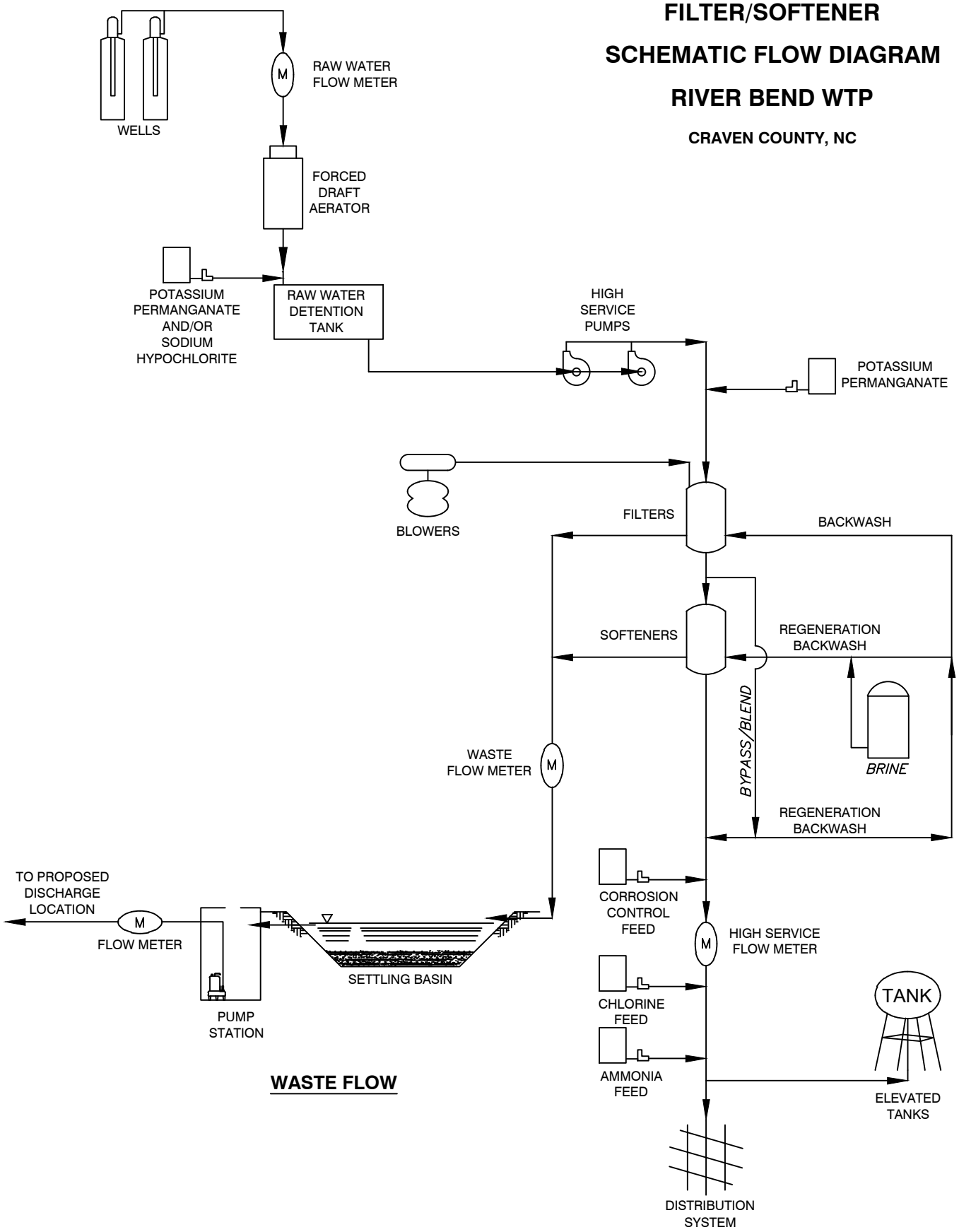
05017C1.DWG

FIGURE 2

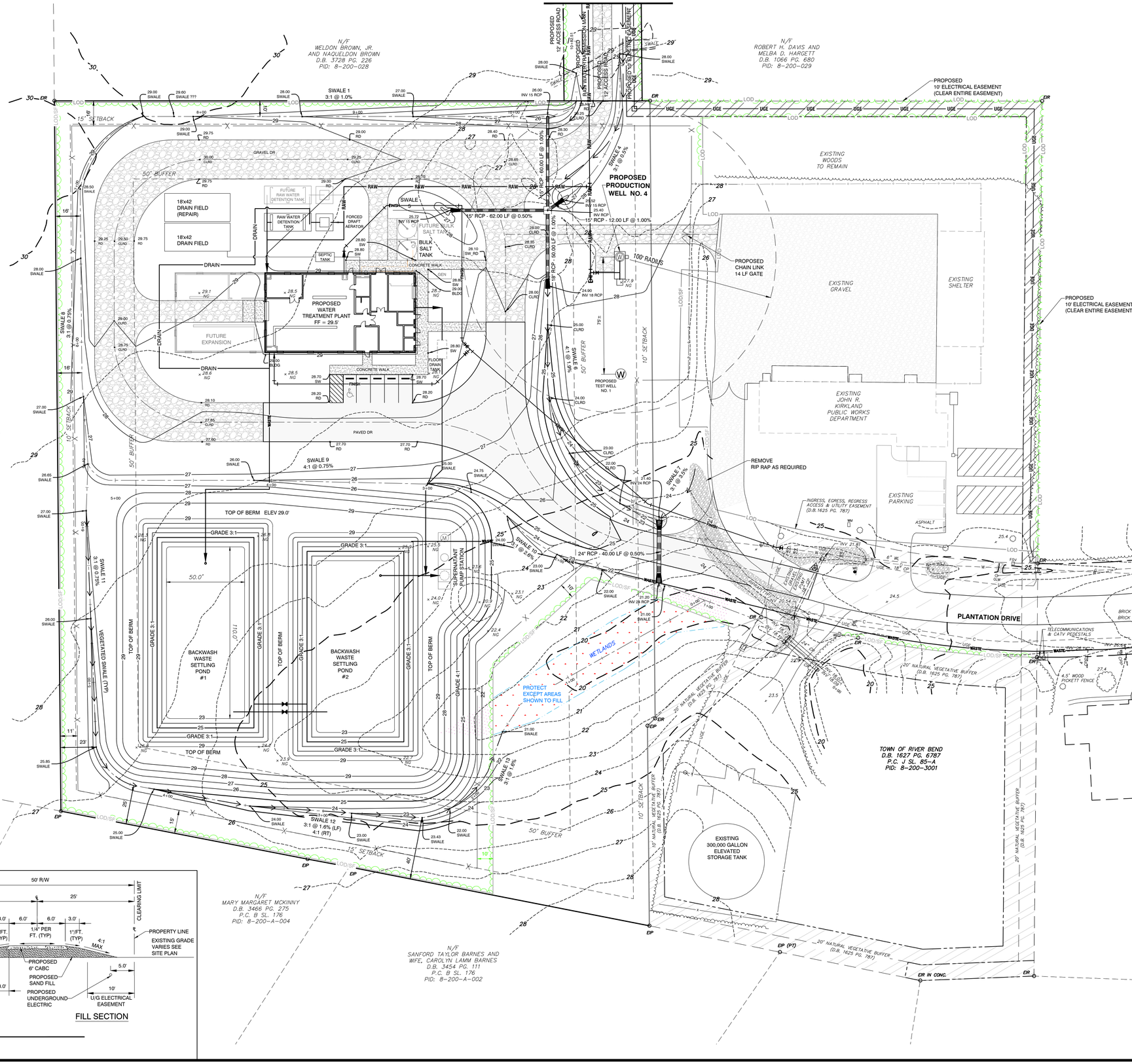
PROPOSED FILTER/SOFTENER WTP TREATMENT PROCESS AND SITE SCHEMATIC

FILTER/SOFTENER
SCHEMATIC FLOW DIAGRAM
RIVER BEND WTP

CRAVEN COUNTY, NC



MATCH SHEET C306



1 C305 **ROAD SECTION**

NOTES:
1. SEE SHEET C102 FOR CONTROL, EASEMENTS AND OTHER SURVEY INFORMATION.
2. APPROXIMATE LOCATION OF BURIED BRIGHT SPEED COMMUNICATION CABLES PER SCHEMATICS. ACTUAL NUMBER OF LINES AND LOCATION MAY VARY AS SOURCE DATA IS INADEQUATE FOR ACCURATE REPRESENTATION. LAY CABLES BACK AND REPLACE AFTER FORCE MAIN INSTALLATION WHERE REQUIRED(TYP).
3. FEMA 500 YEAR FLOOD AND 100 YEAR FLOOD FLOODWAY LINES FROM FRIS GIS DOWNLOAD; REFERENCE FEMA FIRM MAP 3720545800K, PANEL 5458, EFFECTIVE 6/15/22 (BASE FLOOD = 9 FEET±).

N

30' 0 15' 30'

SCALE 1 inch = 30 ft

Rivers & ASSOCIATES, INC. Since 1918
rivers and associates.com
Engineers
Planners
Surveyors
Landscape Architects
107 East Second Street
Greenville, NC 27858
(252) 752-4135
NC License: F-0334

TOWN OF RIVER BEND 1981 NORTH CAROLINA

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049121 GREGORY J. CHURCHILL

PRELIMINARY FOR REVIEW ONLY

PRELIMINARY
Do Not Use for Construction

REVISIONS:

NO.	DESCRIPTION	DATE	BY

WATER SYSTEM IMPROVEMENTS
TOWN OF RIVER BEND
NORTH CAROLINA
CRAVEN COUNTY

SITE GRADING AND PIPING

AUGUST 22, 2025	
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2024135
DRAWING No.	W-4229
SCALE:	AS NOTED
SHEET No.	C300

M:\MUNI\RIVER_BEND\WTP_IMPVTS-2024135\CADD\SHEETS\W4229_C-BASE.DWG - SITECOMBO - 8/28/2025 12:04:47 PM - IRVIN MJELI

1 **FOUNDATION PLAN**

SCALE: 1/4" = 1'-0"

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NC License: F-0334
107 East Second Street
Greenville, NC 27858
(252) 752-4135

PRELIMINARY
FOR REVIEW ONLY

PRELIMINARY
Do Not Use for Construction

REVISIONS:

NO.	DESCRIPTION	DATE	BY

WATER SYSTEM IMPROVEMENTS
TOWN OF RIVER BEND
CRAVEN COUNTY
NORTH CAROLINA

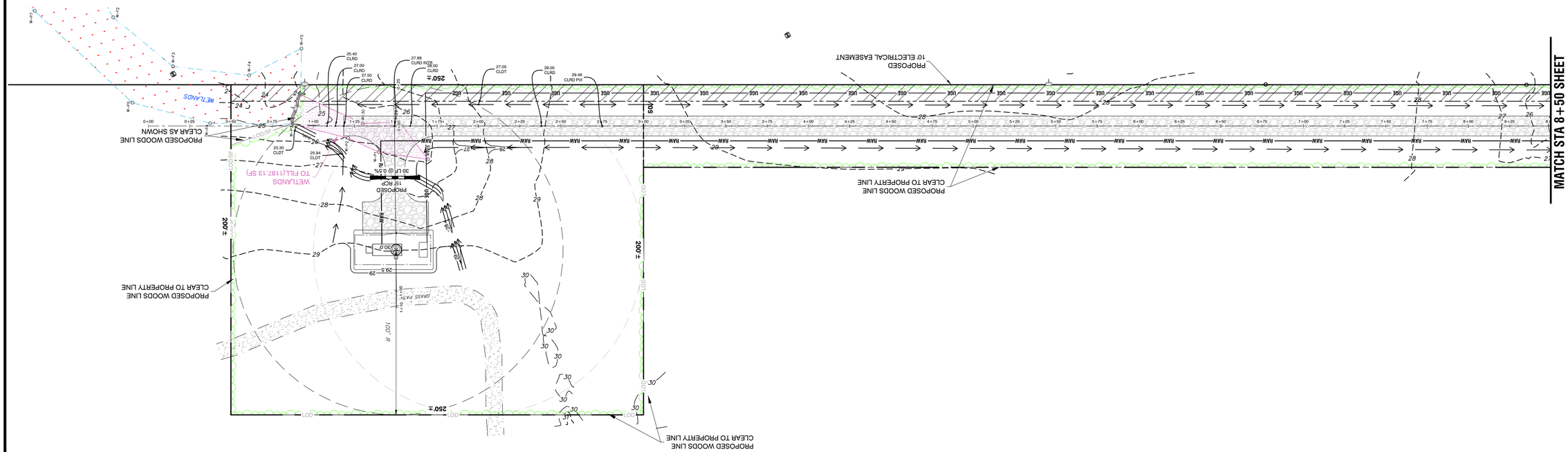
BUILDING FOUNDATION PLAN

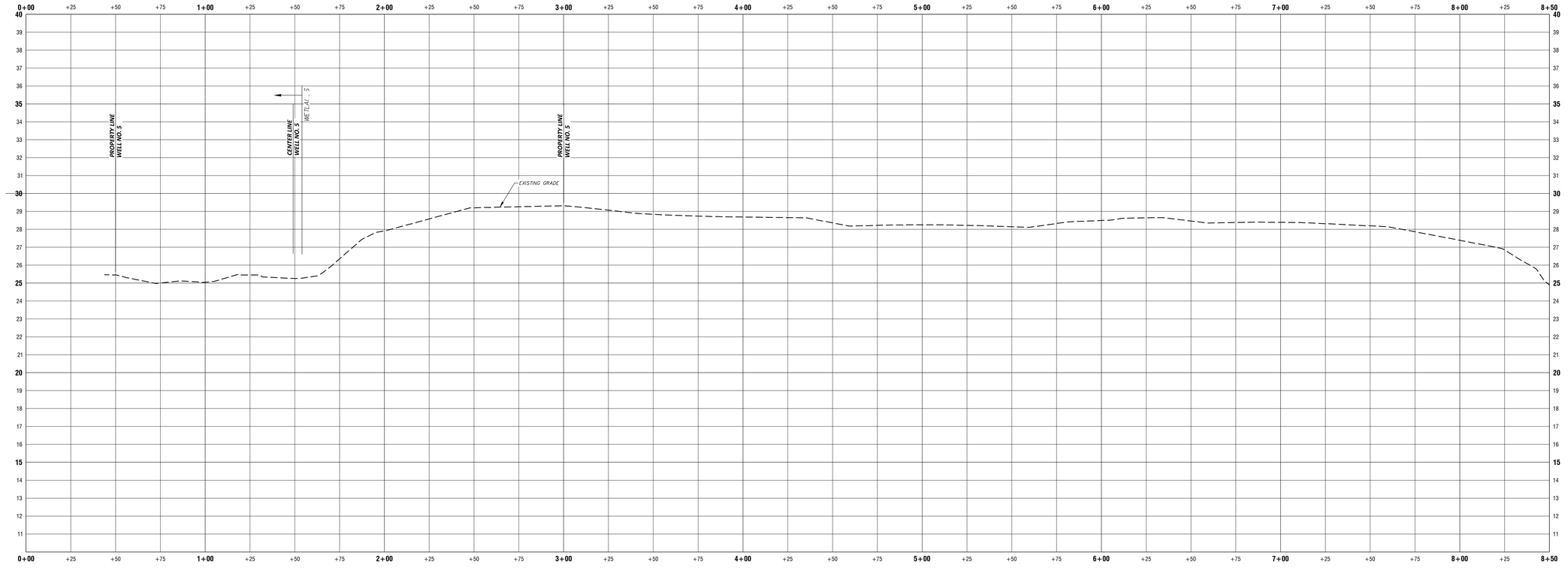
AUGUST 22, 2025	
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2024135
DRAWING No.	W-4229
SCALE:	AS NOTED
SHEET No.	

C901

NOTES:
1. SEE SHEET C102 FOR CONTROL, EASEMENTS AND OTHER SURVEY INFORMATION.
2. FEMA 500 YEAR FLOOD AND 100 YEAR FLOOD FLOODWAY LINES FROM FRIS GIS DOWNLOAD; REFERENCE FEMA FIRM MAP 3720545800K, PANEL 5458, EFFECTIVE 6/15/22 (BASE FLOOD = 9 FEET±).

SCALE 1 inch = 100 ft





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107 East Second Street
Greenville, NC 27858
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PRELIMINARY
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REVISIONS:

NO.	DESCRIPTION	DATE	BY

WATER SYSTEM IMPROVEMENTS
TOWN OF RIVER BEND
CRAVEN COUNTY, NORTH CAROLINA

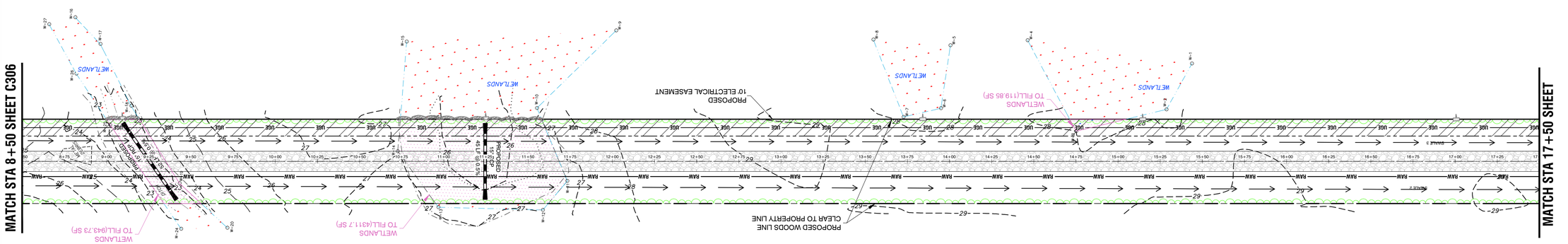
WELL SITE NO 5 AND ACCESS
PLAN - PROFILE

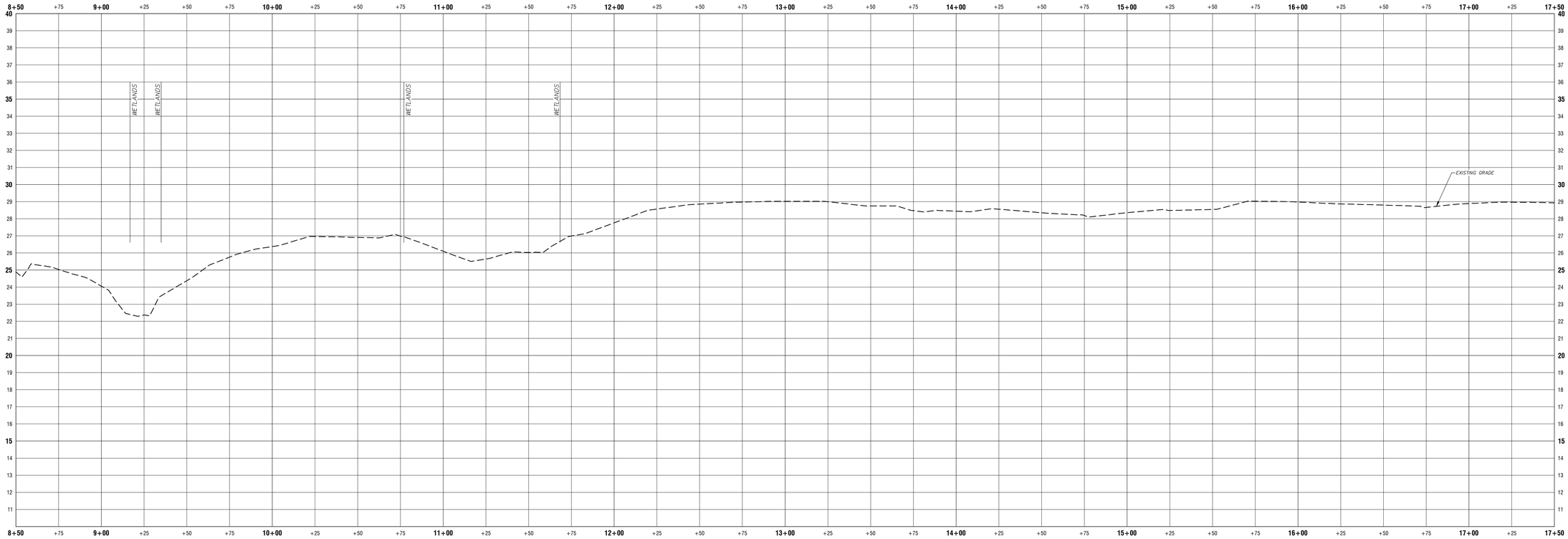
AUGUST 22, 2025	
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2024135
DRAWING No.	W-4229
SCALE:	AS NOTED
SHEET No.	C306

M:\MUNI\RIVER_BEND_WTP_IMPVTS-2024135\CADD\SHEETS\W4229-C-BASE.DWG - WELL5 - 8/28/2025 7:36:33 PM - IRVIN.MIZELL

NOTES:
1. SEE SHEET C102 FOR CONTROL, EASEMENTS AND OTHER SURVEY INFORMATION.
2. FEMA 500 YEAR FLOOD AND 100 YEAR FLOOD FLOODWAY LINES FROM FRIS GIS DOWNLOAD; REFERENCE FEMA FIRM MAP 3720545800K, PANEL 5458, EFFECTIVE 6/15/22 (BASE FLOOD = 9 FEET±).

SCALE 1 inch = 100 ft





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PRELIMINARY FOR REVIEW ONLY

PRELIMINARY
Do Not Use for Construction

REVISIONS:

NO.	DESCRIPTION	DATE	BY

WATER SYSTEM IMPROVEMENTS
TOWN OF RIVER BEND
CRAVEN COUNTY NORTH CAROLINA

WELL SITE NO 5 ACCESS
PLAN - PROFILE

AUGUST 22, 2025	
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2024135
DRAWING No.	W-4229
SCALE:	AS NOTED
SHEET No.	C307

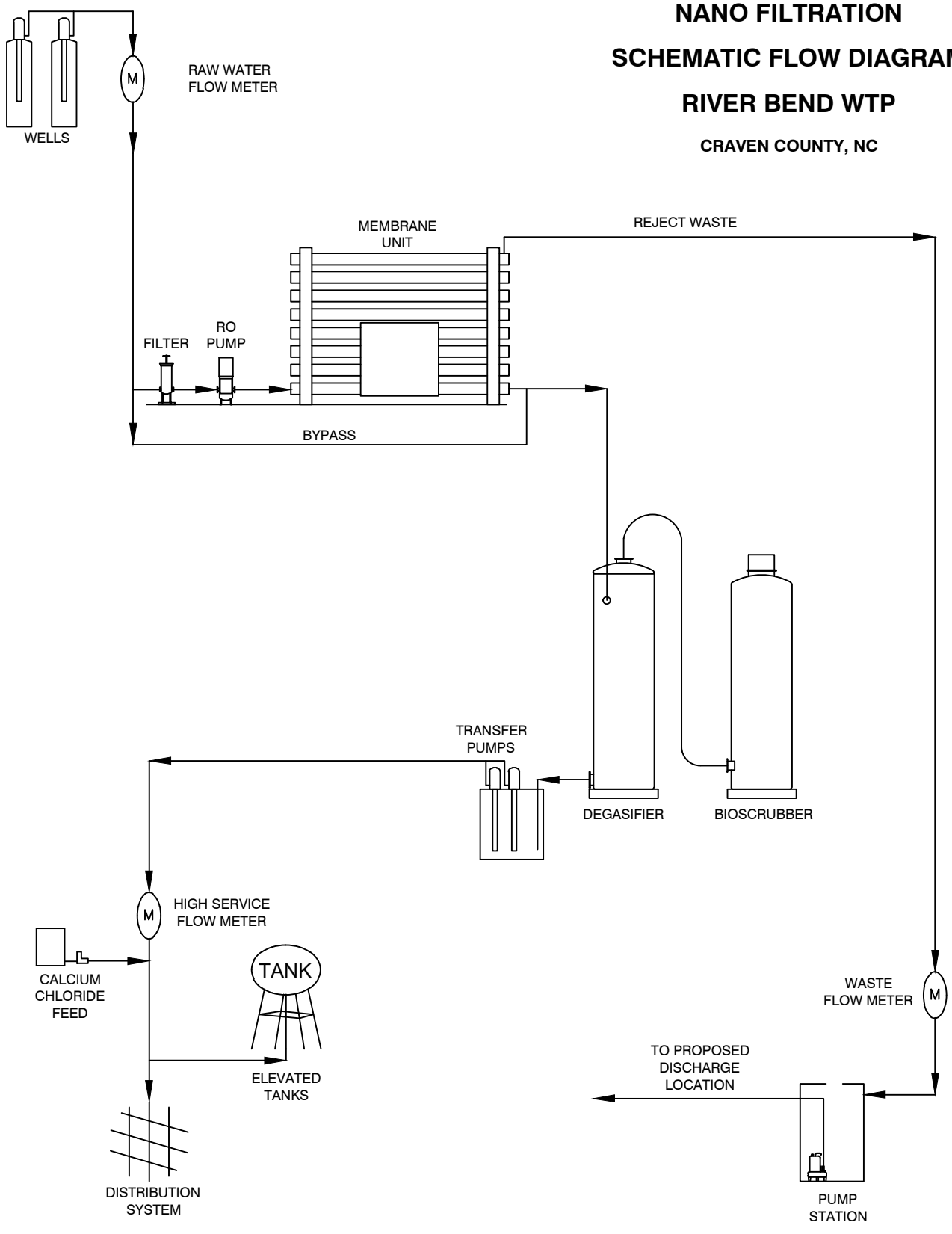
M:\MUNI\RIVER_BEND\WTP_IMPVTS-2024135\CADD\SHEETS\W4229-C-BASE.DWG - WELL5-ACCESS - 8/28/2025 7:36:38 PM - IRVIN.WIZELI

FIGURE 3

NANOFILTRATION WTP TREATMENT PROCESS AND SITE SCHEMATIC

NANO FILTRATION
SCHEMATIC FLOW DIAGRAM
RIVER BEND WTP

CRAVEN COUNTY, NC



WATER FLOW

WASTE FLOW

N/F
WELDON BROWN JR.
HAQUELDON BROWN
D.B. 3728 PG. 0469

N/F
ROBERT H. DAVIS
KIMBERLY HARGETT DOW
D.B. 1066 PG. 0680

15' SETBACK

50' BUFFER

VEGETATED SWALE (TYP)

10' SETBACK

POTENTIAL WELL SITE

HIGH SERVICE PUMPS

ODOR CONTROL

GEN

FLOOR DRAIN TANK

DOMESTIC GRINDER PUMP STATION

TO DISCHARGE LOCATION

RAW

CONCENTRATE TO DISCHARGE LOCATION

WASTE

FINISH

NITRIFICATION FIELD

NITRIFICATION FIELD REPAIR AREA

N/F
RONNIE WALKER BROWN
D.B. 1038 PG. 0226

N/F
TOWN OF RIVER BEND
D.B. 3801 PG. 0554

100' RADIUS

N/F
TOWN OF RIVER BEND
D.B. 3727 PG. 0899

GRAVEL PARKING

EQUIPMENT SHED

EXISTING
JOHN R. KIRKLAND
PUBLIC WORKS
DEPARTMENT

CLR

R/W

PLANTATION DR

MASSACHUSETTS RD

POTENTIAL WETLANDS (TYP)

EXISTING
300,000 GALLON
ELEVATED TANK

N/F
DANIEL E. DEARDORFF,
PATRICIA A. DEARDORFF
D.B. 3360 PG. 0609

N/F
MARY MARGARET MCKINNEY
D.B. 3466 PG. 0275

N/F
SANFORD TAYLOR BARNES,
CAROLYN BARNES
D.B. 3466 PG. 0275

N/F
TOWN OF RIVER BEND
D.B. 1625 PG. 0787

N/F
THOMAS ALAN BOSTIC,
CANDICE BOSTIC
D.B. 3214 PG. 0266

N

30' 0 15' 30'

SCALE 1 inch = 30 ft

Rivers & ASSOCIATES, INC.
Since 1918
rivers and associates.com
Engineers
Planners
Surveyors
Landscape Architects
107 East Second Street
Greenville, NC 27858
(252) 752-4135
NC License: F-0334

TOWN OF RIVER BEND
NORTH CAROLINA
1981

NORTH CAROLINA
PROFESSIONAL
ENGINEER
GREGORY J. CHURCHILL

PRELIMINARY
FOR REVIEW ONLY

REVISIONS:

NO.	DESCRIPTION	DATE	BY

LAND ACQUISITION SITE EVALUATION REPORT
TOWN OF RIVER BEND
TOWN OF RIVER BEND CRAVEN COUNTY NORTH CAROLINA

CONCEPTUAL NF SITE PLAN

DATE:	AUGUST 29,, 2024
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2023141
DRAWING No.	W-4153
SCALE:	AS NOTED
SHEET No.	P03

P:\MUNI\RIVER_BEND-WTR_SUPPLY_STDY-2023141\CADD_DWG-PRELIMINARY\P03 CONCEPTUAL SITE PLAN NF.DWG - P03 CONCEPTUAL NF SITE PLAN - 9/9/2024 4:20:05 PM - IRVIN MIZELI

Do Not Use for Construction - PRELIMINARY

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riversandassociates.com
Since 1918
NC License: F-0834
Engineers
Planners
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Landscape Architects
107 East Second Street
Greenville, NC 27858
(252) 752-4135

TOWN OF RIVER BEND 1981 NORTH CAROLINA

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER GREGORY J. CHURCHILL

PRELIMINARY FOR REVIEW ONLY

REVISIONS:

NO.	DESCRIPTION	DATE	BY

LAND ACQUISITION SITE EVALUATION REPORT

TOWN OF RIVER BEND

TOWN OF RIVER BEND CRAVEN COUNTY NORTH CAROLINA

CONCEPTUAL NF WTP BUILDING

DATE:	AUGUST 29,, 2024
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2023141
DRAWING No.	W-4153
SCALE:	1/4"=1'-0"

SHEET No.

P04

FIGURE 4

VICINITY MAP

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map OnDemand Topo

7.5-MINUTE TOPO QUADRANGLE
NORTH CAROLINA - CUSTOM EXTENT
7.5-MINUTE TOPO

HWY 17 BUSINESS

PROPOSED WTP SITE

GENERAL PROJECT AREA

TRENT RIVER

NEW BERN

River Bend

Rhems

Tenmile Fork

Trent Woods

Cypress Lake

Canaan Air Base

Rocky Run

Hayward Cr

Wilson Cr

Muddy Creek

Island Creek

Scott Creek

Trent River

Brice Creek

Pocosin

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: UNIVERSAL TRANSVERSE MERCATOR, ZONE 18S

Data is provided by The National Map (TNM), is the best available at the time of map generation, and includes data content from supporting themes of Elevation, Hydrography, Geographic Names, Boundaries, Transportation, Structures, Land Cover, and Orthoimagery. Refer to associated Federal Geographic Data Committee (FGDC) Metadata for additional source data information.

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands. Temporal changes may have occurred since these data were collected and some data may no longer represent actual surface conditions.

Learn About The National Map: https://nationalmap.gov

UTM GRID AND 2024 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
TD UD
Grid Zone Designation 18S

SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
CONTOUR SMOOTHNESS = Medium

QUADRANGLE LOCATION

Jasper | Askin
Pollocksville | New Bern

ADJOINING QUADRANGLES

ROAD CLASSIFICATION

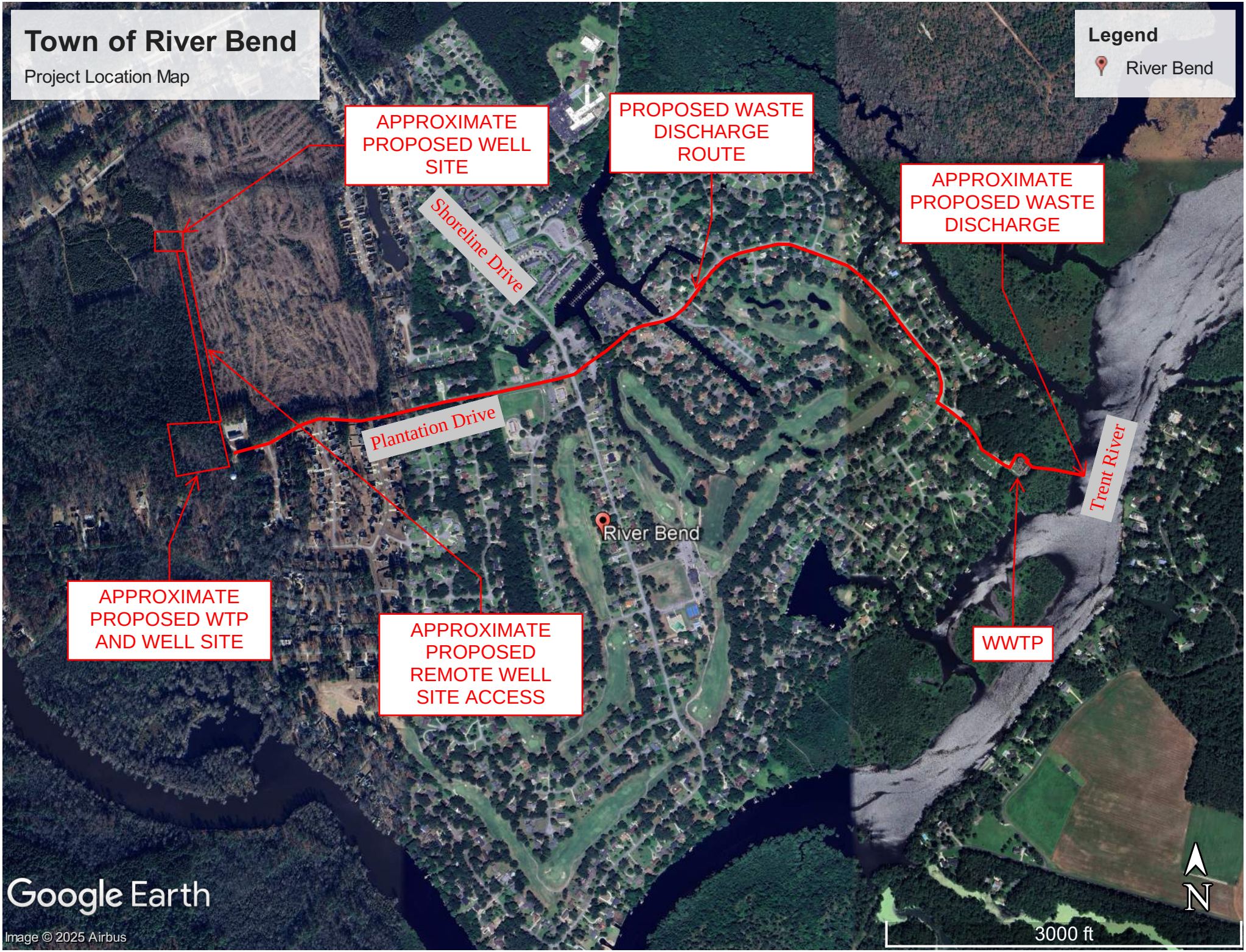
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route
FS Primary Route
FS Passenger Route
FS High Clearance Route

Check with local Forest Service unit for current travel conditions and restrictions.

7.5-MINUTE TOPO, NC
2025

FIGURE 5

LOCATION MAP


Town of River Bend
Project Location Map
Legend
River Bend
APPROXIMATE PROPOSED WELL SITE
PROPOSED WASTE DISCHARGE ROUTE
APPROXIMATE PROPOSED WASTE DISCHARGE
Shoreline Drive
Plantation Drive
Trent River
River Bend
APPROXIMATE PROPOSED WTP AND WELL SITE
APPROXIMATE PROPOSED REMOTE WELL SITE ACCESS
WWTP
Google Earth
Image © 2025 Airbus
N
3000 ft

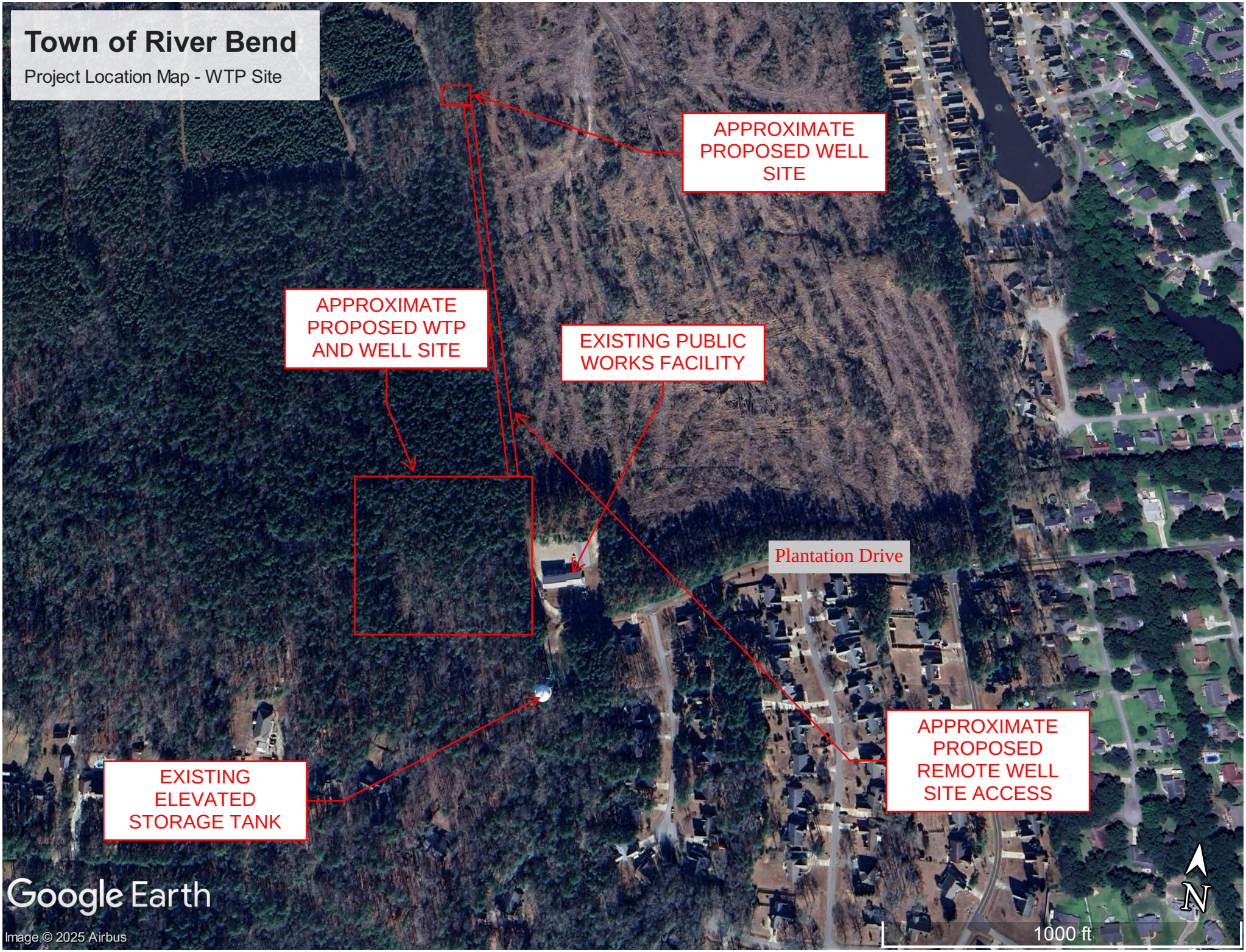

Town of River Bend
Project Location Map - WTP Site
APPROXIMATE PROPOSED WELL SITE
APPROXIMATE PROPOSED WTP AND WELL SITE
EXISTING PUBLIC WORKS FACILITY
Plantation Drive
APPROXIMATE PROPOSED REMOTE WELL SITE ACCESS
EXISTING ELEVATED STORAGE TANK
Google Earth
Image © 2025 Airbus
N
1000 ft

FIGURE 6

ENVIRONMENTAL RESOURCES

FIGURE 6a – FEMA FLOOD ZONE MAP 3720545800K

FIGURE 6b – PROPOSED WTP SITE SOIL MAP

FIGURE 6c – TOWN OF RIVER BEND ZONING MAP (NOVEMBER 2023)

FIGURE 6d – PROPOSED WETLAND IMPACTS

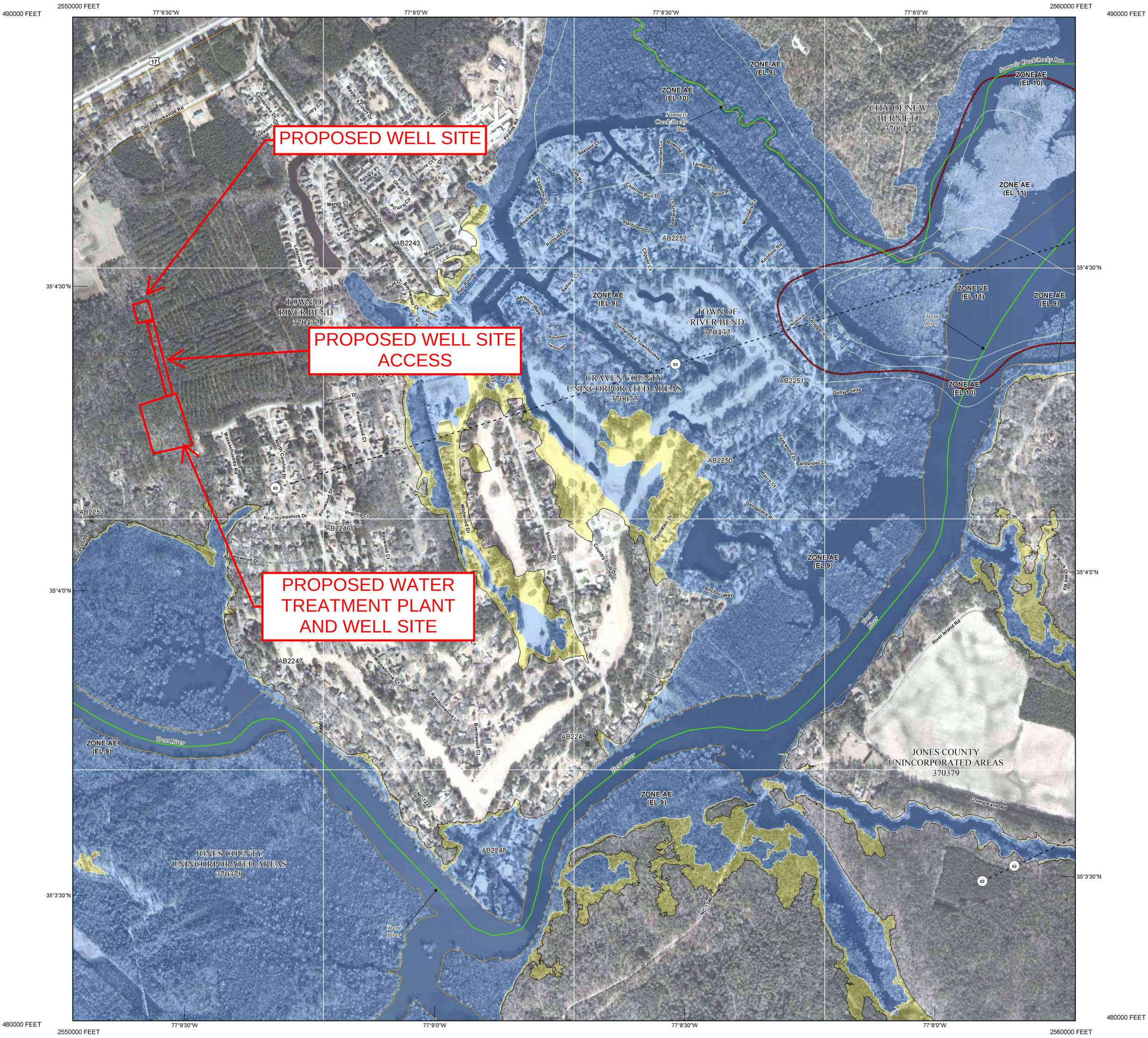
FIGURE 6e – PROPOSED STREAM IMPACTS

FIGURE 6f – PUBLIC LANDS MAP

FIGURE 6g – HISTORIC FEATURES MAP

FIGURE 6a

FEMA FLOOD ZONE MAP
3720545800K



This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach to floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map flood hazard areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTP://FRIS.NC.GOV/FRIS

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with Average Depth Less Than One Foot or With Drainage Areas of Less Than One Square Mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*

OTHER AREAS
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain *Zone X*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- BM5510 North Carolina Geodetic Survey bench mark
- BM5510 National Geodetic Survey bench mark
- BM5510 Contractor Est. NCFMP Survey bench mark
- 012 18.2 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline

OTHER FEATURES
- Hydrographic Feature
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the North Carolina Floodplain Mapping Program website at http://www.ncfloodmaps.com, or contact the FEMA Map Service Center.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the North Carolina Floodplain Mapping Program (NCFMP). The source of this information can be determined from the metadata available in the digital FLOOD database and in the Technical Support Data Notebook (TSDN).

ACCREDITED LEVEE NOTES TO USERS: If an accredited levee note appears on this panel check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at http://www.fema.gov/business/nfip/index.shtm.

PROVISIONALLY ACCREDITED LEVEE NOTES TO USERS: If a Provisionally Accredited Levee (PAL) note appears on this panel, check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection. To maintain accreditation, the levee owner or community is required to submit the data and documentation necessary to comply with Section 65.10 of the NFIP regulations. If the community or owner does not provide the necessary data and documentation or if the data and documentation provided indicates the levee system does not comply with Section 65.10 requirements, FEMA will revise the flood hazard and risk information for this area to reflect de-accreditation of the levee system. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at http://www.fema.gov/business/nfip/index.shtm.

LIMIT OF MODERATE WAVE ACTION NOTES TO USERS: For some coastal flooding zones the AE Zone category has been divided by a Limit of Moderate Wave Action (LiMWA). The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE Zone and the LiMWA (or between the shoreline and the LiMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

Limit of Moderate Wave Action (LiMWA)

COASTAL BARRIER RESOURCES SYSTEM (CBRS) NOTE

This map may include approximate boundaries of the CBRS for informational purposes only. Flood insurance is not available within CBRS areas for structures that are newly built or substantially improved on or after the date(s) indicated on the map. For more information see http://www.fws.gov/cbra, the FIS Report, or call the U.S. Fish and Wildlife Service Customer Service Center at 1-800-344-WILD.

CBRS Area

Otherwise Protected Area

SCALE

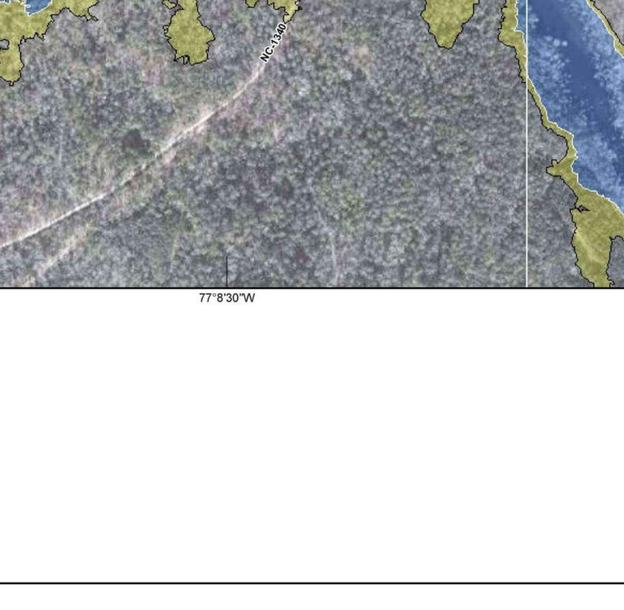
Map Projection:
North Carolina State Plane Projection Feet (Zone 3200)
Datum: NAD 1983 (Horizontal), NAVD 1988 (Vertical)

1 inch = 500 feet 1:6,000

0 250 500 1,000 Feet

0 75 150 300 Meters

PANEL LOCATOR



FEMA National Flood Insurance Program

NORTH CAROLINA FLOODPLAIN MAPPING PROGRAM
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

NORTH CAROLINA

PANEL 5458

FEMA

Panel Contains:

COMMUNITY	CID	PANEL	SUFFIX
CRAVEN COUNTY	370072	5458	K
JONES COUNTY	370379	5458	K
NEW BERN, CITY OF	370074	5458	K
RIVER BEND, TOWN OF	370432	5458	K

VERSION NUMBER
2.3.3.2

MAP NUMBER
3720545800K

MAP REVISED
June 15, 2022

FIGURE 6b

PROPOSED WTP SITE SOIL MAP

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,210 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Craven County, North Carolina
Survey Area Data: Version 27, Sep 13, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 9, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GoA	Goldsboro loamy fine sand, 0 to 2 percent slopes	3.9	86.5%
On	Onslow loamy sand	0.6	13.5%
Totals for Area of Interest		**4.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

FIGURE 6c

TOWN OF RIVER BEND ZONING MAP (NOVEMBER 2023)

Official Zoning Map
Town of River Bend
North Carolina

0 0.13 0.25 0.5 Miles

N

APPROXIMATE PROPOSED WELL SITE

APPROXIMATE PROPOSED WELL SITE ACCESS

PROPOSED WTP AND WELL SITE

Trent River

Jones County

Legend

- Town Limits
- ETJ Limit
- Roads

Zoning Districts

- AG (Agricultural)
- BD (Business)
- ID (Institutional)
- PDR-MF (Planned Development Residential - Multi-Family)
- PDR-SF (Planned Development Residential - Single-Family)
- R15 (Residential 15,000 Sq Ft)
- R20 (Residential 20,000 Sq Ft)
- R20A (Residential - Agricultural 20,000 Sq Ft)
- WP (Wildlife Preserve)
- Conditional Zoning (Available for Consideration by Request)

Overlay District

- Manufactured Homes

Map produced by:

Eastern Carolina Council

Adopted November 16, 2023

John Kirkland, Mayor

This is to certify that this is the Official Zoning Map referenced in §15.02.002 et seq. of the Zoning Chapter of the Town of River Bend, North Carolina.

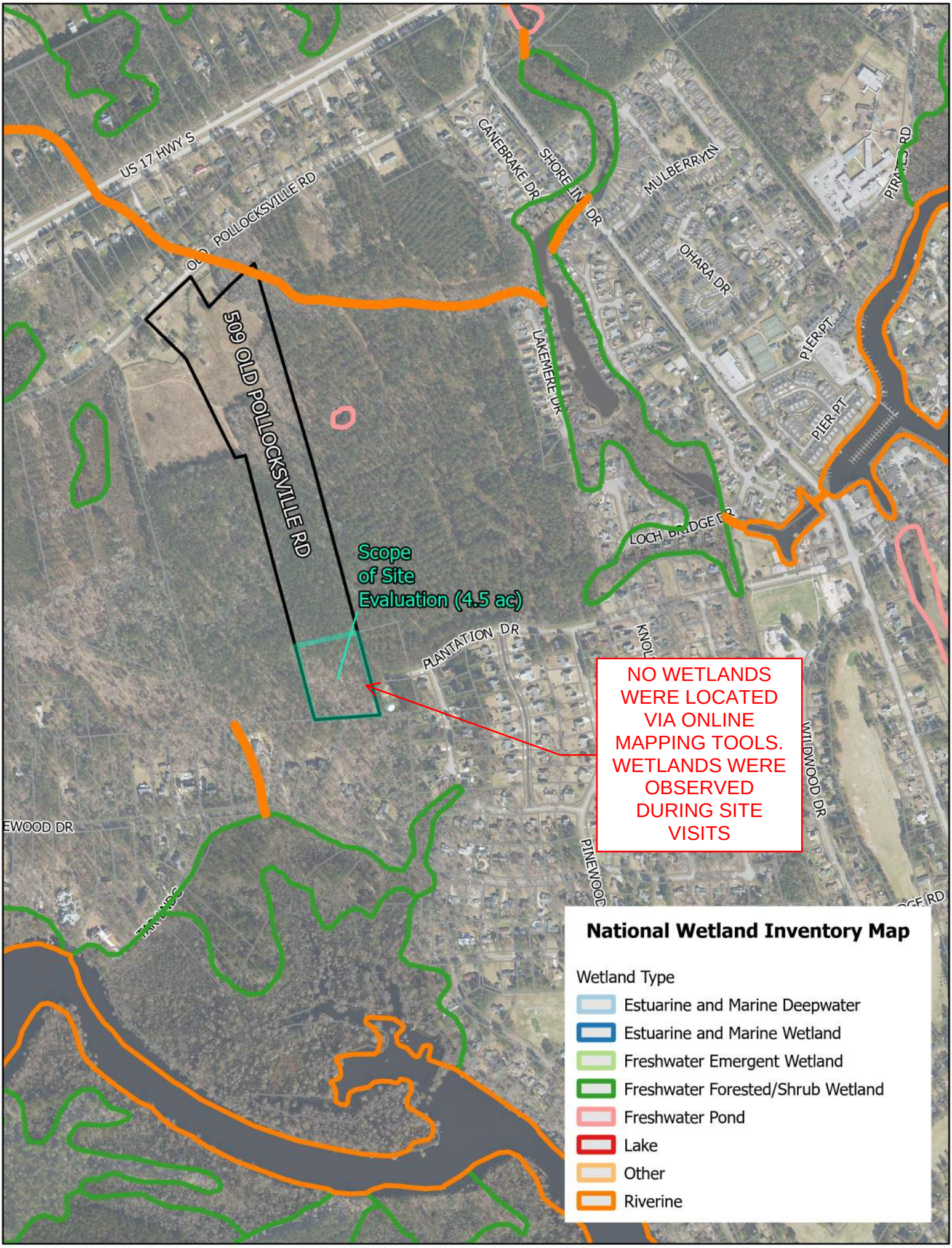
ATTEST:

Kristie Nobles, Town Clerk

TOWN OF RIVER BEND, NC INCORPORATED SEAL 1981

FIGURE 6d

PROPOSED WETLAND IMPACTS


US 17 HWY S
POLLOCKSVILLE RD
CANEBRAKE DR
SHORE IN DR
MULBERRYLN
OHARA DR
PIER PT
LAKEMERE DR
LOCH BRIDGE DR
509 OLD POLLOCKSVILLE RD
Scope of Site Evaluation (4.5 ac)
PLANTATION DR
NO WETLANDS WERE LOCATED VIA ONLINE MAPPING TOOLS. WETLANDS WERE OBSERVED DURING SITE VISITS
WILDWOOD DR
PINEWOOD
EWOOD DR
National Wetland Inventory Map
Wetland Type
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine

MATCH SHEET C306

N/F
WELDON BROWN, JR.
AND NAQUELDON BROWN
D.B. 3728 PG. 226
PID: 8-200-028

N/F
ROBERT H. DAVIS AND
MELBA D. HARGETT
D.B. 1066 PG. 680
PID: 8-200-029

N/F
RONNIE WALKER BROWN
D.B. 1038 PG. 226
PID: 8-200-027

N/F
MARY MARGARET MCKINNY
D.B. 3466 PG. 275
P.C. B SL. 176
PID: 8-200-A-004

N/F
SANFORD TAYLOR BARNES AND
WIFE, CAROLYN LAMM BARNES
D.B. 3454 PG. 111
P.C. B SL. 176
PID: 8-200-A-002

TOWN OF RIVER BEND
D.B. 1627 PG. 6787
P.C. J SL. 85-A
PID: 8-200-3001

PROPOSED PRODUCTION WELL NO. 4

PROPOSED TEST WELL NO. 1

PROPOSED WATER TREATMENT PLANT FF = 29.5'

18'x42' DRAIN FIELD (REPAIR)

18'x42' DRAIN FIELD

FUTURE EXPANSION

FUTURE RAW WATER DETENTION TANK

RAW WATER DETENTION TANK

FORCED DRAFT AERATOR

SEPTIC TANK

FUTURE BULK SALT TANK

BULK SALT TANK

BACKWASH WASTE SETTLING POND #1

BACKWASH WASTE SETTLING POND #2

SUPERNATANT PUMP STATION

EXISTING 300,000 GALLON ELEVATED STORAGE TANK

EXISTING WOODS TO REMAIN

EXISTING GRAVEL

EXISTING SHELTER

EXISTING JOHN R. KIRKLAND PUBLIC WORKS DEPARTMENT

EXISTING PARKING

PROPOSED 10' ELECTRICAL EASEMENT (CLEAR ENTIRE EASEMENT)

PROPOSED CHAIN LINK 14 LF GATE

PROPOSED 10' ELECTRICAL EASEMENT (CLEAR ENTIRE EASEMENT)

REMOVE RIP RAP AS REQUIRED

PROPOSED 12' ACCESS ROAD

PROPOSED 10' ACCESS ROAD

PROPOSED 10' ELECTRIC EASEMENT

INGRESS, EGRESS, REGRESS ACCESS & UTILITY EASEMENT (D.B.1625 PG. 787)

PLANTATION DRIVE

MASSACHUSETTS ROAD

18" BELOW WATER AND GAS MAINS (TYP)

TELECOMMUNICATIONS & CATV PEDESTALS

BRICK PAVERS
BRICK PLANTER

BRIGHT SPEED SEE NOTE 2

4.5' WOOD PICKETT FENCE

4" CPE

20' NATURAL VEGETATIVE BUFFER (D.B. 1625 PG. 787)

50' BUFFER

10' SETBACK

15' SETBACK

10' NATURAL VEGETATIVE BUFFER (D.B. 1625 PG. 787)

WETLANDS

PROTECT EXCEPT AREAS SHOWN TO FILL

559.614 sf

W-2
PROPOSED
WETLAND
IMPACT

387.77 sf

W-1
PROPOSED
WETLAND
IMPACT

SWALE 1
3:1 @ 1.0%

SWALE 2
3:1 @ 0.75%

SWALE 3
3:1 @ 0.75%

SWALE 4
3:1 @ 1.5%

SWALE 5
3:1 @ 3.5%

SWALE 6
3:1 @ 0.75%

SWALE 7
3:1 @ 0.75%

SWALE 8
3:1 @ 0.75%

SWALE 9
4:1 @ 0.75%

SWALE 10
3:1 @ 2.6%

SWALE 11
3:1 @ 0.75%

SWALE 12
3:1 @ 1.6% (LF)
4:1 (RT)

15" RCP - 62.00 LF @ 0.50%

15" RCP - 12.00 LF @ 1.00%

18" RCP - 50.00 LF @ 1.00%

24" RCP - 40.00 LF @ 0.50%

24" RCP - 90.00 LF @ 100%

TOP OF BERM ELEV 29.0'

GRADE 3:1

50.0'

110'

100' RADIUS

NOTES:
1. SEE SHEET C102 FOR CONTROL, EASEMENTS AND OTHER SURVEY INFORMATION.
2. APPROXIMATE LOCATION OF BURIED BRIGHT SPEED COMMUNICATION CABLES PER SCHEMATICS. ACTUAL NUMBER OF LINES AND LOCATION MAY VARY AS SOURCE DATA IS INADEQUATE FOR ACCURATE REPRESENTATION. LAY CABLES BACK AND REPLACE AFTER FORCE MAIN INSTALLATION WHERE REQUIRED(TYP).
3. FEMA 500 YEAR FLOOD AND 100 YEAR FLOOD FLOODWAY LINES FROM FRIS GIS DOWNLOAD; REFERENCE FEMA FIRM MAP 3720545800K, PANEL 5458, EFFECTIVE 6/15/22 (BASE FLOOD = 9 FEET±).

50' R/W
CLEARING LIMIT
25' ℄ 25'
VARIES 3.0' 6.0' 6.0' 3.0'
1"/FT. (TYP) 1/4" PER FT. (TYP) 1"/FT. (TYP)
4:1 MAX 4:1 MAX
PROPERTY LINE
EXISTING GRADE VARIES SEE SITE PLAN
PROPOSED 6" CABC
PROPOSED SAND FILL
PROPOSED RAW WATER MAIN
PROPOSED UNDERGROUND ELECTRIC
5.0' 10' U/G ELECTRICAL EASEMENT
CUT SECTION FILL SECTION

1 C305 **ROAD SECTION**

SCALE 1 inch = 30 ft

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Greenville, NC 27858
(252) 752-4135
NC License: F-0334

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Do Not Use for Construction

REVISIONS:

NO.	DESCRIPTION	DATE	BY

WATER SYSTEM IMPROVEMENTS
TOWN OF RIVER BEND
CRAVEN COUNTY
NORTH CAROLINA

SITE GRADING AND PIPING

AUGUST 22, 2025	
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2024135
DRAWING No.	W-4229
SCALE:	AS NOTED
SHEET No.	**C300**

MATCH SHEET C201

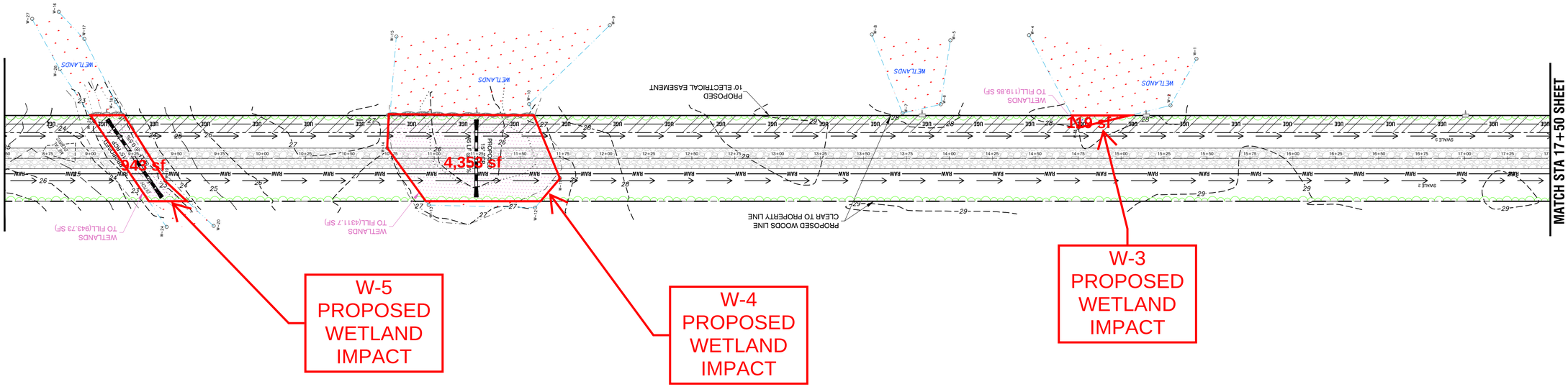
M:\MUNI\RIVER_BEND_WTP_-_MP\DS-2024135\CADD\SHEETS\W4229_C-BASE.DWG - SITECOMBO - 8/28/2025 12:04:47 PM - IRVIN MUELI

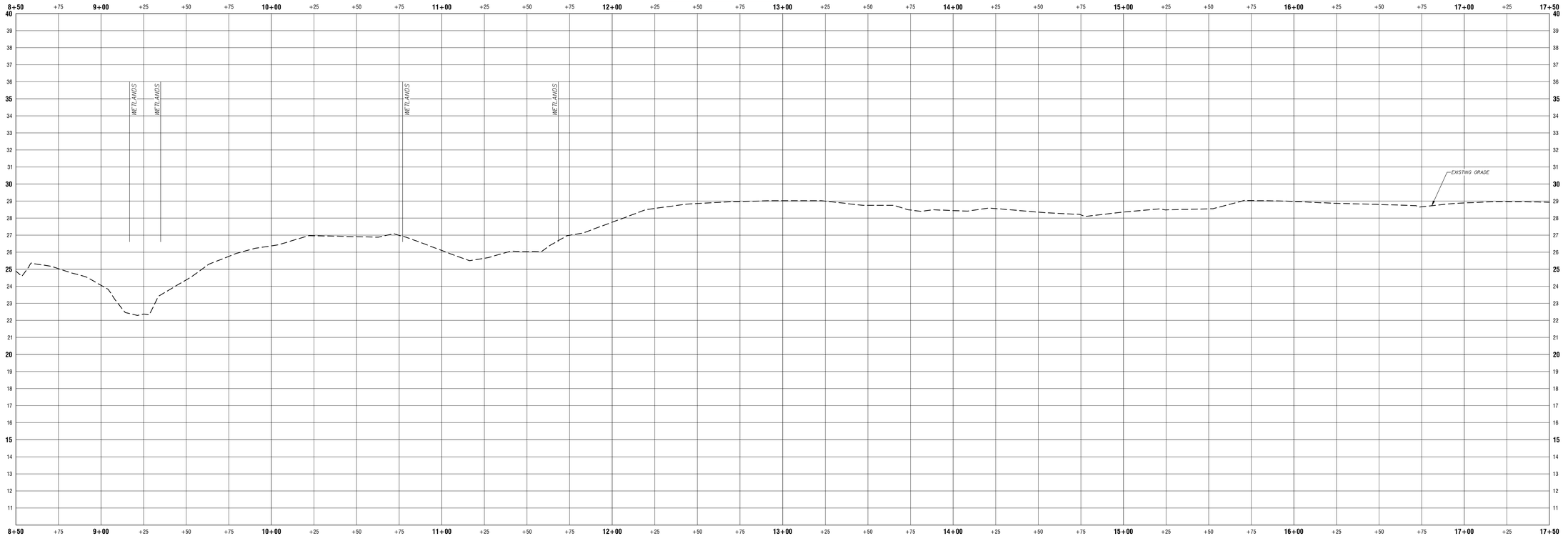
NOTES:
1. SEE SHEET C102 FOR CONTROL, EASEMENTS AND OTHER SURVEY INFORMATION.
2. FEMA 500 YEAR FLOOD AND 100 YEAR FLOOD FLOODWAY LINES FROM FRIS GIS DOWNLOAD; REFERENCE FEMA FIRM MAP 3720545800K, PANEL 5458, EFFECTIVE 6/15/22 (BASE FLOOD = 9 FEET±).

SCALE 1 inch = 100 ft (100' 0 50' 100')

MATCH STA 8+50 SHEET C306

MATCH STA 17+50 SHEET





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REVISIONS:

NO.	DESCRIPTION	DATE	BY

WATER SYSTEM IMPROVEMENTS
TOWN OF RIVER BEND
CRAVEN COUNTY NORTH CAROLINA

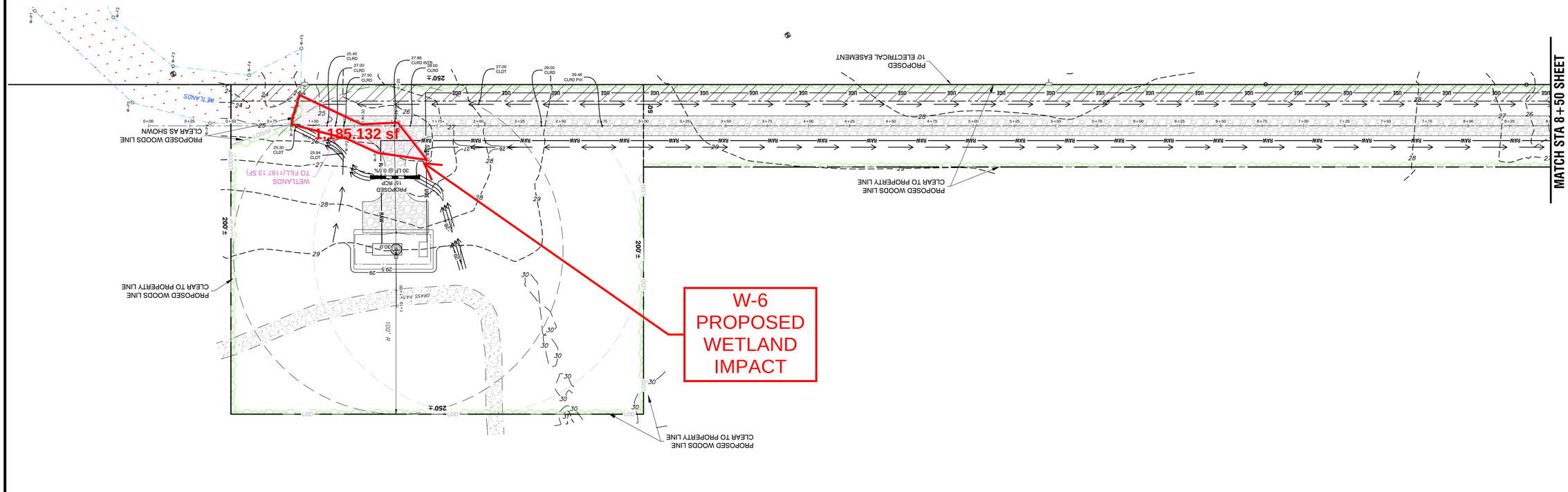
WELL SITE NO 5 ACCESS
PLAN - PROFILE

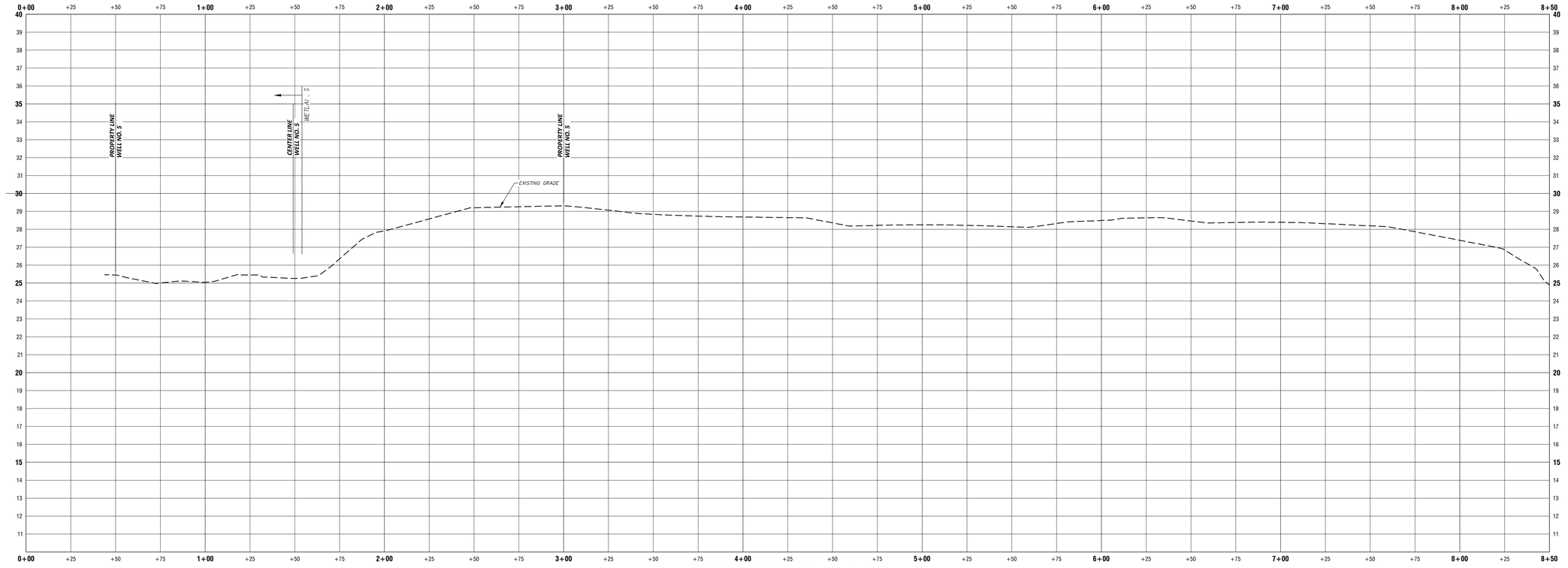
AUGUST 22, 2025	
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2024135
DRAWING No.	W-4229
SCALE:	AS NOTED
SHEET No.	C307

M:\MUNI\RIVER_BEND-WTP_IMPVTS-2024135\CADD\SHEETS\W4229 C-BASE.DWG - WELL5ACCESS - 8/26/2025 12:05:20 PM - IRVIN.MIZELI

NOTES:
1. SEE SHEET C102 FOR CONTROL, EASEMENTS AND OTHER SURVEY INFORMATION.
2. FEMA 500 YEAR FLOOD AND 100 YEAR FLOOD FLOODWAY LINES FROM FRIS GIS DOWNLOAD; REFERENCE FEMA FIRM MAP 3720545800K, PANEL 5458, EFFECTIVE 6/15/22 (BASE FLOOD = 9 FEET±).

SCALE 1 inch = 100 ft (100' 0 50' 100')





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REVISIONS:

NO.	DESCRIPTION	DATE	BY

WATER SYSTEM IMPROVEMENTS
TOWN OF RIVER BEND
CRAVEN COUNTY NORTH CAROLINA

WELL SITE NO 5 AND ACCESS
PLAN - PROFILE

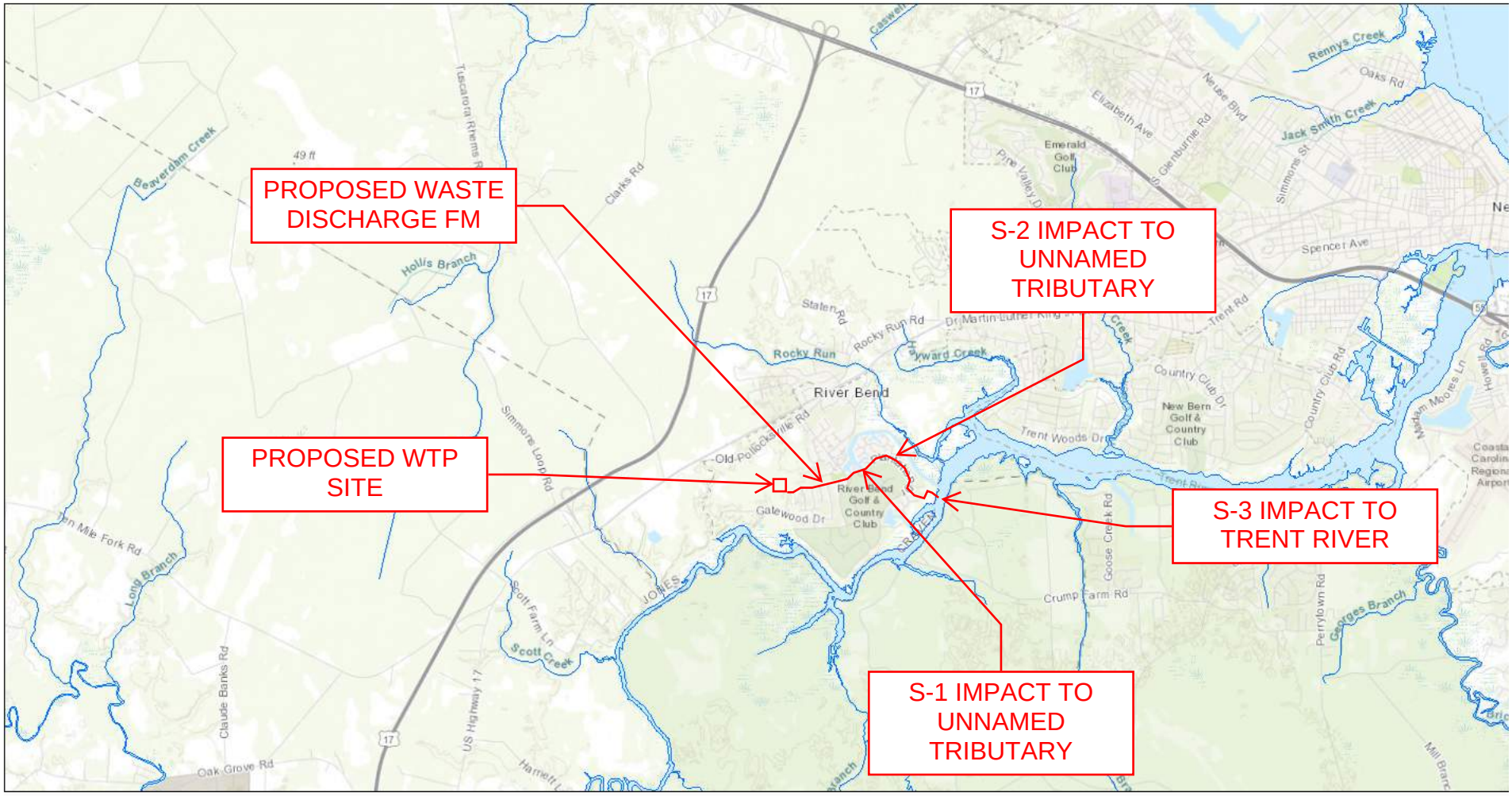
AUGUST 22, 2025	
DESIGNED BY:	GJC
DRAWN BY:	JIM
CHECKED BY:	GJC
PROJECT No.	2024135
DRAWING No.	W-4229
SCALE:	AS NOTED
SHEET No.	C306

M:\MUNIVRIVER_BEND\WTP_IMPVTS-2024135\CADD\SHEETS\W4229-C-BASE.DWG - WELL5 - 8/28/2025 12:05:14 PM - IRVIN.MIZELI

FIGURE 6e

PROPOSED STREAM IMPACTS

Surface Water Map



8/8/2025, 4:50:44 PM

1:73,336

0 0.5 1 2

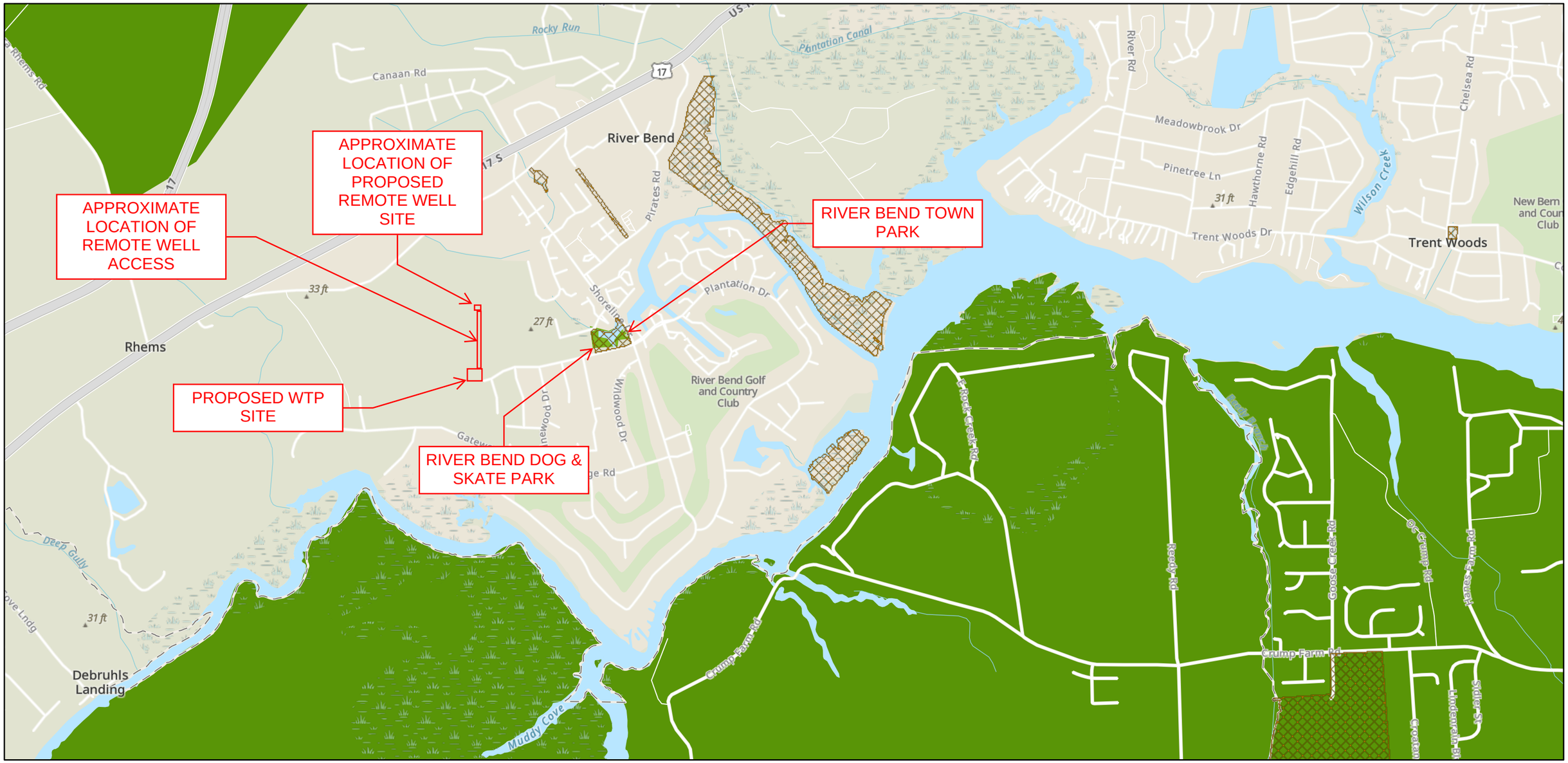
0 1 2

NCDENR - Division of Water Resources, S
DOT, Esri, HERE, Garmin, INCREMENT P
NGA, EPA, USDA

FIGURE 6f

PUBLIC LANDS MAP

1DWXUDO +HULWDJH 3URJUDP 0DQDJHG $UHDV



0DQDJHG $UHDV

'HGLFDWHG 1DWXUH 3UHVHUYH

5HJLVWHUHG +HULWDJH $UHD

&RQVHUYDWLRQ (DVHPHQW

2WKHU 3URWHFWHG /DQG

)HGHUDO 2ZQHUVKLS

6WDWH 2ZQHUVKLS

3ULYDWH

*RYHUQPHQW 2ZQHUVKLS

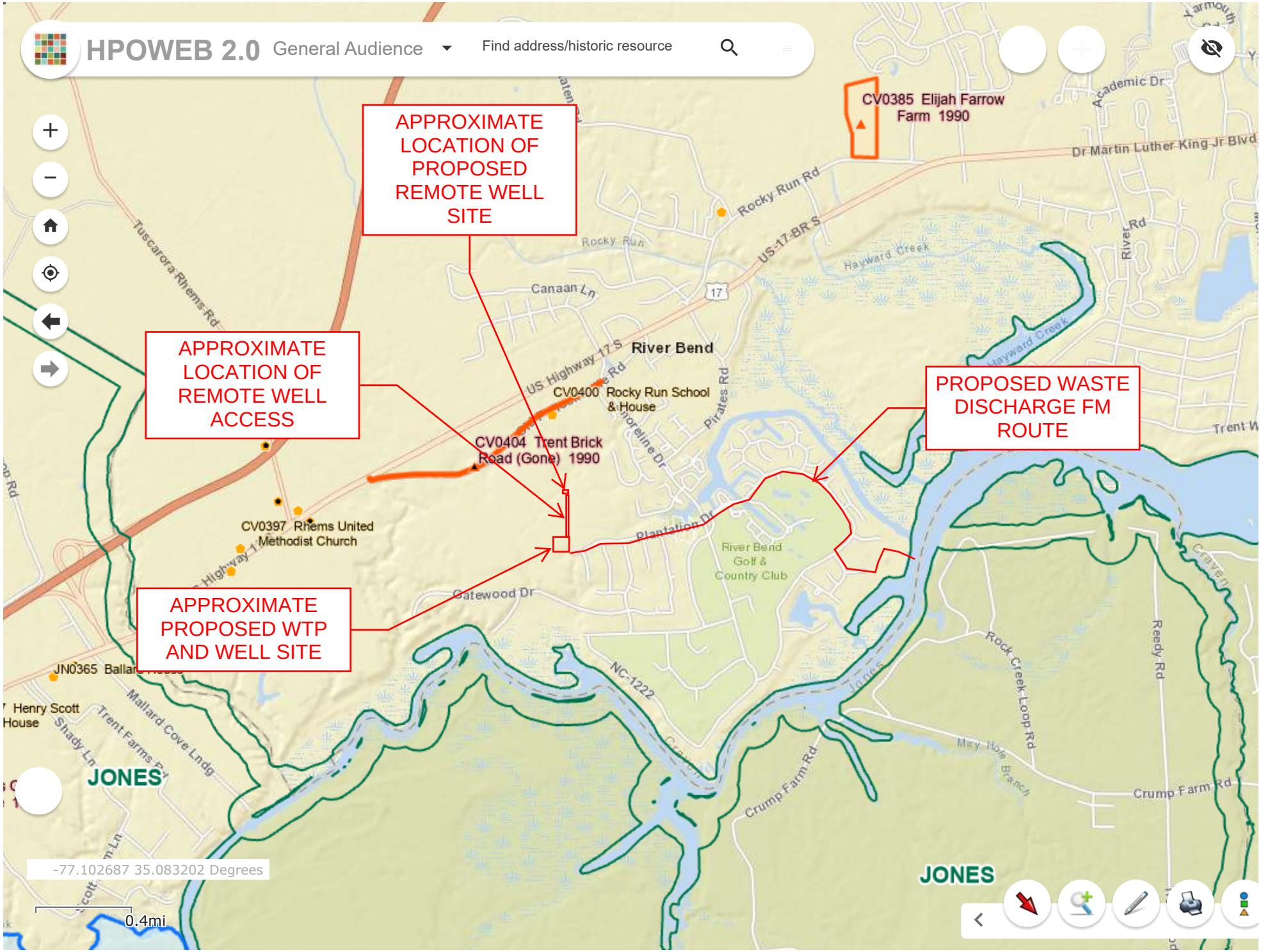
PL

NP

(VUL 1$6$ 1*$ 86*6)(0$ 6RXUFHV (VUL 7H
)$2 12$$ 86*6 F 2SHQ6WUHHW0DS FRQWULE
8VHU &RPPXQLW\

FIGURE 6g

HISTORIC FEATURES MAP


HPOWEB 2.0
General Audience
Find address/historic resource
APPROXIMATE LOCATION OF PROPOSED REMOTE WELL SITE
APPROXIMATE LOCATION OF REMOTE WELL ACCESS
APPROXIMATE PROPOSED WTP AND WELL SITE
PROPOSED WASTE DISCHARGE FM ROUTE
CV0385 Elijah Farrow Farm 1990
CV0400 Rocky Run School & House
CV0404 Trent Brick Road (Gone) 1990
CV0397 Rhems United Methodist Church
JN0365 Ballard House
Henry Scott House
River Bend
River Bend Golf & Country Club
Rocky Run Rd
US-17-BR S
US Highway 17 S
Dr Martin Luther King Jr Blvd
Academic Dr
Canaan Ln
Tuscarora Rhems Rd
Pirates Rd
Shoreline Dr
Plantation Dr
Gatewood Dr
NC-1222
Rock Creek Loop Rd
Reedy Rd
Crump Farm Rd
Mallard Cove Lndg
Trent Farms Pl
Shady Ln
JONES
-77.102687 35.083202 Degrees
0.4mi